AN INTERPRETATION OF KEY STAKEHOLDERS’ EXPERIENCES USING EDUCATIONAL ONLINE TECHNOLOGIES IN BLENDED TERTIARY ENVIRONMENTS:

A PHENOMENOLOGICAL STUDY

THESIS

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Declaration

Originality

I hereby certify that to the best of my knowledge and belief, this thesis is my own work and contains no material previously published or written by another person except where due references and acknowledgements are made. It contains no material which has been previously submitted by me for the award of any other degree or diploma in any university or other tertiary institution.

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I hereby certify that this thesis is submitted in the form of a series of published papers of which I am the author. I have included as part of the thesis, a written statement from each co-author; endorsed in writing by the Faculty Assistant Dean (Research Training), attesting to my contribution to any jointly authored papers.

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Kimberley Tuapawa
PhD student

February, 2017
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This work is a tribute to those of us who have battled through unexpected personal odds to climb a mountain that at times seemed impossible. It is for those of us who set out on a sprint, young and idealistic, and finished a marathon, experienced and resilient.

Kimberley Tuapawa
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Abstract

Although educational online technologies (EOTs) have transformed the delivery of learning in higher education, significant challenges have impeded their effectiveness, preventing widespread implementation. The prevalence of these challenges suggests that tertiary education institutes (TEIs) have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. While it is critical that TEIs adapt to meet these needs, doing this effectively requires that they have current, in-depth knowledge of their stakeholders’ EOT challenges and experiences, at a level that enables the delivery of informed, relevant, and meaningful support.

Using a phenomenological approach, this research aimed to build understandings of key stakeholders’ EOT experiences to determine their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. It was completed in two stages. Firstly, the preliminary research aimed to establish a robust foundation of current knowledge. It verified and updated key issues in the literature through a qualitative analysis of data from 13 blended learning experts in New Zealand, Australia, and Canada. Secondly, the phenomenological research aimed to make an interpretation of key stakeholders’ EOT experiences. It examined and classified the experiences of 10 students and 10 teachers from New Zealand and Australia, and interpreted their phenomenological meanings through an abstraction, articulation and synthesis of local and global themes. These interpretations, which included descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use with different key entities, and assist TEIs to address EOT challenges and meet stakeholders’ needs. The research also proposed the development of a digital tool that could conceptualise phenomenological data and further help TEIs make practical application of stakeholders’ EOT experiences.

This research developed and unified two extensive systems of data, aggregating a collection of highly contextualised phenomenological interpretations with a spectrum of expertly-verified literature, to form an elaborate and multi-dimensional structure of knowledge. Its output was richly narrated across a dual modularised set of publications, which illuminated and synergised a wide array of contemporaneous EOT issues with compelling firsthand insights into the phenomena of EOT use.

1 Its guiding questions were: What are the EOT experiences of key stakeholders in BTEIs? What interpretations can be made from their meanings, and how can these be used to support stakeholders’ EOT needs?
Structure of thesis

This document has been structured using the *thesis by publication* format, a compilation style in which the research output is presented as a series of papers\(^2\). As demonstrated in Figure 1, this thesis contains 13 publications, which have been organised into two sets to represent the output from the two key stages of research: the *preliminary* research (7 papers) and *phenomenological* research (6 papers). This modularised format enables the papers to be used singularly to pinpoint specific issues, or in groups to link homogenous sections of research, or altogether to deliver a broad spectrum of knowledge. Like stackable snap-lock containers, they individually ‘un-clip’ to become unique standalone components, but also ‘join back’ collectively, thematically, and structurally to form a synergistic and coherent whole.

*Figure 1: Structure of thesis*

![Diagram of thesis structure](image)

The by-publication route was selected as a means to accommodate the output of this research, and its progression through a framework of discrete, yet interconnected stages (see Figure 2). The format helped unify a series of distinguishable and linked knowledge compartments into a framed system, capable of supporting a meaningful contribution to this field of research. From the researcher’s perspective, this route also presented an exciting challenge: to assume the textual identity of an expert and write with commensurate scholarly authority early in the candidature. The challenge of undertaking a task of this nature, and the appeal of gaining a scholarly head start through published works, further prompted the researcher to pursue this opportunity.

This document is structured in two parts: 1) Research and 2) Publications.

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\(^2\) The selection of papers included in a thesis by publication, is created in addition to the sections found in a traditional narrative thesis.
Part 1  Research

Part 1 begins in Section 1, which provides an introduction to the research, and its main elements, including the aims, objectives and background. The next sections present this study’s two principal stages of research: 1) the preliminary research, which verifies and updates key issues in the literature, and establishes a rationale for the selection of key stakeholders for the phenomenological research, and 2) the phenomenological research, which analyses and interprets key stakeholders’ EOT experiences. The final sections provide a comprehensive discussion of findings, and a detailed set of recommendations for effective EOT use, which includes a proposal for the practical application of the phenomenological interpretations. In total, Part 1 contains five sections.

Section 1  Introduction
This section defines the key elements or ‘foundation blocks’ of the research: the problem statement, aims, definitions, key questions, context, objectives, structure, background, significance, and methodology. These are introduced alongside a modular framework, which conceptualises and unifies the key components, and provides a visual overview of the entire research process.

Section 2  Preliminary research
This part presents a detailed account of the qualitative methods and procedures used to complete the key phases of preliminary research, including participant sampling, data collection, data transcription, data analysis, and publication output. It also presents the content summaries of all preliminary publications.

Section 3  Phenomenological research
This section firstly presents a background to the philosophy of phenomenology. It then outlines its limitations, and provides a statement of subjectivity, a first-person narrative by the researcher about her influence over the analysis of data. It then presents a comprehensive account of the qualitative methodology, methods and procedures used to complete the key phases of phenomenological research, including participant sampling, data collection, data transcription, data analysis, and publication output. This section also details the process of thematic abstraction, and documents the local and global themes as a series of interpretations of the phenomena. It concludes with content summaries of all phenomenological publications.
Section 4 Discussion
This part articulates the *global* themes abstracted from the descriptions of key stakeholders’ EOT experiences, categorises them to reflect the nature of their interactions with other key entities, and triangulates these findings with literature and data from preliminary research to provide a comprehensive synthesis of knowledge.

Section 5 Recommendations
This section provides a detailed set of recommendations for the effective use of EOTs, as informed through the interpretations of key stakeholders’ EOT experiences. The recommendations are structured into categories that reflect the nature of stakeholders’ interactions with other key entities, and aim to assist TEIs in their efforts to address EOT challenges, and support stakeholders’ needs.

Section 6 Conceptual application
This part presents a conceptual tool for presenting phenomenological interpretations, and proposes its development as a way to help TEIs make practical application of key stakeholders’ EOT experiences.

Section 7 Conclusion
A summary of evidence demonstrating how this study fulfils the research aims and objectives, addresses the central questions, and delivers the expected outcomes.
Part 2  Publications

Part 2 contains the published output of this research, 13 publications in total, the appendices, and bibliography. Papers 1-7 form the output of the preliminary research. Their purpose was to verify and update key issues in the literature, and establish a rationale for the selection of key stakeholders for the phenomenological research. Papers 8-13 form the output of the phenomenological research. Their purpose was to present the local themes of this research through written interpretations documenting key stakeholders’ EOT experiences with other key entities.

Section 7  Publications


During 2015, IGI Global, publishers of the IJWLTT journal advised the author that this paper had been selected for inclusion as a chapter in a new book entitled “Revolutionizing Education through Web-Based Instruction”. Paper 4, which is a revised edition of Paper 3, contains new references, and insights from feedback with blended learning experts.


Released in March 2016, this book was a comprehensive, multi-disciplinary exploration of the emerging digital opportunities available to educators. It presented contemporary theoretical frameworks as well as practical research findings that supported the use of new computer-assisted teaching techniques.


Paper 8

Paper 9

Paper 10

Paper 11

Paper 12

Paper 13

Section 8 Appendices
These sections provide additional documentation that supports the main body of research.

Section 9 Bibliography
An aggregation of all bibliographic references cited in this study.
1 Introduction

Educational online technologies (EOTs) have dynamically transformed the delivery of higher education, creating extraordinary opportunities for enhanced learning and teaching. In an era of unparalleled online growth, their rapid emergence and improved functionalities have stimulated online engagement, engendering significant advances across the higher education sector. Traditional learning spaces have evolved into vibrant blended tertiary environments (BTEs), providing tertiary education institutes (TEIs) with an exciting means through which to engage and expand methods of knowledge delivery.

These digital transformations foreshadow exciting prospects for teachers and students, the key stakeholders in BTEs. Predictions about future online learning suggest that as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (Anderson, Boyles, & Rainie, 2012, p. 17). This is now happening, as “millions of students [take] online courses... [giving] evidence that this modality is meeting a clear demand” (Allen & Seaman, 2015, p. 21). Similar forecasts indicate that the digital delivery of course-work via online technologies will revolutionise higher education (Anderson et al., 2012). Results already show that “since 2010, there has been an increase in the use of most technologies for learning” (Gosper, McKenzie, Pizzica, Malfroy, & Ashford-Rowe, 2014, p. 298).

Despite this significant growth and demand for online learning, considerable obstacles impede the effective use of EOTs. Some of these involve attitudinal pre-dispositions and organisational barriers, and insubstantial training (Panda & Mishra, 2007). Others involve a lack of funding for digital resources, changing student demographics, and inadequate or insufficient facilities (Merfert, 2016; Peppers, 2016). Still others include resistance to change, ineffective EOT usage, lack of motivation, technical constraints, and accessibility (Tuapawa, 2016a). These challenges pose a clear risk to the future success of BTEs (Moskal, Dziuban, & Hartman, 2013), and create difficulties for key stakeholders as they strive to support digital developments and fulfil their roles effectively.

Significant efforts have been made to better understand EOT challenges, which has resulted in considerable research, with varied contributions to the literature. Some studies have focussed on technology integration in blended environments (Moore, 2013), the affordances and effectiveness of online technologies in higher education (Arenas, 2015; El-Khalili & El-Ghalayini, 2015), barriers to the adoption of online learning (Bacow, Bowen, Guthrie, Lack, & Long, 2012), and e-learning challenges faced by academics (Islam, Beer, & Slack, 2015). However, while these studies contribute useful perspectives, and though the “research foundation is rich” (Passey, 2013, p. 209), not all problems have been adequately identified and addressed.
The persistence of these challenges suggests that TEIs have experienced gaps in their understandings about the reality of key stakeholders’ EOT activities and needs. Over time, these needs have shifted and evolved, and in an environment of rapid transformation and technological change have not been understood and addressed effectively. The dynamic and competitive nature of the environment in which TEIs operate means that their relevance is dependent on their ability to evolve and adapt to meet their stakeholders’ needs. However, doing this effectively requires that TEIs have current, in-depth understandings of their stakeholders’ EOT challenges in a newer, more relevant context, and at a level that enables the delivery of informed, relevant, and meaningful support.

Through a phenomenological approach, this research aimed to build understandings of key stakeholders’ EOT experiences to determine their current EOT needs and challenges, and to make recommendations for effective EOT use that would assist TEIs in providing support. It was completed in two principal stages. Firstly, the preliminary research, which aimed to establish a robust foundation of current knowledge for the phenomenological research, reviewed and analysed the key issues in the literature, which included EOTs in BTEs, EOT classifications, key stakeholders in BTEs, and stakeholders’ EOT challenges. Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, it verified and updated these key issues, and presented the outcomes of the analysis across a series of seven preliminary publications. These papers identified the EOTs in BTEs and discussed their functionality (Tuapawa, 2013; Tuapawa, in press), proposed a multi-dimensional EOT classification system (Tuapawa, Sher, & Gu, 2014, 2016), re-evaluated the identity of key stakeholders in BTEs (Tuapawa, 2016b), identified and discussed their EOT challenges (Tuapawa, 2016a), and elaborated on a key EOT challenge (resistance to change)(Tuapawa, 2015).

Secondly, the phenomenological research made an interpretation of key stakeholders’ EOT experiences, to establish their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. Using the methodology of interpretive phenomenology and a 5-step qualitative analysis process, it examined the descriptions of EOT experiences from 10 students and 10 teachers in New Zealand and Australia, to understand their use of different EOTs to interact with other key entities: students, teachers, and content. It then interpreted the meanings of these phenomena through an abstraction and articulation of local and global themes. The global theme interpretations delivered broad understandings about the meanings of stakeholders’ EOT experiences with other students, other teachers and content. The local theme interpretations developed meanings that were specific to stakeholders’ use of individual EOTs. These were presented across a series of six phenomenological publications, which documented students’ EOT experiences with teachers (Tuapawa, 2017b), students’ EOT experiences with other students (Tuapawa, 2016c), students’ EOT experiences with content with content

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3 The global theme interpretations are presented in the discussion section of this document.
Tuapawa, 2017a), teachers’ EOT experiences with students (Tuapawa, 2016e), teachers’ EOT experiences with other teachers (Tuapawa, 2017e), and teachers’ EOT experiences with content (Tuapawa, 2017f). The interpretations included descriptions of stakeholders’ EOT challenges, which contributed to a frank and realistic portrayal of the phenomena, and helped in developing an informed set of recommendations for effective EOT use.

Additionally, this research proposed the concept of a tool that sought to make practical application of the interpretations, and that if developed could be used to deliver TEIs with real-time digital access to their key stakeholders’ EOT data. It conceptualised the display of a software interface, with various levels of data access points that could present data about stakeholders’ experiences in an immediate and visually attractive manner, and serve to enhance their ability to make effective and informed decisions about delivering EOT support.

This study has contributed to the overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a first-hand insight into the phenomena of key stakeholders’ EOT experiences. Its insights about educational technologies, their multi-dimensional aspects, and current applications within contemporaneous higher education contexts, will assist TEIs to keep abreast of technological developments. The outcomes will also assist them to champion and encourage the effective use of EOTs, while delivering relevant EOT support to their key stakeholders. The study’s proposal and development of a new multi-dimensional framework for categorising EOTs will assist TEIs in understanding, prioritising, and applying new tools. Its re-evaluation of stakeholders’ identities will help TEIs clarify and understand the roles and contributions of critical BTE groups, and will supply key stakeholders with a basis for building awareness of peers’ and colleagues’ experiences. The study’s verification of EOT challenges and realistic portrayal of the phenomena will strengthen TEIs’ understandings of stakeholders’ needs. Its interpretations of key stakeholders’ EOT experiences will assist TEIs in their efforts to meet stakeholders’ EOT needs, tackle EOT challenges and deliver relevant and meaningful EOT support.

This document was prepared and submitted by Kimberley Tuapawa, full-time distance research student from Hawkes Bay, New Zealand as a thesis by publication for the degree of Doctor of Philosophy (Building). Its output comprises a collection of 13 complementary papers, all of which have been published or accepted for publication in internationally peer-reviewed journals, book chapter(s), or conference proceedings. The timeframe for this research was February 2013 – February 2017.

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4 The recommendations were presented across six key categories of interactions: student-to-teacher, student-to-student, student-to-content, teacher-to-student, teacher-to-teacher, and teacher-to-content.
1.1 Problem statement

Although EOTs have transformed the delivery of learning in higher education, significant EOT challenges have impeded their effectiveness, preventing widespread implementation (Nagel, 2013). The continuance of these challenges suggests that TEIs have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. Over time, these needs have shifted and evolved, and in an environment of rapid technological change have not been understood and addressed effectively.

The dynamic nature of the environment in which TEI’s operate means that their relevance is dependent on their ability to evolve and adapt to meet their stakeholders’ needs. However, doing this effectively requires that TEIs have current, in-depth understandings of their stakeholders’ EOT challenges, at a level that enables the delivery of informed, relevant, and meaningful support.

1.2 Aim

The aim of this research is: 1) to understand and interpret key stakeholders’ EOT experiences in BTEs, and 2) make recommendations for effective EOT use.

An expansion of this aim is expressed to provide a greater level of detail and meaning to the purpose of this study, and clarify its link to the problem statement. It is: 1) to understand and interpret students’ and teachers’ EOT experiences (which include challenges) in BTEs, to provide a basis from which to 2) make recommendations for effective EOT use (that assist TEIs in their efforts to meet stakeholders’ EOT needs, tackle EOT challenges and deliver relevant and meaningful EOT support).
1.3 Definitions

The following terms are explained to establish their meaning and relevance in the context of this study:

**EOTs:** Educational online technologies (EOTs) are web-based software programs that are used to facilitate learning and teaching. This term is more specific than the commonly used phrase educational technology, which is very broad in its scope definition as a design science or research interest. In this research, EOTs are essentially the tools themselves, examples of which are identified in Papers 1, 2 (Tuapawa, 2013; Tuapawa, in press). This study focuses on the experiences of the use of those tools, and interprets the meaning of these phenomena.

**Key stakeholders:** Key stakeholders are the individuals who are central to the learning and teaching processes and outcomes in a BTE. This research defines them as teachers and students, with the rationale for their use based on the outcomes from a study by the author (see Paper 5) (Tuapawa, 2016b), which found students and teachers to be among those most prominently and frequently identified as key stakeholders in BTEs.

**EOT experiences:** In a phenomenological sense, EOT experiences are the phenomena or the experiences of a phenomenon (of EOT use), from which meaning is derived and interpreted. The interpretations of the phenomena of key stakeholders’ EOT use was the primary product of this research.

Note: Interpreting the meanings of key stakeholders’ EOT experiences was a key step to understanding their EOT needs. For the interpretations to reflect the phenomena in a realistic manner so that key stakeholders’ needs could be determined authentically, it was necessary that their EOT experiences include descriptions of any EOT challenges faced. As noted in the problem statement, it was the prevalence of these challenges that initially indicated a gap in knowledge about their needs. Therefore, the interview questions in the phenomenological stage of this research were carefully constructed to elicit from stakeholders, descriptions of experiences (Moustakas, 1994) that included EOT obstacles and barriers. The frank and realistic portrayal of the phenomena helped develop understandings and build interpretations of the experiences. This in turn provided a basis from which to make recommendations for effective EOT use, which could be
used to assist TEIs in their efforts to meet stakeholders’ EOT needs, tackle EOT challenges, and deliver support.

The interview questions were also framed to stimulate recollections of different kinds of EOT experiences, according to stakeholders’ interactions with different key entities: students, teachers, and content – to reveal distinctions between phenomena occurring in different but pivotal (BTE) relationships, and to create a structure in which to establish the similarities in or essences of the EOT experiences, or phenomena.

BTEs:

Blended tertiary environments (BTEs) are locations in which higher education-level learning and teaching takes place through a combination of face-to-face delivery and online methods. BTEs provided the “real world contextual conditions” in which this qualitative inquiry was made (Yin, 2015, p. 9). The term BTE was coined from three separate terms, which together describe the context in which the research would occur. The importance of its meaning lies with the value and practicality inherent to the combined definition of its three key elements: blended, tertiary and environment. When used together, these terms accurately represent the context of this study. This phrase uses the term environment, so as not to limit its scope and meaning to a physical institute, but to denote its inclusion of physical and online spaces within which, as the literature indicates, learning and teaching occurs (Annetta, Folta, & Klesath, 2010, p. 73). The term tertiary is used interchangeably with higher education, and refers to post-compulsory education.

1.4 Questions

The central question in a phenomenological study is often in the form ‘What are the lived experiences of (a group) around (a phenomenon)?’ (Simon & Goes, 2012). In this investigation, the questions that gave focus to the research were carefully constructed so as to guide and direct the phenomenological process (Moustakas, 1994). They are:

1. What are the EOT experiences of key stakeholders in BTEs?
2. What interpretations can be drawn from their meanings?
3. How can these meanings be used to support stakeholders’ EOT needs?
1.5 Context

Discerning the context in which a study of the phenomena was to occur was critical to the aim of the research, and to the integrity of the phenomenological approach. In this study, key stakeholders’ experiences and the understandings of these phenomena were contextualised in BTEs, a space closely associated to EOT use, the object of the phenomena. In their interviews, phenomenological research participants were asked for a “description of a situation in which [they had] experienced the phenomenon” (Englander, 2012, p. 25). The experiences would therefore be situated within or “connected to a specific context in which the phenomenon [was] experienced” (Englander, 2012, p. 25).

1.6 Objectives

The four objectives of this research are:

1. To review and analyse the literature for key issues and developments about EOTs in BTEs, EOT classifications, key stakeholders, and their EOT challenges (Papers 1-7)
2. To verify and update these key issues through a qualitative analysis of preliminary data, and provide an informed basis from which to begin phenomenological research (Papers 1-7)
3. To analyse key stakeholders’ (students and teachers) EOT experiences - their use of various EOTs to interact with other entities (students, teachers, and content) - and interpret the meanings of these phenomena through an abstraction, articulation and synthesis of local and global themes (Papers 8-13)
4. To recommend methods for effective EOT use that will assist TEIs to meet stakeholders’ EOT needs, tackle EOT challenges and deliver relevant and meaningful EOT support (Papers 8-13)

Each one of the four objectives corresponds to one or more of the publications contained in Section 6 and listed in Figure 2.

1.7 Outcomes

The four outcomes from this research are:

Outcome 1: A robust foundation of current knowledge about the key issues in the literature has been developed (Obj 1)
Outcome 2: Key issues have been verified and updated through qualitative analysis of preliminary data (Obj 2)
Outcome 3: Key stakeholders’ EOT experiences have been interpreted through phenomenological analysis of data (Obj 3)

Outcome 4: Recommendations for effective EOT use that support stakeholders’ needs have been made (Obj 4)

Each one of the four outcomes corresponds to each one of the four objectives described in Section 1.6. Figure 2 presents a conceptual model that demonstrates the link between the aim, objectives, research stages, and research output of this research.

1.8 Structure

The structure of this research was comprised of two primary components 1) the preliminary research, and 2) the phenomenological research. This section expands that structure from two stages to four stages to provide additional details about the research steps, and their links to the objectives and outputs. The four new stages are:

1. **Preliminary research**: Review and analysis of key issues (Obj 1)
2. **Preliminary research**: Verification and update of key issues (Obj 2)
3. **Phenomenological research**: Analysis and interpretation of experiences (Obj 3)
4. **Phenomenological research**: Recommendations for effective EOT use (Obj 4)

Stages 1 and 2 of this expanded framework outline the key steps taken to complete the preliminary research, and stages 3 and 4 outline those taken to complete the phenomenological research. As indicated above, each one of the four stages corresponds to each one of the four objectives. While reading this section, please refer to Figure 2, which provides a visual representation of these stages and a conceptual overview of the entire research process.

1.8.1 Preliminary research: Review and analysis of key issues

   a. **EOTs**: Identify, review and describe functionality and use of EOTs in BTEs (Paper 1)
   b. **EOT classifications**: Identify and review existing EOT taxonomies, augment these to include EOTs (from 1). Establish rationale for more robust taxonomy, re-engineer existing taxonomies, and integrate these into (and propose) a new multi-dimensional EOT classification system (Paper 3)
   c. **Stakeholders**: Identify key stakeholders in BTEs, and describe their roles
   d. **EOT challenges**: Identify and describe key stakeholders’ EOT challenges
   e. Research output: Section 1.9, 1.11, Section 2, Paper 1, Paper 3.
1.8.2 Preliminary research: Verification and update of key issues

a. Inform and select 13 expert participants using expert sampling strategy
b. Conduct and record qualitative semi-structured interviews to obtain data about EOTs, EOT classifications, key stakeholders, and EOT challenges
c. Transcribe data from recordings, import and compile interview transcripts
d. Disassemble data (code using nodes), and reassemble data (using memos to develop understandings)
e. Interpret meanings of data, verify and update key issues using experts’ feedback, establish rationale for selection of key stakeholders for phenomenological research
   i. EOTs: Identify, describe and verify use of (35) different EOTs in BTEs, summarise their characteristics using multi-dimensional taxonomy (Paper 2)
   ii. EOT classifications: Revise Paper 3, verify use and classification of EOTs (Paper 4)
   iii. Stakeholders: Re-evaluate and verify identity of key stakeholders, propose current list of 10 key stakeholders, identify those who contribute most significantly to BTEs (Paper 5)
   iv. EOT challenges: Identify, describe and verify (over 17) EOT challenges, and make recommendations for addressing these (Paper 6). Elaborate on a key challenge: resistance to change (Paper 7)

1.8.3. Phenomenological research: Analysis and interpretation of key stakeholders’ EOT experiences

a. Inform and select 20 key stakeholder participants (10 students, 10 teachers) using purposive sampling strategy.

b. Conduct and record phenomenological interviews to obtain descriptions of students’ and teachers’ EOT experiences using various different EOTs to interact with various other key entities: students, teachers, and content
c. Transcribe data from recordings, import and compile interview transcripts
d. Disassemble data (code using nodes) and reassemble data (using memos to develop understandings), categorising experiences to reflect stakeholders’ EOT interactions with other entities, as follows:
   i. Students’ experiences
      a. Student-to-teacher
      b. Student-to-student
      c. Student-to-content

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5 Participant selection was informed by the preliminary research, which in part identified key stakeholders in BTEs.
ii. **Teachers’ experiences**
   a. Teacher-to-student
   b. Teacher-to-teacher
   c. Teacher-to-content

e. Interpret meanings of phenomena through thematic analysis involving abstraction of both local and global themes (see Figure 4):
   i. **Local themes**: Drawn from stakeholders’ use of various different EOTs to interact with various other key entities
   ii. **Global themes**: Involved broader issues, ideas and theories, which explained reasons for specific phenomenological occurrences

f. Develop **local theme interpretations** into phenomenological publication output
   i. Interpretations of students’ EOT experiences with teachers (*Paper 8*)
   ii. Interpretations of students’ EOT experiences with students (*Paper 9*)
   iii. Interpretations of students’ EOT experiences with content (*Paper 10*)
   iv. Interpretations of teachers’ EOT experiences with students (*Paper 11*)
   v. Interpretations of teachers’ EOT experiences with teachers (*Paper 12*)
   vi. Interpretations of teachers’ EOT experiences with content (*Paper 13*)

g. Develop global theme interpretations, triangulate to the literature and preliminary research, and generate new theories, documenting all of this in thesis discussion

h. Research output: **Sections 3 and 4, Paper 8, Paper 9, Paper 10, Paper 11, Paper 12, Paper 13.**

### 1.8.4. Phenomenological research: Recommendations for effective EOT use

a. Use interpretations to inform recommendations for effective EOT use, and present these across the six categories of interactions

b. Develop conceptual model for representing EOT experiences, and propose its development and use as a method for providing TEIs with efficient access to key stakeholders’ phenomenological data

c. Research output: **Section 5, Section 6.**

*Figure 2* demonstrates a conceptual overview of this expanded research structure. In this model, all of the key parts are labelled and colour-coded (see Key). Through its framework of linked components, the model shows a linear connection between all of the elements in the research process. Its bottom-up display serves to symbolise the project’s course from beginning to end. Analogous to a house-building project, it began at the base of the structure, with the foundation ‘building block’ stages of preliminary research. These blocks provided the sub-structural support for the phenomenological structure or main body of the research, which developed as the study progressed, and finally culminated with the delivery of recommendations and application of phenomenological data.
The structure’s modularised presentation enables the entire research process to be separated and reassembled into grouped components which can be understood from different angles. For example, by viewing the model as an arrangement of blue elements (preliminary methods), and green elements (phenomenological methods), one can view the entire process as being comprised of two primary parts, the preliminary research and phenomenological research. From another perspective, the research can be understood through its objectives, by separating the model’s contents into four sections according to the four objectives (represented by the dark red lines with arrows).

Key

- Division of main research stages
- Preliminary analysis helps inform publications 1-7
- Discussion relates back to literature and preliminary research
- Range of methods and milestones corresponds to objectives
- Preliminary analysis informs phenomenological research, including selection of key stakeholders
- Global theme interpretations used to develop discussion and recommendations
- Local theme interpretations used to develop publications 8-13 and recommendations
- Phenomenological research steps
- Preliminary research steps

While the model in Figure 2 demonstrates the structure of research using a series of linked key components, it does not establish the connection between some of the more basic but fundamental building blocks upon which the research is based. These elements included the aim, or the destination of this endeavour; the objectives, or tasks that were undertaken to ensure the aim was reached; the outcomes, or results that demonstrated that the objectives were reached; the output, which was presented as a series of 13 publications, and the thesis, which documented all necessary components of the journey.

Figure 3 therefore, aims to show how these fundamental elements, stitched together to form a picture of completed works. The colours of the boxes indicate which stages of research each element belongs to, with the blue elements representing the components from the preliminary research, and the green elements representing those from the phenomenological research.

To further support understandings about the structure, Figure 4 provides a conceptual model that demonstrates in greater detail (than Figure 2) how the interpretation of themes from the phenomenological research were organised for discussion, presented across a series of papers, and used to inform a set of recommendations for effective EOT use.

6 These divisions are based on the structure detailed in Section 1.8.
Figure 2: Research structure, methods, and components
Figure 3: Aim, objectives, outcomes, and publications

**AIM**
1. To understand and interpret key stakeholders’ EOT experiences in BTEs, and
2. Make recommendations for effective EOT use

**OBJECTIVE 1:**
To review and analyse the literature for key issues and developments about EOTs in BTEs, EOT classifications, key stakeholders, and EOT challenges

**OBJECTIVE 2:**
To verify and update key issues through analysis of preliminary data, and provide an informed basis from which to begin phenomenological research

**OBJECTIVE 3:**
To analyse key stakeholders’ EOT experiences – their use of various EOTs to interact with other entities (students, teachers, and content) – and interpret the meanings of these phenomena through an abstraction, articulation and synthesis of local and global themes

**OBJECTIVE 4:**
To recommend methods for effective EOT use that will assist TEIs to meet stakeholders’ needs

**STAGE 1 | OUTCOME 1:**
A robust foundation of current knowledge about the key issues in the literature has been developed

**STAGE 2 | OUTCOME 2:**
Key issues have been verified and updated through qualitative analysis of preliminary data

**STAGE 3 | OUTCOME 3:**
Key stakeholders’ EOT experiences have been interpreted through phenomenological analysis of data

**STAGE 4 | OUTCOME 4:**
Recommendations for effective EOT use that supports stakeholders’ needs made

**PAPER 1:** “Educational Online Technologies in Blended Tertiary Environments: Review of Literature”

**PAPER 2:** “Educational Online Technologies in Blended Tertiary Environments: Experts’ Perspectives”

**PAPER 3:** “Pentexonomy: A Multi-Dimensional Taxonomy of Educational Online Technologies”

**PAPER 4:** “Pentexonomy: A Multi-Dimensional Taxonomy of Educational Online Technologies (Revised)”

**PAPER 5:** “Identifying Key Stakeholders in Blended Tertiary Environments: Experts’ Perspectives”

**PAPER 6:** “Challenges Faced by Key Stakeholders using Educational Online Technologies in Blended Tertiary Environments”

**PAPER 7:** “Resistance to Change Concerning the Use of Educational Online Technologies in Blended Tertiary Environments”

**PAPER 8:** “Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Teachers in Blended Tertiary Environments”

**PAPER 9:** “Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments”

**PAPER 10:** “Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments”

**PAPER 11:** “Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments”

**PAPER 12:** “Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Teachers in Blended Tertiary Environments”

**PAPER 13:** “Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments”

**THESIS:** Discussion, Recommendations, Application
Figure 4: Structure of themes, experiences, output and recommendations
1.9 Background

This section provides a background of knowledge to this research. It is based on material that was considered in a review of literature involving approximately 300 publications, undertaken as part of the preliminary research.

The literature map in Figure 5 provides an overview of the key sections and elements considered in the review, and links them to the preliminary papers. The content of the preliminary papers is based on these key sections of literature (e.g. Papers 1 and 2 relate specifically to EOTs, Papers 3 and 4 relate to EOT classifications). While these sections may be considered separately, they can also be linked together to form a coherent whole which develops a broad picture of the issues concerned with educational technologies in higher education.

Some of the elements are discussed in this section, and others were used to form the basis of introductory sections in the preliminary and phenomenological papers. A separate literature review section was therefore omitted to prevent unnecessary duplication.

Figure 5: Literature Map

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7 Please refer to Figure 3 for full list of publications.
8 In collating this document, efforts were made to avoid repetition. However, as the publications in Section 7, which form the primary output of this research required literature references, some repetition was unavoidable and necessary.
The Internet and higher education

The Internet is a phenomenal digital structure that has revolutionised the application of online technologies. Through an “ubiquitous and universal means” of interconnection, this global network (Tselentis et al., 2009, p. 9), has brought unparalleled levels of connectivity to a populace of more than 3 billion users (Davidson, 2015). Its various developments have expanded mankind’s metropolis of ‘digitalia’, with penetration rates having increased almost seven-fold, from 6.5% in 2000 to an astounding 43% in 2015 (Davidson, 2015). On a global scale, the Internet has been an “extraordinarily successful” catalyst for growth (Tselentis et al., 2009, p. 9), enabling a growing international populace to rapidly exploit an expanding array of digital services. In the area of higher education, its influence has effected great transformations, and opened new opportunities for enhanced learning and connectivity. For example, the Internet of Things (IoT), which embodies the connection of objects to the Internet, has grown to become a phenomenon that has the potential to deliver game-changing levels of educational experiences.

The Internet of Things

Experts believe that with its “ubiquitous access to computing power, high-quality online content, and social media” interactions, the IoT could “improve practically every aspect of [an] institution’s engagement with all parties” (Asseo, Johnson, Chalapathy, & Costello, 2016, p. 1). Its implementation has huge implications for TEIs. Not only could it remove traditional barriers to learning and teaching, but would enable them to tailor and innovate their operations to digitally engage students. TEIs could, through an analysis and predication of students’ interactions, provide a 1:1 journey that is personalised and unique from enrolment to orientation and through study (Asseo et al., 2016). Its highly flexible features would optimise methods of learning and dissemination, enabling key stakeholders to consume vast amounts of content and deliver knowledge effectively. Students could attend any class, at any time, from any device. Teachers could enrich their student-based interactions, and champion robust, hybrid learning environments” (Asseo et al., 2016, p. 1).

The Internet has also stimulated other dynamic developments in higher education. Ambitious new endeavours to deliver online education to learners have been bolstered through the use of massively open online course (MOOC) ventures, such as Coursera9, edX, FutureLearn and Udacity. These platforms have experienced dramatic growth, with enrolment numbers climbing at an astonishing rate. In 2015, for example, over 35 million students had enrolled in at least one course – an increase of an estimated 16-18 million from the previous year (Shah, 2015). These statistics reflect the rising demand and increased use of EOTs in higher education.

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9 Coursera now has 17 million students (Shah, 2015).
EOTs and higher education

Educational online technologies (EOTs) have dynamically transformed the delivery of higher education, creating extraordinary opportunities for enhanced learning and teaching. In an era of great digital growth, their enhanced functionalities and affordances have revolutionised methods of knowledge access and engagement, generating phenomenal increases in the demand for web-based learning and support. Factors including affordability, scalability, ubiquity, and accessibility have bolstered levels of generational acceptance and encouraged growth. In rapid fashion, traditional learning spaces have evolved into dynamic BTEs, and channels of content dissemination have switched from didactically-styled “traditional, face-to-face courses to ...online courses” (Picciano, 2015, p. 148). Clearly, “the idea that learning occurs only within” the “confines [of an institute] is becoming obsolete” (Annetta et al., 2010, p. 73). Knowledge transmission is no longer tethered to a campus (Anderson et al., 2012) or confined by the limitations of a physical classroom.

These digital developments signal positive changes to “academic leaders at all types of institutions” (Allen & Seaman, 2010, p. 5). Their belief in “technological innovation...and integration...on the formation of the future” is increasingly evident (Gupta, 2016). Predictions about future online learning suggest that virtual universities and off-campus sites will be the trends in the future of higher education (Peppers, 2016), and that as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (Anderson et al., 2012, p. 17). This is happening now, as “millions of students [take] online courses” (Allen & Seaman, 2015, p. 21), with the demand for these now “greater than that for the corresponding face-to-face offerings” (Allen & Seaman, 2010, p. 5). Similar forecasts indicate that the delivery of online learning will revolutionise higher education (Anderson et al., 2012). Results already show that “since 2010, there has been an increase in the use of most technologies for learning” (Gosper et al., 2014, p. 298). In fact, the proportion of institutions now stating that online learning is critical to their strategy is at an all-time high (Allen & Seaman, 2015). This growth has intensified with the proliferation of mobile technologies and emergence of mLearning (Asseo et al., 2016; Davison & Lazaros, 2015).

Meanwhile, ‘Generation Z...are coming through’ with ‘expectations...that [are] a challenge for [teachers] to keep up with’ (Tuapawa, 2016a). They are the connected students from “the ‘bring-your-own-device era’” (Skiba, 2016, p. 1), who are “at great ease with the online culture” (Gupta, 2016, p. 1), and have “learned to expect immediate, continuous, all-round support” (Serdyukov, 2015, p. 64). Meeting their demands has required that TEIs make content accessible “in a variety of modalities, such as text, audio, visuals, videos, and multimedia” (Serdyukov, 2015, p. 66), and that “IoT technologies, including Smartphone’s and a wi-fi connection” be used (Asseo et al., 2016, p. 1).
Responsively, TEIs, many of whom are “under immense pressure to respond to the digital lifestyles” have accepted the value of online technologies, (Chikerema, Chikari, & Chikerema, 2016, p. 1) and have redesigned their areas of learning (Johnson et al., 2016), recognising that “no longer are classes one-dimensional” (Weller, 2013, p. 48). Understandably, the institutes that adjust “to the technology and become content producers will survive and flourish” whereas those “confined to being content consumers will struggle” (Lucas, 2016, p. 1). Propelled by the need to become adaptive under changing economies and effective in meeting learners’ demands, TEIs are seeking to “re-imagine the student experience” (Asseo et al., 2016, p. 1), gentrify traditional teaching approaches and swiftly assimilate the use of EOTs into their programmes of learning.

Some are experimenting with IoT approaches, striving to enhance and optimise learning and teaching methods (Asseo et al., 2016), and increase levels of innovation in their digital environments (Johnson et al., 2016). Others are exploring the ways in which technology will support the needs of faculty and students, anticipating that teachers who are willing to embrace new technologies and employ effective EOT strategies will produce more effective learners (Peppers, 2016). They realise that with the rise and influence of EOTs, some older teaching methods will no longer be adequate and appropriate for modern students (Peppers, 2016), and those that fail to understand that EOTs are changing the “way people learn, when they learn, and how they learn ... [will be] ill-prepared to teach the students of today” (Theriault, 2015).

Understandably, the circumstances brought about through digital transformations may elicit “threatening change and unsettling volatility” or “exciting possibilities” (Chandler, 2012, p. 1). Most educationalists however, recognise that as ‘modality demands’ transition from face-to-face to online, efficient use of digital services must occur to improve traditional methodologies and provide learners with opportunities to “real world experiences and gateways to more interactions” (Gupta, 2016). Technologies such as social media, interactive gaming, virtual worlds and video conferencing, have gained popularity with those whose education ideologies entail an adaptive approach to learning, and whose practical sense dictates that the needs of a greater number of remote students be accommodated (Tuapawa et al., 2014, 2016). Through the affordances of cloud-based computing, mobile connectivity, high-quality streaming video (Anderson et al., 2012) and IoT advancements (Asseo et al., 2016), key stakeholders have access to a dramatically improved array of learning and teaching opportunities, which espouse higher-quality academic experiences.

Although EOTs have transformed the delivery of learning in higher education, significant EOT challenges have impeded their value, preventing widespread implementation (Nagel, 2013). This is a concern, especially in a time of growing EOT demand.
**EOT challenges**

Significant efforts to better understand the EOT challenges in BTEs have resulted in considerable research, with varied and noteworthy contributions to the literature. Some of these studies have focused on technology integration into blended environments (Moore, 2013), affordances and effectiveness of learning technologies in higher education (Arenas, 2015; El-Khalili & El-Ghalayini, 2015), barriers to the adoption of online learning (Bacow et al., 2012), and e-learning challenges faced by academics (Islam et al., 2015). Other studies have focused on implementations of blended learning (Graham, Woodfield, & Buckley Harrison, 2013), technology enhanced learning (Passey, 2013), strategic planning for blended learning in higher education (Kimbler, 2009), and on technology to support institutional roles (Huynh, Gibbons, & Fonda, 2009).

The persistence of these challenges suggests that TEIs have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. Over time, these needs have shifted and evolved, and in an environment of rapid technological change have not been understood and addressed effectively. Some feel that “it is the university leadership..., it is the leaders at a university who must...see that...it happens...if widespread change is to occur” (Christie & Jurado, 2009, p. 278), and that institutional leaders should approach it first by discovering the biggest pain points” (Asseo et al., 2016, p. 1).

Therefore, some research efforts have sought to identify EOT challenges, some of which occur due to a “lack of training” or ineffective or insubstantial training (Merfert, 2016, p. 1), and create difficulty for teachers who “struggle to keep up with the ever-increasing...tools available” (Ko & Rossen, 2010, p. 16). They have experienced challenges “in acquiring new technology skills” (Vaughan, 2007, pp. 85, 87) and “finding the time to learn” (Merfert, 2016, p. 1). The inability to keep pace with technology-enhanced teaching and learning has exacerbated problems (Lucas, 2016). High online course workloads (Bolliger & Wasilik, 2009) and learning curve complexities (Christie & Jurado, 2009) have also presented difficulties. Students have experienced frustration, at the lack of “access to digital media” on and off campus, where “necessary resources are either unavailable or can only be accessed from select computer labs” (Merfert, 2016, p. 1).

While some of these challenges involve attitudinal pre-dispositions, institutional barriers, and inadequacies in instructional design support (Panda & Mishra, 2007), others involve resistance to change, ineffective EOT usage, lack of motivation, and technical constraints (Tuapawa, 2016a). Some experience a fear of online communication (Hanisch, Hughes, Carroll, Combes, & Millington, 2011) which presents obstacles, alongside limited social interactivity, academic skills, technical skills, learner motivation, and time and support for studies (Muilenburg & Berge, 2005). Other obstacles are linked to financial resources, a lack of funding for digital resources, changing student demographics, and inadequate or insufficient facilities (Merfert,
There are also bandwidth constraints, high implementation costs, lack of technical and management support, and negative preconceptions towards the technology (Tuapawa & Skelton, 2012). These challenges are not only technical, but also organisational, conceptual, and administrative (Bacow et al., 2012). These pose a clear risk to the future success of BTEs (Moskal et al., 2013), the locations in which higher education-level learning and teaching takes place.

**Blended tertiary environments**

BTEs have become a significant part of the higher education landscape, delivering effective learning experiences to increasingly mobile students. Enhanced through the effective use of EOTs (Huynh et al., 2009), these implementations have engendered increased levels of interactivity between students and teachers, driving opportunities for enriched levels of engagement. However, while BTEs have delivered exciting transformations, their existence has often been as a result of the efforts of technically-savvy early adopters (Bacow et al., 2012), “grassroots” experimentation and development through faculty effort, rather than through “strategic institutional initiative[s]” (Graham et al., 2013, p. 4). Therefore, they have been characterised as a technologically demanding and highly transitive places (Dziuban, Hartman, & Moskal, 2004).

In this context, the term *blended learning* has been subject to a level of interpretation and changeability. “Ultimately, blended learning has become an evolving, responsive and dynamic process that in many respects is organic, defying all attempts at universal definition”, and frustrating the search for specificity (Moskal et al., 2013). While considerable rhetoric about its definition exists, the activity of blended learning is understood by most to involve the use of online technologies and traditional teaching methodologies. Vaughan, Cleveland-Innes & Garrison (2013) describe it as the process of “enhancing engagement through the innovative adoption of purposeful online learning activities” (p. 9). For the purposes of *this* research, “blended learning [has] emerged as [and currently is] the dominant label for an educational platform that represents some combination of face-to-face and online learning” (Moskal et al., 2013). It enables the delivery of learning using traditional methodologies with the help of technology integration (Gupta, 2016), and draws upon the distinct advantages of both online and face-to-face worlds (Skiba, 2016).

Blended learning influences a panorama of activities within an institute, and as an integral part of modern-day tertiary strategies “intersects within almost every sector of the university environment” (Moskal et al., 2013). In fact, the line between learning and blended learning has become increasingly blurred, with some noting that “the trend toward blended learning systems will increase” to become “so ubiquitous that we will eventually drop the word blended and just
call it learning” (Bonk & Graham, 2006, p. 7). Such changes impact the key stakeholders in BTEs, and create difficulties for them as they strive to deliver and engage in learning.

Key stakeholders in BTEs

Key stakeholders\(^{10}\) have contributed significantly to the success of digital transformations, fulfilling an extraordinary role in the advancement of higher education. In an era of phenomenal growth, their commitment to the use of EOTs has helped transform traditional learning spaces into dynamic BTEs. Attitudinal factors including flexibility, innovativeness and creativity have stimulated levels of generational acceptance of online engagement, prompting an increase in interactivity and “collaboration” (Theriault, 2015). For TEIs, this has increased the range of learning and teaching opportunities, enabling them to swiftly adapt to the changing needs of a digitally native generation, and thus ensure institutional relevance in an era of dramatic change.

In this context, TEIs bear responsibility for ensuring their key stakeholders receive an appropriate level of support to fulfil their roles. In fact, “having knowledge of stakeholders will always be an important responsibility” for them (Avci, Ring, & Mitchelli, 2015, p. 53). It is achievable when they understand the role of “knowledge management” as it relates to the capabilities of their people, and the complexities of their environments (Maric, 2013). This involves identifying and analysing their key stakeholders, “to realise who [they] are, and what they want” (Maric, 2013, p. 223), and then to “improve its processes to meet their needs” (Kettunen, 2015, p. 56).

TEIs that “can identify and understand the[ir] stakeholders...can greatly enrich their knowledge” (Avci et al., 2015, p. 53), whereas “neglecting stakeholder relationships” will “lead to limited success” (Kettunen, 2015, p. 56). Significant gaps in knowledge about stakeholders’ identities and contributions may impede the provision of appropriate support, and limit their ability to perform their roles effectively. Establishing stakeholders’ identities, and determining the extent to which their needs and activities are understood and supported is therefore critical. As online growth intensifies, changing contexts of learning, it is essential that TEIs address their gaps and develop understandings about these groups, at a level that enables the delivery of informed, relevant, and meaningful support.

While some efforts have been made to better understand key stakeholder roles, the number of studies about their identification are relatively few. Mainardes, Alves & Raposo (2013), in a theoretical exploratory case study, identified and ranked 21 distinct groups of university stakeholders. Chapleo and Simms (2010), through stakeholder analysis, identified and ranked

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\(^{10}\) In this study, the term stakeholder refers primarily to those individuals, groups or organisations affected or involved in the learning processes and outcomes of a BTE.
Wagner, Hassanein & Head (2008) compiled a stakeholder list of at least seven groups, and Sanderson (1997) identified more than 15 distance education stakeholders. An overview of the results from these four studies is outlined in Table 1.

**Table 1: Results from existing studies**

<table>
<thead>
<tr>
<th>Research approach</th>
<th>Stakeholders identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mainardes, et al., (2013)</td>
<td>Students, teachers, researchers, employers, research and development partners, government, accreditation bodies, local public authorities, non-teaching staff, other higher education institutes, local community, secondary level schools</td>
</tr>
<tr>
<td>Chapleo &amp; Simms (2010)</td>
<td>Students, staff, funders, commercial, government, community, governing and academic bodies, research councils and bodies, educational community, graduate recruiters</td>
</tr>
<tr>
<td>Sanderson (1997)</td>
<td>Regulators, purchasers, suppliers (creators and providers: content providers, learning experts, designers, media providers, admin support, HR, technical providers, site coordinators), end users (teachers and learners)</td>
</tr>
<tr>
<td>Wagner et.al (2008)</td>
<td>Students, instructors, educational institution, content providers, technologies providers, accreditation bodies, employers</td>
</tr>
</tbody>
</table>

In these studies, students and teachers were featured as the most dominant stakeholders. Bodies supplying accreditation or some form of governance also held top positions, and providers of media, technology and funders factored in significantly. Other key groups included local and educational communities.

Additional literature further developed a picture of stakeholder representation in higher education. In a paper about stakeholder priorities, Power & Morven-Gould (2011) identified stakeholders as students, faculty and administrators. Gross & Godwin (2005b) recommended that higher education stakeholder analysis begin with the “obvious and well-known stakeholders: students, faculty, and administrators” (p. 1). Similarly, it was noted that in educational institutions, the most important stakeholders were “students, staff, administration and employers” (Singh & Weligamage, 2012, p. 5). Coleman et al (2013) identified higher education stakeholders as “students, employers, policy makers, faculty and administrators” (p. 3).

Tang & Hussin (2011), in a study about stakeholder perspectives, identified higher education groups as university managers, academic staff, students, parents, graduates, industry employers and other representatives. Leisyte, Westerheijden, Epping, Faber, & De Weert (2013) similarly explained that higher education stakeholders could include academics, students, parents, administrators, managers, alumni, employers, media, and community representatives. The

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11 An analysis of the results and approaches used in these four studies can be found in Appendix A.

12 These studies did not specifically focus on stakeholder identification.
University of Wisconsin (2005) identified higher education stakeholders as students, faculty, staff, alumni, parents and visitors. Other research identified teachers, students, support staff, administrators, and managers as those whose roles in higher education had changed (Freeman, Patel, Routen, Scott, & Ryan, 2013).

The shortage of studies on stakeholder identification in BTEs, and the need for updated relevant understandings signalled that an “examination of [the] stakeholder environment...[was]...pertinent” (Chapleo & Simms, 2010, p. 6). Researchers hoped that stakeholder identification would in the future attract the deserved attention from other researchers in higher education (Avci et al., 2015). While “who the stakeholders...[were was] a very complicated issue” (Avci et al., 2015, p. 53) and considered “difficult to implement” (Maric, 2013, p. 217) since TEIs had “a particularly complex stakeholder environment” (Chapleo & Simms, 2010, p. 6), new stakeholder research was necessary. Re-evaluations of key stakeholders’ identities and their roles needed to occur “when stakeholders’ requirements change[d]” (Kettunen, 2015, p. 56). Especially since TEIs were “under continuous pressure...to follow the global trends of technolog[ical] innovations”, and adapt to the use of “modern technologies” and “new [educational] forms and structures” (Maric, 2013, p. 223).

This section provided a background or backdrop to the research. Through a detailed summary of the literature’s key features, it illuminated a broad range of issues, which helped build insights into the topic and contextualise the study. The next section highlights the significance of this research, spotlighting its importance and relevance.
1.10 **Significance**

The following four reasons highlight the significance of this research:

1. Technological developments have prompted change in BTEs,
2. Students’ demand for EOT use has increased,
3. EOT challenges have impeded EOTs’ effective use, and
4. Key stakeholders’ roles and EOT needs have evolved.

1. **Technological developments have prompted change in BTEs**

**Background:** Higher education contexts have been impacted, transformed and re-contextualised through technological developments. TEIs recognise that their traditional learning spaces have evolved into vibrant BTEs, and that through EOT usage, “educational process[es have been] reconstituted in real time” (Bacow et al., 2012, p. 27). Forecasts indicate that “technology will drive change in the [higher education] sector; and it will do so relentlessly” (Bacow et al., 2012, p. 28). Predictions about online learning suggest that as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (Anderson et al., 2012, p. 17).

**Significance:** This research recognised that rapid technological advancements and changing perspectives on learning had created new challenges and opportunities, which affected TEIs who “didn’t have any other choice than to look to providing online components” (Tuapawa, 2016b), and were “under continuous pressure...to follow the global trends of technolog[ical] innovations” and use of “modern technologies” (Maric, 2013, p. 223). It offered insights into the effects of digital transformations in higher education, describing the impact of new innovations and expectations, and provided recommendations that could assist TEIs to adapt to the use of EOTs and maintain their relevance. It reiterated their responsibilities in championing, managing and sustaining BTEs, encouraging their investment in skilled expertise to facilitate digital transformations, and emphasised the need for TEIs “to design an eco-system of technologies and infrastructure that [was] responsive to changing landscapes, [and] robust enough to ensure stability and quality of learning experiences” (Tuapawa, 2016b). It also made a significant contribution to knowledge about educational technologies, their multi-dimensional aspects and current applications within contemporaneous tertiary contexts. In an era of great change, the outcomes of this research will not only help TEIs develop and maintain pace with technological developments, but assist them to champion and encourage the effective use of EOTs, while delivering relevant EOT support to their key stakeholders.
2. **Students’ demand for EOT use has increased**

**Background:** EOTs have opened up extraordinary opportunities for learning. Their enhanced features, levels of affordability and accessibility have generated increases in levels of online learning, and their use has intensified with the proliferation of mobile technologies and emergence of mLearning (Asseo et al., 2016; Davison & Lazaros, 2015). The increase in EOT demand has been accompanied by strong expectations of support for their use. Growing numbers of students expect that their teachers will “have a good grip on technology” (Islam et al., 2015, p. 109) to facilitate appropriate assistance.

**Significance:** This research recognised that students’ demand for EOT use and support had increased, that ‘Generation Z...[had come] through’ with ‘expectations that were a challenge for [teachers] to keep up with’ (Tuapawa, 2016a) and that often they were “inadequate[ly] experience[d] with using digital technologies for teaching and learning” (Koehler & Mishra, 2009, p. 62). It examined ‘both sides of the coin’, drawing interpretations from students whose experiences were impacted by teachers’ negative attitudes and EOT methods, and interpretations from teachers whose experiences were influenced by students’ expectations of EOT support. From these, it developed a series of recommendations that sought to address their challenges, and support both sets of stakeholders to engage EOTs effectively. In addition, this research contributed knowledge about popular media-rich EOTs, to help teachers understand how various tools could be used to enhance their delivery. It also proposed the development and use of a multi-dimensional taxonomy for classifying EOTs, which aimed to provide support for understanding, prioritising and applying these tools. The research furthermore encouraged teachers to engage in “specific training, guidance and support ... to [help them] successfully use these new technologies, and incorporate them into course delivery...” (European Union, 2014, p. 17).

3. **EOT challenges have impeded EOTs’ effective use and adoption**

**Background:** The prevalence and persistence of EOT challenges has created an atmosphere where negative learning experiences are common, and widespread EOT adoption is restricted. Yet, EOTs are in most cases counted on to facilitate enhanced delivery of learning and teaching activities in an operationally effective manner. Importantly, their ability to function as required and be used in the right way contributes to the success of BTEs.

**Significance:** This research recognised the importance of understanding and addressing the current EOT challenges faced by key stakeholders. It identified,
described and verified a number of obstacles and their impact on students and teachers. It also interpreted a series of EOT experiences, which included vivid descriptions of their EOT challenges, to build understandings about the phenomena of EOT use. From these, it developed a series of recommendations that would assist TEIs to tackle the obstacles and deliver meaningful support to stakeholders. The research promoted to TEIs the importance of “a shared vision and strategy on how to achieve success” in BTEs, the “resource[s] and the desire to change”, and a “profound and deeply held sense of commitment to improving” (Tuapawa, 2016b).

4. Key stakeholders’ roles and EOT needs have evolved

**Background:** To maintain relevance in a globally competitive environment, TEIs must evolve to meet the needs of their key stakeholders, and ensure that they receive appropriate levels of support to fulfil their responsibilities. Since stakeholder roles have been subject to change, re-evaluating their identities “to realise who [they] are, and what they want” (Maric, 2013, p. 223) is important. In “contemporary, turbulent times”, universities have experienced a shift in social and technological values, and are being forced to reconsider their relationships with stakeholders in diverse and multi-dimensional environments (Maric, 2013, pp. 220, 221). These must be understood in newer, more relevant contexts. TEIs that “can identify and understand the[ir] stakeholders...can greatly enrich their knowledge” (Avci et al., 2015, p. 53) and are better positioned to “improve [their] processes to meet [stakeholder’s] needs” (Kettunen, 2015, p. 56).

**Significance:** This research recognised that rapid technological developments had impacted stakeholders’ roles, that TEIs needed current knowledge about their identities to deliver appropriate support, and that therefore an “examination of [the] stakeholder environment...[was]...pertinent” (Chapleo & Simms, 2010, p. 6). It re-evaluated the identity of key stakeholders in BTEs and described their contributions, highlighting the positions of those considered to have contributed most significantly to the success in BTEs. It also gathered experiences from key stakeholders about their interactions with other key entities, and interpreted these to develop better understandings about their challenges and needs. The outcomes from this research provided TEIs with a basis from which to deliver relevant support to the people who fulfilled key functions in BTEs. This research also gave a voice to key stakeholders, those at the coalface of delivery, providing them with an opportunity to share their first-hand knowledge about real and varied encounters and interactions with other key entities. The outcomes of this research will not only help TEIs understand the identities of critical BTE groups, but also supply individual stakeholders with a level of awareness about their peers’ and colleagues’ experiences, which may prompt them to share and collaborate on issues in common.
1.11 Methodology

This section provides a general overview of the qualitative methodologies, methods and procedures that were used to guide the activity in the two principal stages of research: 1) the **preliminary research**, and 2) the **phenomenological research**. It also explains how these methods demonstrated the important qualitative principles of transparency, credibility, adherence to evidence, authenticity of data, soundness of data sources, and triangulation.

The **preliminary research**, which was a preparatory endeavour, aimed to establish a robust foundation of current knowledge for the phenomenological research, through a review and analysis of the key issues in the literature, which included EOTs in BTEs, EOT classifications, key stakeholders in BTEs, and stakeholders’ EOT challenges. Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, it verified and updated these key issues, and presented the outcomes of the analysis across a series of seven preliminary publications.

The preliminary research was guided by a qualitative system of methods that supported the collection and analysis of data (Marelli, 2016). Participants were selected using an **expert sampling** strategy to ensure that data came from those with specific expertise and experience in the field (Trochim, 2006). Criteria were set to establish a basis for the selection of expert participants, and small group of 13 were chosen (Saldana, 2011). The interviews were **semi-structured**, and used open-ended questions to elicit meaningful responses from participants (Penner & McClement, 2008) about their views on key issues experienced “in their real world roles” (Yin, 2015, p. 9). The interview data were recorded, and then self-transcribed, which enabled the researcher to develop an **intimate familiarity with the content** (Daniels, 2016). It was analysed using Yin’s (2015) five phases of qualitative data analysis: 1) **Compiling**, 2) **disassembling**, 3) **reassembling**, 4) **interpreting**, and 5) **concluding**.

NVivo software (QSR International, 2015) was used to import, **compile**, and organise the transcribed documents into a logical filing structure (Yin, 2015). The data from these documents were **disassembled** into smaller pieces and coded. Using the **Nodes** coding function, the data was separated into categories that corresponded to the interview questions. These nodal categories, which were labelled using truncated versions of the questions, represented specific portions of the data. Their use enabled the data to be assigned logically, labelled, referenced, and contained within manageable groupings (Williams, 2003).

The data was then **reassembled**, which required that it be transferred from its nodal position into **analytic memos** (Yin, 2015), which were used to build ideas and develop understandings.

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13 Section 2 provides further detail about the preliminary research methods and procedures.

14 The italicised text is used to highlight key words that reflect the use of qualitative methods.
about the material (QRS International, 2015). Interpretations of the memo data were developed, formatted and refined to provide a basis for the discussions and conclusions, in the preliminary publications.

The phenomenological research\textsuperscript{15}, the primary qualitative endeavour, aimed to interpret the meaning of key stakeholders’ EOT experiences, to establish their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. Using the methodology of interpretive phenomenology and a 5-step qualitative analysis process, it examined the descriptions of EOT experiences from 10 students and 10 teachers in New Zealand and Australia, to understand their use of different EOTs to interact with other key entities: students, teachers, and content. It then interpreted the meanings of the phenomena through an abstraction and articulation of local and global themes. The global theme interpretations delivered broad understandings about the meanings of stakeholders’ EOT experiences with other students, other teachers and content, and are presented in the Discussion section. The local theme interpretations developed meanings that were specific to stakeholders’ use of individual EOTs. These were presented across a series of six phenomenological publications.

The collection and analysis of this data was guided by the methodology of interpretive phenomenology, which aimed to make an interpretation (rather than only a description) of the meanings of participants’ experiences (Padilla-Diaz, 2015; Sloan & Bowe, 2014; Yuksel & Yildirim, 2015). Aligned to the tenets of Heideggerian philosophy (Reiners, 2012), this study of experience (Friesen, Henriksson, & Saevi, 2012) abstracted and articulated emergent themes from key stakeholders’ experiences into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use. This methodological choice was influenced by 1) the research aim, which sought to understand and interpret key stakeholders’ EOT experiences in BTEs, 2) the central research questions (Marelli, 2016), which were: What were the EOT experiences of key stakeholders in BTEs? and What interpretations could be drawn from their meanings? and 3) the researcher’s “interest in the meaning of a phenomenon as it [was] lived by other subjects” (Englander, 2012, p. 14).

A small group of ten students and ten teachers from TEIs were selected as participants (Englander, 2012; Nicholls, 2009b; Padilla-Diaz, 2015) using a purposive sampling strategy (Yuksel & Yildirim, 2015). This method ensured that data would be obtained from key informants, individuals with first-hand experiences of the phenomena (Waters, 2016), in support of the aim of phenomenology, to understand a particular phenomenon “from the point of view of the lived experience” (Englander, 2012, p. 16).

\textsuperscript{15} Section 3 provides greater detail about the phenomenological research methods and procedures.
The interviews were semi-structured, and used a number of broad, open questions to obtain first-hand descriptions (Dowling & Brown, 2012; Waters, 2016). Participants responded with first-hand narratives (Dowling & Brown, 2012; Moustakas, 1994; Waters, 2016) of their EOT experiences, which included descriptions about their use of different types of EOTs to interact with different sets of key entities (students, teachers and content).

The interview data were recorded, and then self-transcribed in the same way as the preliminary research. Yin’s (2015) five phases of qualitative data analysis were again used to frame and structure the analysis. The data were compiled, disassembled, and then reassembled, which required that they be transferred from the nodal position into analytic memos (Yin, 2015), where they could be used to elaborate ideas and insights (QRS International, 2015) and help develop understandings about the phenomena (Saldana, 2011). Finally, the data were subjected to an interpretation, through a thematic analysis, which involved an abstraction and synthesis of local and global themes (Padilla-Diaz, 2015) using a reflexive perspective (Sloan & Bowe, 2014). In this process, themes, the essential meanings of or aspects associated with the phenomena, were discovered through thoughtful engagement with the descriptions of the stakeholders’ experiences (Waters, 2016), into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use. Interpretations of the local themes were developed, formatted and presented across a series of six phenomenological publications.

While both the preliminary and phenomenological stages of research had different aims and objectives, their activity was complementary and mutually supportive. Both sets of research applied the distinguishable principles of qualitative research (Yin, 2015, pp. 9,10), which included: 1) studying the meaning of people’s lives, 2) representing participants’ perspectives, 3) accounting for real-world contextual conditions, 4) explaining social behaviour and thinking, and 5) using multiple sources of evidence.

This research aimed to demonstrate the principle of transparency through well-presented and detailed sections of documentation, which would enable readers to understand the procedures that were followed (Yin, 2015). Through the use of comprehensive descriptions of methods and procedures (both through text content and conceptual frameworks), it strove to demonstrate “methodic-ness” (p. 14), the following of an orderly set of research procedures whether it was “based on an explicitly defined research design or on a more informal” routine, and a “bringing a sense of completeness to a research effort”. Especially was this highlighted in Sections 1.8, which detailed an expanded form of the structure of research, and through a conceptual model demonstrated the entire research process.

This research also aimed to demonstrate the principle of adherence to evidence through discussions, which verified key issues that were based on feedback from expert participants. Adherence to the evidence was also shown through local and global interpretations of themes.
that had emerged from key stakeholders’ descriptions of their personal EOT experiences (p. 14). Through explicit and methodical reporting about the selections and strategies for sampling of participants, data collection and analysis, this research sought to promote trustworthiness (p. 86). This was especially evident in Sections 2 and 3 which presented detailed accounts of the qualitative methods and procedures used to complete the key phases of preliminary and phenomenological research.

The commitment to supporting the authenticity of data, and ensuring the soundness of data sources (p. 86) was demonstrated through the use of an expert sampling strategy and purposive sampling strategy for participant selection, as described in Sections 2 and 3. It was also supported through the personal and engaging manner in which participants were interviewed, as explained in Sections 2.2, 3.3, and 3.5, and the expectations that they would provide rich and extensive descriptions of their first-hand “personal perspective[s] and interpretation[s]” (Lester, 1999, p. 1) of the phenomena. These principles were also supported through the researcher’s prolonged exposure in the field, as described in the researcher’s personal statement of subjectivity in Section 3.3.

The validity of the inquiry was supported through the use of expert and purposive sampling strategies, which ensured that the data came from those with specific expertise and knowledge in the field (Trochim, 2006), and those with first-hand experiences of the phenomena (Waters, 2016). The similarity of the researcher’s experiences to those of the participants enabled her to develop a strong and immediate sense of familiarity with or ‘knowing-ness’ about the phenomena. This ‘knowing-ness’ provided a strong basis for accurate understandings about others’ EOT experiences. It made for a near-parallel alignment of experiences, which helped to develop interpretations that were precise and truthful, which in turn contributed to the integrity and validity of the qualitative research (Yin, 2015).

The intention to develop converging lines of inquiry through triangulation was demonstrated through the use of at least three sources to verify or corroborate the data. These sources included the literature, the preliminary research, which verified and updated the key issues in the literature, and the phenomenological research, which interpreted key stakeholders’ EOT experiences. The use of these various data sources was evidenced in the Discussion in Section 4, where the global theme interpretations were discussed, and where links were made to the literature and preliminary research for the purpose of triangulation (Yuksel & Yildirim, 2015).

These qualitative principles are demonstrated in the next section, which presents an account of the qualitative methods and procedures used to complete the key phases of preliminary research.
2 Preliminary research

This section presents an account of the qualitative methods and procedures used to complete the key phases of preliminary research\(^\text{16}\), including participant sampling, data collection, data transcription, data analysis, and publication output. Without duplicating text from the general methodological overview, it enlarges on the previous section, and provide a greater level of detail around each of the research activities. Finally, it presents the content summaries of all the preliminary publications.

The preliminary research fulfilled Objectives 1 and 2 of this study. These were: to review and analyse the literature for key issues and developments about EOTs in BTEs, EOT classifications, key stakeholders, and their EOT challenges, and to verify and update these key issues through a qualitative analysis of preliminary data, and provide an informed basis from which to begin phenomenological research. By providing a robust foundation of current knowledge, it supported the phenomenological activity which would achieve the primary aim of this study and provide answers to the main research questions.

2.1 Sampling and participants

This section describes the methods that were used to identify, select and recruit participants for the preliminary research.

A qualitative system of methods was used to guide the collection and analysis of data (Marelli, 2016). Participants were selected using an expert sampling strategy to ensure that data came from those with specific expertise and experience in the field (Trochim, 2006). This method was similar to the approaches used by Chapleo and Simms (2010), who obtained data from ‘opinion-formers’, and Wagner et al. (2008) who used experts’ feedback. Criteria were set to establish a basis for their selection for interviews. Participants had to fit the criteria of a ‘blended learning expert’. An expert is defined as “one whose special knowledge or skill causes him to be regarded as an authority” (Oxford University Press, 2014). Experts could be selected on relatively simple criteria, such as through certain qualifications or experience (Changing Minds, 2013). Thus, the following criteria established a basis for their selection: 1) the individual must have occupied an academic role for not less than 10 yrs in a tertiary blended learning context, 2) hold a post-graduate qualification, and 3) have conducted published

\(^\text{16}\) The term preliminary research is normally used to describe an initial exploration of issues, or investigation that is introductory to, or preparatory for a significant body of research. The assumption sometimes is that this type of research is limited in scope, is inferior to the work that follows, and exists simply to gather information about the topic. In this study however, the preliminary research encompassed a significant proportion of the workload, and contributed substantially to this inquiry through a verification and update of key issues in the literature. Its purpose in preceding the phenomenological research, was to develop a strong and well-informed basis of knowledge that would strengthen the foundations for the phenomenological analysis. Its significance to this study was evidenced through its quantity of output, i.e. publications 1-7.
research in the area of blended learning. Candidates without blended learning experience, or without post-graduate qualifications were excluded from this study.

A small group of 13 participants were chosen (Saldana, 2011), from TEIs in the Commonwealth countries of New Zealand, Australia, and Canada. The rationale for this number was based on literature about qualitative research. Saldana (2011), for example, explained that there were varying opinions about the appropriate number of participants. While studying a single individual case in depth would make for a rich profile, an individual was not always representative of the population at large. Therefore, a small group of participants would provide sufficient data, with a minimum of 10-20 needed to ensure credible and trustworthy findings (Saldana, 2011). Accordingly, the use of 13 expert participants fitted within the required range. Obtaining data from a group of several individuals, rather than from one or two would likely deliver a holistic set of results that were applicable in more than one setting, and ensure that “no untoward consequences or none...easily anticipated” (Yin, 2010, p. 47) could arise.

Obtaining data from long-serving experts, from across several institutions and countries, was considered an appropriate way of “testing the evidence for consistency across sources” (Yin, 2010, p. 20) and generating results that would likely “fall within acceptable and known parameters” (Yin, 2010, p. 20). Due to their significant experience, the experts would render richer contextualised explanations than non-expert candidates. Notably, the credibility of findings were increased when they involved feedback from those with prolonged engagement in the field (Nicholls, 2009b). The expectations were that “this particular group of people thought to share a common experience... [would] offer meaningful insights into the phenomenon” and “talk candidly about their experiences” (Nicholls, 2009b, p. 640).

The participants were identified through a search of educational conference proceedings and University website profiles of academic staff living and teaching at TEIs in New Zealand, Australia, Canada and the United Kingdom. An information sheet and accompanying consent form was written and addressed to each prospective individual, inviting their participation in the research. It explained why the research was being conducted, who could participate, what the participants would be asked to do, the risks and benefits of participating, and how the information would be collected and used. Participants were encouraged to read and understand the contents of the information sheet before giving consent. They were asked to contact the researcher if they had questions or sought clarification on any matter. If willing to engage, they were to complete a consent form, which was attached to the information sheet. Participants had the option of providing written consent via letter/post or via scan/email. A follow-up reminder was sent via email to those who had not responded within 2 weeks to the initial letter of invitation17.

17 Copies of the letters, information sheets, and consent forms can be viewed in Appendix A.
Interestingly, once letters inviting participation were sent out, the responses from those keen to participate often contained recommendations to make contact with others who might be willing to participate. In one example, a blended learning expert and Professor, recommended via email that contact be made with his colleague, another blended learning expert and Associate Professor, who had significant experience in BTEs. An interview was later held with this recommended participant. In another instance, a different expert was put forward and an interview was held. In an effort to work efficiently and save time, all letters were sent out in quick succession. Participant responses came in randomly, occasionally with several on the same day.

2.2 Data collection

This section describes the methods used to collect data for the preliminary research.

The interviews were *semi-structured*, and used open-ended questions to elicit meaningful responses from participants (Penner & McClement, 2008) about their views on key issues experienced “in their real world roles” (Yin, 2015, p. 9). Participants set aside at least 45 minutes of un-interrupted time to completed semi-structured interviews, which were conducted via online video-conferencing technology (Skype), and audio recorded using Pamela software\(^\text{18}\).

The aim of the interviews was to explore, clarify, and verify key issues from the literature. It contained 13 questions in total. These explored the types of EOTs in BTEs, and their use, the identity and level of contribution of key stakeholders, their EOT challenges, the impact of these challenges on BTEs, the potential for overcoming them, the shift in key stakeholders’ needs, the impact of increasing EOT growth, the ability of TEIs to understand and meet key stakeholder needs, their attitudes towards these challenges, and gaps in the provision of EOT support for key stakeholders. Table 2 outlines the interview questions.

\(^{18}\) Permission to audio record the interviews was received from each participant.
**Table 2: Preliminary research interview questions**

<table>
<thead>
<tr>
<th>EOTS</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1. Which educational online technologies (EOTs) are being used in</td>
<td>blended tertiary environments (BTEs)? Give examples.</td>
</tr>
<tr>
<td>2. Please describe how these EOT(s) are being used in BTEs.</td>
<td></td>
</tr>
<tr>
<td><strong>KEY STAKEHOLDERS AND BTES</strong></td>
<td></td>
</tr>
<tr>
<td>3. Please identify the group(s) or individual(s) you consider to be</td>
<td>key stakeholders in BTEs? Explain why.</td>
</tr>
<tr>
<td>4. Which of these key stakeholders provides the most significant</td>
<td>Explain why.</td>
</tr>
<tr>
<td>contribution to the success of BTEs? Explain why.</td>
<td></td>
</tr>
<tr>
<td>5. What kind of challenges might these key stakeholders experience</td>
<td>using EOTs in BTEs? Explain why.</td>
</tr>
<tr>
<td>in using EOTs in BTEs?</td>
<td></td>
</tr>
<tr>
<td>6. How might these challenges impact on the success and</td>
<td>sustainability of BTEs?</td>
</tr>
<tr>
<td>sustainability of BTEs?</td>
<td></td>
</tr>
<tr>
<td>7. How do you think these challenges could be overcome?</td>
<td></td>
</tr>
<tr>
<td>8. Do you think that the needs of key stakeholders in BTEs are</td>
<td>shifting or evolving? Give reasons for your answer.</td>
</tr>
<tr>
<td>9. If answer to Question 8 is 'yes', do you believe these issues</td>
<td>with the increased growth and demand for EOTs?</td>
</tr>
<tr>
<td>are becoming more challenging with the increased growth and demand</td>
<td></td>
</tr>
<tr>
<td>for EOTs?</td>
<td></td>
</tr>
<tr>
<td>10. Do you think that the needs of key stakeholders in BTEs are</td>
<td>understood by tertiary education institutes (TEIs), and met</td>
</tr>
<tr>
<td>understood by tertiary education institutes (TEIs), and met</td>
<td>effectively? Please give reasons for your answer.</td>
</tr>
<tr>
<td>effectively? Please give reasons for your answer.</td>
<td></td>
</tr>
<tr>
<td>11. If answer to Question 10 is 'no', how do you think that the</td>
<td>needs of key stakeholders in BTEs can be understood by TEIs and</td>
</tr>
<tr>
<td>needs of key stakeholders in BTEs can be understood by TEIs and</td>
<td>met effectively? Give reasons for your answer.</td>
</tr>
<tr>
<td>met effectively? Give reasons for your answer.</td>
<td></td>
</tr>
<tr>
<td>12. Should TEIs be concerned about the EOT challenges faced by</td>
<td>key stakeholders concerning EOT use in BTEs?</td>
</tr>
<tr>
<td>key stakeholders concerning EOT use in BTEs?</td>
<td></td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
</tr>
<tr>
<td>13. Do you think that a gap exists in the way support is provided</td>
<td>their key stakeholders concerning EOT use in BTEs?</td>
</tr>
<tr>
<td>by TEIs to their key stakeholders concerning EOT use in BTEs?</td>
<td></td>
</tr>
<tr>
<td>14. Are there any final comments you would like to make?</td>
<td></td>
</tr>
<tr>
<td>15. Do you have questions for the researcher?</td>
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</tbody>
</table>

The use of open-ended questions generated deep, meaningful answers, and gave participants an opportunity to state their own opinions (Penner & McClement, 2008). Probes were used to clarify the meanings of responses, encourage in-depth explanations, and stimulate participants to expand their original comments (Yin, 2015). Figure 6 demonstrates how probing was used, with an excerpt of an interview transcription. In this example, a participant was probed about whether the use of video technology was ‘creating a double-up’ and increasing stakeholders’ challenges. Their responses helped clarify the issue. The probe that followed focussed on feedback from students, and prompted a response that also helped elaborate the point.

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19 The use of probes supported the aim of these preliminary interviews, which was to explore, clarify and verify issues from the literature.
Figure 6: Probes clarify meaning of text during interview

Figure 7 demonstrates another instance in which probes were used to clarify the issue and prompt richer descriptions. In this example, a participant was asked about whether the use of EOTs ‘provided more flexibility to adult students who had other commitments’. This question, not only enlarged on the previous statements, but expanded on issues in the literature (Anderson et al., 2012). The use of these auxiliary questions helped generate “a large quantity of interview notes...[and] recordings...all of which [had] to be analysed” (Lester, 1999). In addition to asking “good questions”, the researcher had to “listen” well (Yin, 2015, p. 27). A conversational manner promoted a series of effective two-way interactions (Yin, 2015).

Figure 7: Probes used in clarifying key issues
The recursive relationships between the data collection and analysis were evident, as were the number of tasks that required attention at the same time. An example of this occurred during the question-and-answer process, as the researcher focussed on listening to participants’ descriptions, while considering appropriate follow on questions, while also thinking about the analytic implications to determine whether additional data might be required, or whether confirmation of existing data was necessary (Yin, 2015).

There were also unexpected issues to handle during the interview period. The scheduling and conducting of interviews occurred in a less structured way than anticipated. Although in the research process these were depicted (in Figure 2) as distinct finite steps, in reality much overlap occurred between the scheduling, interviews, and other activities. They did not ‘fit’ neatly into a compartmentalised project schedule as expected. Therefore, managing the interview process efficiently meant not scheduling them into rigid time-slots dictated by the project’s timeline, but holding them at times that were suitable to participants. It was therefore necessary for the researcher to adapt to the work and study demands of each person, and adjust scheduled times if necessary to accommodate their needs. Occasionally, this meant conducting interviews outside of normal work hours, and often during weekends or evenings.

On one occasion, an interview with a Professor from Canada was held very early one workday morning, after several unsuccessful attempts to connect the previous weekend. In other instances, the time zone differences between New Zealand and Australia (where many participants were located) created challenges. In another case, planning an interview at a suitable time with one participant was made difficult due to time zone differences and large workload issues. On another occasion, unexpected technical issues prevented an interview from taking place. Such situations highlighted some of the real-world challenges faced when undertaking research with geographically-distributed participants who had busy lives, and provided an excellent opportunity to find practical work-around solutions. Through careful coordination, communication and planning, many of the challenges experienced were mitigated, which increased levels of confidence and accomplishment in having executed the required tasks under not-so-perfect circumstances. Maintaining a flexible and patient attitude, and also a sense of humour helped overcome elements of discomfort, and achieve positive outcomes. The preliminary interviews were held over the course of a number of weeks, and due to timing and re-scheduling, were interspersed with phenomenological interview activity.
2.3 Data transcription

This section describes the methods used to transcribe data for the preliminary research.

Interview transcription was completed manually using pre-formatted question-and-answer templates that had been developed by the researcher in Microsoft Word. Using these enabled the data to be recorded in an efficient, organised and consistent format\(^2\) (Daniels, 2016). The transcription process lasted approximately three months.

While initially the researcher had organised for the transcription to be undertaken by third party specialists, the researcher decided instead to self-transcribe the data. There were a number of valid reasons for choosing to do so. Firstly, the process of self-transcribing enabled the researcher to develop a more intimate familiarity with the content (Daniels, 2016). The preliminary interviews, which generally exceeded 45 minutes, took approximately 4-5 hours on average to transcribe, with some taking between 1-2 days to complete. Lengthy time periods spent with the raw data helped the researcher develop an deep insights into its meaning.

Secondly, self-transcribing accommodated the way in which the audio recording software (Pamela) recorded the sessions. It would record from the beginning of the Skype conversation, and therefore include greetings, sound tests and introductory explanations. While these formalities were necessary, they were surplus to transcription requirements. A third-party would have required specific instructions about how to deal with these segments, (e.g. the point at which each file needed to be cut). Specifying such details for the interviews, each of which was unique, would have been costly and have wasted time. An alternate option, which would have involved editing the files to remove this material and then submitting to a third party, would have also taken time. Instead, by self-transcribing the data, the researcher was able to omit the unnecessary segments in an easy and timely manner.

Thirdly, self-transcribing the data enabled the researcher to determine clearly which other parts of the discussion were immaterial to the meaning of the text, and take action to correct or remove these. Examples included remarks which contained colloquialisms, anacoluthon, confirmation sentences, imperfect sentence structure, and fillers such as ‘um’ and ‘uh’. In his responses, one participant used the word whiskers ‘um’ and ‘uh’ very frequently, which apart from being irrelevant to the meaning of the text, and in many circumstances muffling the main ideas, would have taken additional time to transcribe (Parker, 2008). Removing these sections streamlined the transcription process, while ensuring the integrity of the key points being made. Also, through self-transcription, the researcher was able to remove segments that contained explanations about specific concepts or EOTs. For example, the answer given to participants

\(^2\) A copy of the transcription template, developed by the researcher, can be viewed in the Appendix.
who asked ‘what is Second Life?’ or ‘what does learner-to-context mean?’ was superfluous to the meaning of the text, and was removed during transcription.

The researcher was also able to remove segments where questions had been paraphrased to help a participant understand a key point or question. For example, the question ‘how do you think these challenges could be overcome?’ might have been reworded to ‘what would be a solution to this problem?’, but not added in to the transcription. The researcher also removed segments where help was given to help the participant recall a specific term. For example, a segment where one individual struggled to remember the name of an immersive 3D virtual world and was asked ‘are you referring to Second Life?’ was removed. Their comments about the challenges in recalling names of EOTs on the spot were also immaterial to the meaning of the transcribed texts. Segments where the participant had unintentionally used expletives were also removed. The researcher paraphrased segments of the discussion that moved backwards and forwards very quickly without changing direction. Often the ideas were repeated or juxtaposed, creating excessive word use and repetition, and which if transcribed would cloud the key points and result in more work.

Fourthly, self-transcribing enabled the researcher to handle, distinguish and interpret words and thoughts from participants who spoke English as a second or other language. At times, this involved re-ordering words to reflect correct sentence structure, while ‘keeping true’ to their thoughts. In one example, a participant made the statement: “students start to complain ‘why our courses don’t use this and that?’” [sic] This sentence was transcribed as “students start to complain ‘why don’t our courses use this and that?’” On other occasions, where the participant omitted the letter ‘s’ from certain words although intending that they be plural, the researcher made the needed adjustment (Parker, 2008). Cultural cues used to address the researcher in a respectful way were also omitted. These included comments such as ‘Excuse me, Miss’ and ‘Yes, Miss’.

While the adjustments made indicated that the transcriptions were unavoidably an interpretation, the researcher accepted that slight variations were inherent to the transcription process, and would not invalidate the process itself. Rather, the transcription process was strengthened because it was more intelligently used (Rodgers & Kalmanovitch). Primarily, it was important that the key thoughts of each participant were captured and articulated appropriately. The level of accuracy needed was dictated by the purpose of the transcribed interview material, which was to help clarify and verify issues from the literature.

The care and security of the raw data was of utmost importance, and a key feature of good qualitative research (Yin, 2015). To ensure that the records were not jeopardised but were kept safe from a variety of hazards (e.g. temperature, moisture), the data was stored on computer hard drive, with backup copies saved onto removable drives, and additional copies saved in cloud storage.
2.4 Data analysis

This section describes the methods and procedures used to analyse the preliminary data. It was analysed using Yin’s (2015) five phases of qualitative data analysis: 1) Compiling, 2) disassembling, 3) reassembling, 4) interpreting, and 5) concluding. Table 2 demonstrates the link between these five phases and the research techniques used.

Table 2: Qualitative phases vs research techniques

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage description</th>
<th>Preliminary research technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compiling</td>
<td>Import and arrange transcripts</td>
</tr>
<tr>
<td>2</td>
<td>Disassembling</td>
<td>Use nodes to code data</td>
</tr>
<tr>
<td>3</td>
<td>Reassembling</td>
<td>Use memos to develop understandings of data</td>
</tr>
<tr>
<td>4</td>
<td>Interpreting</td>
<td>Explain meaning of data (publication discussion)</td>
</tr>
<tr>
<td>5</td>
<td>Concluding</td>
<td>Conceptualise data (publication conclusion)</td>
</tr>
</tbody>
</table>

Prior to the analysis of data, NVivo, a qualitative data analysis software program was installed, and online tutorials were used to help the researcher learn how to use its basic functions, which included importing source documents, identifying data segments using coding stripes and highlights, and coding the data into categories using nodes.

The first stage of analysis, which involved compiling the data into a formal database (Yin, 2015), required that these documents be imported into NVivo and arranged in order. Folders were created to help organise the data into a logical structure. They also served as repositories for the source documents, each of which became a separate file in NVivo, and was assigned a name or identifier. Figure 8 demonstrates the format of this internal filing structure. Its highly structured format supported principles which stated that orderly arrangements led to stronger levels of analyses with higher levels of rigor (p. 190).
The second stage of analysis, which involved *disassembling* the data, required that the transcription documents be opened and their data broken into smaller pieces and coded. The *Nodes* function in NVivo was used to separate the data into coded categories. These categories were labelled using truncated version of the interview questions. This particular labelling step made the data highly identifiable. It could then be logically assigned, referenced, and contained within manageable groupings (Williams, 2003). *Table 3* demonstrates the link between the node labels used for coding the data, and the interview questions.

*Table 3: Nodes linked to interview questions*

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Related question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EOTs being used</td>
<td>Which EOTs are being used BTEs?</td>
</tr>
<tr>
<td>2</td>
<td>How EOTs being used</td>
<td>Please describe how these EOTs are being used in BTEs.</td>
</tr>
<tr>
<td>3</td>
<td>Key stakeholders identified</td>
<td>Please identify the group(s) or individual(s) you consider to be key stakeholders in BTEs?</td>
</tr>
<tr>
<td>4</td>
<td>Most important contributors</td>
<td>Which of these provides the most significant contribution to the success of BTEs?</td>
</tr>
<tr>
<td>5</td>
<td>EOT challenges for stakeholders</td>
<td>What kind of challenges might they experience in using EOTs in BTEs?</td>
</tr>
<tr>
<td>6</td>
<td>How challenges impact BTE success</td>
<td>How might these challenges impact on the success and sustainability of BTEs?</td>
</tr>
<tr>
<td>7</td>
<td>How challenges overcome</td>
<td>How do you think these challenges could be overcome?</td>
</tr>
</tbody>
</table>

---

21 The numbers assigned to the nodes as shown in tables in this section, differ from those displayed in the final papers. A sequential numbering system was applied to the nodes in this section for ease of reference.
<table>
<thead>
<tr>
<th></th>
<th>Needs of stakeholders shifting</th>
<th>Do you think that the needs of key stakeholders in BTEs are shifting or evolving?</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Issues more challenging with demand for EOTs</td>
<td>If ‘yes’, do you believe these issues are becoming more challenging with the increased growth and demand for EOTs?</td>
</tr>
<tr>
<td>10</td>
<td>Are needs understood by TEIs</td>
<td>Do you think that the needs of key stakeholders in BTEs are understood by TEIs and met effectively?</td>
</tr>
<tr>
<td>11</td>
<td>How needs understood by TEIs</td>
<td>If ‘no’, how do you think their needs can be understood by TEIs and met effectively?</td>
</tr>
<tr>
<td>12</td>
<td>Should TEIs be concerned about challenges</td>
<td>Should TEIs be concerned about the EOT challenges faced by key stakeholders in BTEs?</td>
</tr>
<tr>
<td>13</td>
<td>Gap in support TEIs provide</td>
<td>Do you think that a gap exists in the way support is provided by TEIs to their key stakeholders concerning EOT use in BTEs?</td>
</tr>
<tr>
<td>14</td>
<td>Final or general comments</td>
<td>Miscellaneous</td>
</tr>
<tr>
<td>15</td>
<td>BL, BTE, F2F, Students, EOTs</td>
<td>Miscellaneous</td>
</tr>
</tbody>
</table>

*Figure 9* illustrates the mechanics of the coding in NVivo. In this example, a segment of text from the source transcription file (left-hand pane, in orange) was selected. Using the ‘code selection’ function, an existing node label (‘key stakeholders identified’) was chosen, and then applied to this text segment. The yellow coding stripe (in orange box), which extends the vertical length of the coded paragraph, represents the applied node.

*Figure 9:* **Node applied to code segment of transcribed text**

*Figure 10* demonstrates the format of the node structure in NVivo. The left-hand pane displays the nodes that were created for coding the data. The first node label in this sequence (Node 1: *Label: EOTs being used, refer Table 1*) is highlighted (in orange). Its contents are displayed in the right-hand pane (Node 1: *Container: EOTs being used, in orange*), as a list of references linked to feedback from individual participants (initials in orange). Viewing data in this manner provided an immediate overview of all coded responses for specific interview questions.
During the disassembly phase, an interesting phenomena which involved multiple data categorisations occurred. Some segments of data were relevant to multiple nodes and could be jointly and severally coded, which created the opportunity to connect key data to multiple themes. Figure 11, for example, demonstrates how a participant’s response to Question 1 contained data which were relevant to 19 different nodes. The left-hand pane shows the transcription excerpt, and the right-hand pane displays a series of different coding stripes, each of which represent various nodes that were applied to sections of this data.

Prior to coding, it was assumed that all responses would fit neatly into their respective nodes. But it was naive to expect exact ‘cookie-cutter’ responses that would correspond precisely to each question. In reality, and as Figure 11 demonstrates, responses were often relevant to more than one area, and could be coded several. This ‘phenomena’ occurred throughout the research process.

Figure 10: Node structure and contents in NVivo

Figure 11: Example of several coding in NVivo
The breadth and richness of the data obtained from expert participants reinforced the nuances and benefits of using an expert sampling strategy. Participants’ with considerable subject expertise often responded in broad, varied, complex and unstructured ways. There were “surprises” because certain “topics of inquiry [did] not fall within neat or well-established boundaries” (Yin, 2015, p. 27). It was irrational to expect clean compartmentalised ‘one-answer to one-code’ analysis. “Analysis [was] necessarily messy, as data [did not] tend to fall into neat categories, and there [were] many ways of linking between different parts of discussions or observations” (Lester, 1999, p. 2).

The third stage of analysis, which involved reassembling the data, required that it be transferred from its nodal position into analytic memos (Yin, 2015). These memos, which were created in NVivo or Microsoft Word, were used as ‘idea-generating’ documents, and provided a method through which to keep the analysis separate from (but linked to) the data being analysed. Through their use, distinctive features of the data emerged. As elements of the narrative were recorded, new insights were noted, and their relationship to the original research questions discerned (Yin, 2015). Memos, therefore were used not only to record ideas, but to summarise and develop meaningful thoughts about the material (QRS International, 2015). Figure 12 provides an example of a memo.

**Figure 12:** Example of memo

Adapted from ‘Handle Your Ideas (Memos) (QRS International., 2015 http://help-nv10.qsrinternational.com/desktop/concepts/handle_your_ideas.htm)
Described as meaning-rich units, memos helped assimilate and develop effective understandings about the features of each data segment (Saldana, 2011). While important to the analysis process, their use was not rigid or purely ‘forwards-moving’. Instead, the techniques used in the analysis were recursive, and at times required a backwards-and-forth swing between nodes, memos and source files.

Another interesting phenomena related to the generation of several memos from data in single nodes. For example, data in the first two nodes were separated into 35 different memos, to reflect the variety of different EOTs being used.

The nodal structure had a bearing on preliminary output, and as noted earlier, was based on the order of interview questions. This arrangement also provided a framework of categories for the output of preliminary publications. Table 4 demonstrates the link between the first six nodes and corresponding preliminary papers.

Table 4: Nodes linked to preliminary publications

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Preliminary publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EOTs being used</td>
<td>Paper 2, 3, 4</td>
</tr>
<tr>
<td>2</td>
<td>How EOTs being used</td>
<td>Paper 2, 3, 4</td>
</tr>
<tr>
<td>3</td>
<td>Key stakeholders identified</td>
<td>Paper 5</td>
</tr>
<tr>
<td>4</td>
<td>Most important contributors</td>
<td>Paper 5</td>
</tr>
<tr>
<td>5</td>
<td>EOT challenges for stakeholders</td>
<td>Paper 6, 7</td>
</tr>
<tr>
<td>6</td>
<td>How challenges impact BTE success</td>
<td>Paper 6, 7</td>
</tr>
</tbody>
</table>

The fourth stage of analysis, which involved interpreting the data, required that meaning be given to the findings. The interpretations were made from data in the memos, and used to form the basis of the discussions in the preliminary publications. The fifth stage of analysis, which involved drawing conclusions, required that the interpretations be conceptualised through a broader set of ideas. These could include lessons learned, practical implications (Yin, 2015), or recommendations. An example of this was demonstrated in Paper 2, which provided a summary of recommendations for using some EOTs. It also used a multi-dimensional taxonomy to demonstrate the EOTs’ key characteristics. Also, Paper 4 provided a summary of the implications of various EOT challenges, and outlined recommendations for addressing them.

It is important to note, that the data were not analysed through the various phases of analysis in one large cluster. Rather, it was processed in nodal sub-sets. The conceptual diagram in Figure 13, although representative of how all data in nodal subsets were analysed, uses a highlighted example to demonstrate the links between stages of the analysis process for data in nodes 1 and 2.
After being compiled, the data were disassembled using nodes, and then reassembled into (35) memos, each of which contained data about specific EOTs, and how they were being used. Interpretations of the memo data were made, and used to form the basis of the discussion in Paper 2\textsuperscript{23}, which identified and described the application of a range of nearly 35 different EOTs. The discussion was presented in separate EOT sections, each of which contained EOT definitions and descriptions of their use, with supporting examples from the narrative\textsuperscript{24}.

\textbf{Figure 13:} Process of data analysis for Paper 2

There were also challenges during the disassembly stage, which involved consolidating complex segments of data across different technological and pedagogical areas\textsuperscript{25}. For example, the data from Questions 1 and 2 were also coded to nodes that corresponded to parts of the five augmented taxonomies outlined in Papers 3 and 4\textsuperscript{26}. Table 5 outlines the additional 41 nodes that were created to code the data for the taxonomic classifications in Paper 4.

\textsuperscript{23} Paper 2 entitled ‘Educational Online Technologies in Blended Tertiary Environments: Experts’ Perspectives’ identified the types of EOTs being used in BTEs. Through an analysis of preliminary data, it also explored the ways in which these EOTs were being used. Their key characteristics were summarised through use of a multi-dimensional taxonomy that categorised EOTs. (Refer page 158).

\textsuperscript{24} The small coloured icons in Figure 11 represent the specific EOT brand exemplars (e.g. Facebook) discussed in the body of Paper 2.

\textsuperscript{25} This underscored the value in using a multi-dimensional taxonomy, as proposed in Papers 3 and 4

\textsuperscript{26} Paper 3 entitled ‘Pentexo: A Multi-dimensional Taxonomy of Educational Online Technologies’, proposed a new taxonomic framework of EOTs called the Pentexonomy. Developed by augmenting five existing taxonomies, the Pentexonomy synergised a range of perspectives to produce a robust and multi-dimensional classification, which facilitated effective decision-making on EOT activity. Paper 3 was selected for inclusion in a new publication entitled “Revolutionising Education through Web-Based Instruction” Paper 4 was a 2016 revision of Paper 3, and contained updated references and feedback from experts. (Refer pages 180 and 201).
Table 5: Nodes created and linked to Pentexonomy classification (Paper 4)

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Pentexonomy classification node based on:</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>(PENT) Learner to content</td>
<td>Classification by Interaction</td>
</tr>
<tr>
<td>17</td>
<td>(PENT) Learner to context</td>
<td>Classification by Interaction</td>
</tr>
<tr>
<td>18</td>
<td>(PENT) Learner to expert</td>
<td>Classification by Interaction</td>
</tr>
<tr>
<td>19</td>
<td>(PENT) Learner to learner</td>
<td>Classification by Interaction</td>
</tr>
<tr>
<td>20</td>
<td>(PENT) Learner to media</td>
<td>Classification by Interaction</td>
</tr>
<tr>
<td>21</td>
<td>(PENT) Assessment tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>22</td>
<td>(PENT) Asynchronous learning tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>23</td>
<td>(PENT) Broadcasting tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>24</td>
<td>(PENT) Collaborative tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>25</td>
<td>(PENT) Media repositories</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>26</td>
<td>(PENT) Real time learning tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>27</td>
<td>(PENT) Social tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>28</td>
<td>(PENT) User construction tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>29</td>
<td>(PENT) Analysing</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>30</td>
<td>(PENT) Applying</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>31</td>
<td>(PENT) Creating</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>32</td>
<td>(PENT) Evaluating</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>33</td>
<td>(PENT) Remembering</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>34</td>
<td>(PENT) Understanding</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>35</td>
<td>(PENT) Inquiry-based learning</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>36</td>
<td>(PENT) Media for communication</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>37</td>
<td>(PENT) Collaboration</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>38</td>
<td>(PENT) Communication</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>39</td>
<td>(PENT) Document preparation</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>40</td>
<td>(PENT) Teaching</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>41</td>
<td>(PENT) Media for construction</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>42</td>
<td>(PENT) Media for expression</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>43</td>
<td>(PENT) Media for inquiry</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>44</td>
<td>(PENT) Data access</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>45</td>
<td>(PENT) Data collection</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>46</td>
<td>(PENT) Theory-building</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>47</td>
<td>(PENT) Media for recreation</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>48</td>
<td>(PENT) High asynchronicity</td>
<td>Classification by Technical Affordances</td>
</tr>
<tr>
<td>49</td>
<td>(PENT) High customisation</td>
<td>Classification by Technical Affordances</td>
</tr>
<tr>
<td>50</td>
<td>(PENT) High fidelity</td>
<td>Classification by Technical Affordances</td>
</tr>
</tbody>
</table>
The contents of these nodes grew to form rudimentary lists of tools that established which EOTs were being used in BTEs, and their pedagogical or technological fit within the Pentexonomy. The nodal data were reassembled into memos, and the memo content was interpreted and included in Section 1 of Paper 4. Figure 14 displays an excerpt of the discussion in Section 1 of Paper 4. The content (in red), originally coded to the ‘Real-time learning tools’ node (see yellow coding stripe, Figure 8) and transferred to the ‘Real-time learning tools’ memo, was refined for inclusion in the ‘classification by similar functionality’ (in green) section of Paper 4.

**Figure 14:** Memo content becomes part of discussion in Paper 4

Data from nodes 3 and 4 involved the identity of key stakeholders and their levels of contribution to the success of BTEs. This nodal data were separated into memos, each of which contained material about specific key stakeholders. Interpretations of the memo data were made, and used to form the basis of the discussion in Paper 527, which focussed on the identification of key stakeholders in BTEs, and of these, the most significant contributors to BTE

27 Paper 5 entitled ‘Identifying Key Stakeholders in Blended Tertiary Environments’ re-evaluated the identity of key stakeholders in BTEs and described their contributions. Through an analysis of preliminary data it verified and proposed a current list of key stakeholders in BTEs. Some were considered to be among those who contributed most significantly to BTE success. (Refer page 230.)
success. The conceptual diagram in Figure 15 uses a highlighted example to demonstrate the link between stages of the analysis process. The outcomes of the analysis provided a basis from which to identify and discuss the roles, contributions, and interests of the “key players in the environment” (Maric, 2013, p. 217).

**Figure 15:** Process of data analysis for Paper 5

The data from node 5 corresponded to the fifth interview question: ‘what kind of challenges might key stakeholders experience in using EOTs in BTEs’. This data were separated into 18 different memos, each of which (except memo 18) contained data about specific EOT challenges. Table 6 outlines these series of memos.

**Table 6:** Memos for node 5 (Paper 6)

<table>
<thead>
<tr>
<th>Memo</th>
<th>Memo label</th>
<th>Memo</th>
<th>Pentexonomy classification node based on:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Resistance to change</td>
<td>10</td>
<td>Accessibility to technology</td>
</tr>
<tr>
<td>2</td>
<td>Unrealistic expectations</td>
<td>11</td>
<td>Financial constraints</td>
</tr>
<tr>
<td>3</td>
<td>Ineffective EOT usage</td>
<td>12</td>
<td>Time constraints</td>
</tr>
<tr>
<td>4</td>
<td>Lack of motivation</td>
<td>13</td>
<td>High workload commitments</td>
</tr>
<tr>
<td>5</td>
<td>EOT constraints</td>
<td>14</td>
<td>Lack of training and development</td>
</tr>
<tr>
<td>6</td>
<td>Management-related issues</td>
<td>15</td>
<td>Preventing boredom</td>
</tr>
<tr>
<td>7</td>
<td>EOT support-related issues</td>
<td>16</td>
<td>Keeping abreast of technology</td>
</tr>
<tr>
<td>8</td>
<td>EOT overload</td>
<td>17</td>
<td>Other challenges</td>
</tr>
<tr>
<td>9</td>
<td>Rapid EOT growth</td>
<td>18</td>
<td>Recommended solutions</td>
</tr>
</tbody>
</table>
Interpretations of the memo data were made, and used to form the basis of the discussion in Paper 6, which identified and discussed EOT challenges in BTEs, and outlined recommendations for addressing some of these. Figure 16 demonstrates this process.

**Figure 16:** Process of data analysis for Paper 6

![Diagram of data analysis process](image)

*Figure 16* displays an excerpt of data from memo 1 of node 5. It contained data about 'resistance to change', a major challenge faced by key stakeholders using EOTs in BTEs.

**Figure 17:** Example of coded memo content for Paper 6

**Memo: Solutions to challenges:**

**Feedback from experts**

- **Resistance to change**
  - Skilled support staff to "work alongside academics to help them" develop engaging learning activities, and improve look and feel of online resources. Change expectations about teachers “generating everything”.
  - Implement course "health-check" strategy where teachers' development and delivery of online course components are reviewed for effectiveness.
  - Increase use of enthusiastic casual lecturers who engage students effectively, and ease load on teachers.
  - Rethink policies around support and training for blended learning, and create incentive for engagement online.
  - Encourage communities of practice that share knowledge about EOTs, resources, and pedagogy. "Innovation that one department uses can be showcased to others"
  - Encourage teachers to adopt a ‘happy to learn’ approach, rather than ‘I have to know everything about EOTs’.

*Teachers facilitate or encourage relationships between students and industry members. Have industry experts join in-class sessions, deliver guest lectures and engage students in discussions about current practice. "They’re all over the new technologies, the newest things that are happening. Students really enjoy that interaction a lot more, rather than listening to a dry old academic."

*Increase teachers’ awareness about benefits of EOT use, translate benefits across disciplines.*

**High workload commitments**

**Lack of training and development**

- Managers urge and facilitate effective needs-based training for EOT use. "Ensure that whoever is involved has appropriate tools, training and support." Time provided for teachers to undertake training, value "incremental skill improvements".

*Rethink tertiary teacher education. "You get a PhD, and you are qualified to teach. Implement formal mechanism for teaching qualifications at tertiary level."

Training is needed to help teachers "adapt" understanding of

---

28 Paper 6 is entitled 'Challenges Faced by Key Stakeholders using Educational Online Technologies in Blended Tertiary Environments'. (Refer page 243).
Interpretations of the memo data were made, and used to form the basis of the discussion in Paper 7, which discussed this issue as it related to EOT usage. Figure 18 demonstrates this process.

**Figure 18:** Process of data analysis for Paper 7

Data from nodes 6 to 15 involved a number of different key areas. These included how challenges impacted the success of BTEs, the shift in stakeholders’ needs, whether EOT issues had become more challenging with increased the demand for EOTs, whether stakeholders’ needs were understood and met by TEIs, how such needs could be understood and met by TEIs, whether TEIs should be concerned with these EOT challenges, whether a gap existed in the level of support provided by TEIs, and other feedback.

While these data were coded and disassembled, they were reserved for a later analysis which may occur after the submission of this thesis. Discussion of it is currently beyond the scope of this PhD.

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29 Paper 7 is entitled ‘Resistance to Change Concerning the Use of Educational Online Technologies in Blended Tertiary Environments’. (See page 257).

30 A large amount of data was expected and received from the preliminary interviews. In recognition of this, the author stated in Ethics Application (HREC Approval No. H-2014-0257) that the data could be used in a series of publications, during and beyond the submission of this thesis.
2.5 Preliminary output

Paper 1  

Paper 1 is a short reflection paper that contributed insights about the usage and capabilities of five popular media-rich EOTs. Through a literature review, it highlighted how these EOTs were being used to support and facilitate learning in BTEs.

Paper 2  

Paper 2 made an identification of the types of EOTs being used in BTEs. Through an analysis of preliminary data, it also explored the ways in which these EOTs were being used. Their key characteristics were summarised through use of a multi-dimensional taxonomy that categorised EOTs.

Paper 3  

Making educationally sound choices about technology proved challenging, amidst the extensive and largely unclassified range of tools. The absence of a taxonomy comprehensive enough to guide EOT choice was a concern, given the current extent of online activity. Paper 3 addressed this issue by proposing a new taxonomic framework of EOTs called the *Pentexonomy*. Developed by augmenting five existing taxonomies, the *Pentexonomy* synergised a range of perspectives to produce a robust and multi-dimensional classification, which facilitated effective decision-making on EOT activity.

Paper 4  

During 2015, IGI Global, publishers of the IJWLTT journal advised the author that Paper 3 had been selected for inclusion as a book chapter in the new publication entitled: “Revolutionizing Education through Web-Based Instruction”. The authors of Paper 3 updated its contents, added new references and insights gathered from blended learning experts, and resubmitted it for inclusion in this book. Paper 4 is a revised edition of Paper 3.

Released in March 2016, the new book was a comprehensive, multi-disciplinary exploration of the emerging digital opportunities available to educators. It presented contemporary theoretical frameworks as well as practical research findings that supported the use of new computer-assisted teaching techniques. http://www.igi-global.com/book/revolutionizing-education-through-web-based/141020

Paper 5 re-evaluated the identity of key stakeholders in BTEs, and described their contributions. Through an analysis of preliminary data it verified and proposed a *current* list of key stakeholders in BTEs. Some were considered to be among those who contributed most significantly to BTE success.


Paper 6 identified and discussed the specific challenges stakeholders experienced in using EOTs in BTEs. Recommendations for addressing some of these challenges were outlined.


Paper 7 discussed the issue of *resistance to change* as it related to EOT usage, how it was demonstrated, and the extent to which it impacted on key stakeholders in BTEs.
3 Phenomenological research

This section presents a detailed account of the qualitative methodologies, methods and procedures used to complete the key phases of phenomenological research, including participant sampling, data collection, data transcription, data analysis, thematic analysis and publication output. Without duplicating text from the general methodological overview, it attempts to enlarge on the content from Section 1.11 and provide a greater level of detail around each of the research activities. Importantly, it provides a background to the philosophy of phenomenology, outlines its limitations, and describes the researcher’s influence to this approach. In addition, it documents the local and global themes abstracted from stakeholders’ EOT experiences. Finally, it presents the content summaries of all the phenomenological publications.

The phenomenological research fulfilled Objectives 3 and 4 of this study. These were: to analyse key stakeholders’ EOT experiences - their use of various EOTs to interact with other entities (students, teachers, and content) - and interpret the meanings of these phenomena through an abstraction and synthesis of local and global themes, and to recommend methods of effective EOT use that supports stakeholders’ needs. Its aim, which directly linked to the primary aim of this study, was to understand and interpret the phenomena of key stakeholders’ EOT experiences in BTEs, and provide a basis from which to recommend methods of effective EOT support. Through the local and global theme interpretations, this research provided answers to the main research questions: What are the EOT experiences of key stakeholders in BTEs? What interpretations can be drawn from their meanings? and How can these meanings be used to support stakeholders’ EOT needs?

3.1 Background

While the beginning of phenomenological philosophy is difficult to pinpoint (De Chesnay, 2015), an understanding of its contemporary beginnings and development as a methodology helped to provide insights on its usefulness and modern application. Variations on the philosophy have flourished, with philosophers interpreting its definition differently. Remarkably however, the philosophy and methodology of phenomenology have become a popular means through which to undertake qualitative inquiries. A careful consideration of its key aspects were important in determining its suitability for this research.

In contemporary times, phenomenology is commonly defined as the study of the phenomena of human experience (Smith, 2013). It is used to describe or interpret the meanings of the lived experiences of a phenomenon, or object of human experience. Descriptions are collected from a homogenous set of participants who have experienced the phenomenon (Creswell, 2006; Yuksel & Yildirim, 2015). Phenomenologists, in their analysis of the experiences, aim to understand
human behaviour through the eyes of their participants (Simon & Goes, 2012), and generate descriptions or interpretations of the phenomena (Yuksel & Yildirim, 2015).

The philosophy of phenomenology was originally based on the work of Edmund Husserl (1859-1938), a German mathematician who was later considered to be the ‘founding father’ and greatest figure of phenomenology (Creswell, 2006; De Chesnay, 2015; Padilla-Diaz, 2015). In his work, Husserl called attention to how experiences appeared to the consciousness (De Chesnay, 2015). He espoused a number of key tenets, including the intentionality of consciousness, epoche, and bracketing. Intentionality, which is described as being synonymous with consciousness, was directed or pointed, and contained meaning (Moustakas, 1994). Epoche, a concept which derived from a Greek term meaning to doubt or to “refrain from judgement” was involved when searching into the meaning of the conscious experience (Simon & Goes, 2012). Adopting the ideology of epoche oriented phenomenologists towards looking before judging, removing the biases and pre-judgements that could predispose understandings about the experiences. Engaging this concept involved bracketing out one’s personal experience and knowledge of the phenomena (Yuksel & Yildirim, 2015).

Husserl's work was followed, criticised, augmented, and advanced by a number of notable individuals including Heidegger, Sartre, and Merleau-Ponty (Creswell, 2006; Wheeler, 2015), all of whom asserted various arguments for the use of phenomenology, and contributed significantly to its body of knowledge. Martin Heidegger (1889-1976), who was a colleague of Husserl's was considered to be the second most notable figure in phenomenological philosophy. His work however advanced in a very different direction to that of Husserl’s. Rather than focus on the descriptive aspect of experience, his work focussed on the interpretive nature of the phenomena, and espoused the notion that human beings interpreted or attached meanings to their experiences. From this interpretive standpoint, he believed, unlike Husserl, that personal awareness was intrinsic to phenomenological research, that researchers became enmeshed with the experience (Reiners, 2012), and therefore that bracketing out ones personal experiences to understand the phenomena was impossible (De Chesnay, 2015). One had to look back at the situation, and focus on the process that had occurred, to interpret the meaning of a phenomenon (Idczak, 2007).

While various phenomenological perspectives emerged through the years, it was generally agreed that these two main figures of phenomenology, Husserl and Heidegger, provided the foundation for the development of the two primary types of phenomenology: descriptive and interpretive. Descriptive phenomenology, also known as psychological, had Husserlian origins, whereas interpretive or hermeneutic phenomenology had Heideggerian origins. In descriptive phenomenology, researchers aimed to reveal essential general meaning structures of a phenomenon and delivered a description of the meaning of an experience (Friesen et al., 2012; Sloan & Bowe, 2014). However, in interpretive phenomenology, the meanings of experiences
were made through interpretation (Friesen et al., 2012; Padilla-Diaz, 2015; Yuksel & Yildirim, 2015).

This research adopted the interpretive approach. It involved the analysis of texts from the descriptions of participants’ experiences, an engagement with the phenomenological data, and a search for themes. Its focus on understanding the phenomena of lived experiences provided the appropriate lens through which to ‘see’ phenomena, and its general methodology as the ideal vehicle to ‘arrive’ at the meanings of the experiences. The term general is used, since variations in phenomenological methodology flourish. Several approaches to data analysis exist (Reiners, 2012). In fact, different phenomenological studies have their own unique way of describing, understanding and engaging with hermeneutic phenomenology, offering different pathways within a common methodological landscape (Friesen et al., 2012). Granted, for researchers, this can create an element of freedom, but also confusion.

Significantly however, the phenomenological approach is used quite often in educational research, because it is a “powerful [method] for understanding subjective experience...and cutting through the clutter of...conventional wisdom” (Lester, 1999, p. 1). One study, for example, undertook a phenomenological analysis of teachers’ experiences with social media for in-class educational purposes (Yuksel & Yildirim, 2015). Another one investigated lecturers’ experiences of curriculum design (Sloan & Bowe, 2014). Yet another examined the experiences of university faculty who adopted instructional technology for teaching and learning purposes, to determine if it’s adoption affected the way a person taught, worked, and lived (Tuttle, 2012).

3.2 Limitations

While in fields such as education and technology, phenomenology as a methodology has grown in popularity, various limitations restrict broad application. The small sample size characteristically used in phenomenological studies can make it challenging to generalise results across large populations (Waters, 2016). Tuttle (2012) for example, who used a phenomenological approach to examine the technology experiences of 20 faculty teaching members, was unable to generalise the results to the entire faculty of staff members. While this limitation did not reduce the significance of the study, the results provided understandings that were pertinent only to homogenous individuals.

Various phenomenological studies have their own unique way of describing, understanding and engaging with hermeneutic phenomenology, offering different pathways within a common methodological landscape. Variations in phenomenological methodology flourish (Friesen et al., 2012), and no one set method is defined. This may make the approach more difficult and elusive than other methods.
The nature of qualitative research is that it permits and encourages midstream adjustments. Since the design process was a recursive one, portions of the design were established and augmented as the research proceeded. This provided an opportunity for the researcher to influence the findings (Yin, 2015, p. 85). To overcome the threat to data validity, and ensure the credibility of material, the researcher had an obligation to address the ways in which any influences on the interpretations could have occurred. This involved making a personal acknowledgement of the research lens through which analysis was made, and the potential effect it could have on the findings. The influences on this research were discussed throughout Sections 2 and 3, but especially in the reflexive statements made in Section 3.3.

3.3 Researcher

A phenomenologist must determine the method by which his or her personal understandings of the phenomena will be introduced into the study (Creswell, 2006). This can be achieved through a personal statement of subjectivity, which is classed in Husserlian phenomenology as a necessary pre-cursor to data analysis, and can be used as a measure of validity. In such a statement, the phenomenologist describes their prejudgements and beliefs about the phenomenon (Yuksel & Yildirim, 2015), then invokes the concept of epoche, and brackets out their personal experiences to prevent bias from influencing their understandings of the phenomena. This research however, did not adopt a strict Husserlian or descriptive approach to researcher involvement. Rather, it was persuaded towards the Heideggerian or interpretative methodology, which embraces the concept of reflexivity. Rather than removing personal experience using epoche, the researcher engaged a retrospective and recollective reflection of personal experiences to aid interpretations of the meanings of phenomena. Reflexivity is the antithesis to the principle of bracketing out influences, since it depends on the phenomenologist’s use of relevant prior experience to analyse and interpret data (Sloan & Bowe, 2014). The importance of acknowledging one’s own research lens was important “because the researcher, not some mechanical device [was]...the main instrument for collecting the data” (Yin, 2015, p. 27).

“Qualitative research demands disclosure about a researcher’s personal roles and traits that might affect a study and its outcomes” (Yin, 2015, p. 45). Interpretive methods especially, must account explicitly for their approach and how interpretations are managed (Friesen et al., 2012). The following therefore, is a reflective statement from the researcher about how her personal experiences influenced the interpretations of the phenomena. These experiences involved “biases, predilections, preferences, and choices...[that] seep[ed] into the picture” (Yin, 2015, p. 40). As part of the statement, the researcher identifies personal attributes that were necessary in undertaking these qualitative procedures. In addition to the statement, the author created a
Word Cloud\textsuperscript{31}, (see Figure 19) an image composed of different sized words that visually communicate aspects of her experiences and activities.

“\textbf{I}t was exciting to contemplate the variety of experiences in my life that had become relevant to the themes in this research. Many of the phenomena, whether experienced in an educational, research, or career context, had shaped my perceptions about the use of EOTs in BTEs. They would therefore have a direct influence on my interpretations of the meanings of the phenomena. Aspects of my own past experiences certainly helped characterise the way in which I perceived the “personal perspective[s] and interpretation[s]” (Lester, 1999, p. 1) of others. Significantly, it was the similarity of my own experiences to those of the participants that enabled me to develop a strong and immediate sense of familiarity with or ‘knowing-ness’ about the phenomena. In my mind, this ‘knowing-ness’ provided a strong basis for an accurate level of understanding about others’ EOT experiences.

The roles I had occupied and the activities in which I had engaged, had been similar if not almost identical to those experienced by the students and teachers. The direct comparison was, at times quite surreal. Student life, for example, whether experienced in the classroom, the campus, the lab, or online, was familiar, memorable, at times exciting, but at other times frustrating, filled with anxiety. Will I pass? What if I haven’t done enough? Why such ridiculous deadlines? Why on earth did I choose this course? Having once been a student and frequent EOT user, I was drawn close to the EOT experiences of my learner participants. Their reactions, emotions, and thoughts about EOT challenges with teachers, students, and content were recognisable, easy to comprehend. Having also been a teacher and strong EOT promoter, I became absorbed in descriptions that bore out teachers’ concerns, and anxieties about EOT use, those which were similar to my own. Why are we even using this technology? Where can I find more time to learn how to use this EOT? Their comments jogged personal recollections, which ‘transported’ me back to a similar time in my own history, where I could ‘replay’ in parallel these experiences alongside those of my interviewees.

My extensive involvement with EOTs, whether in learning and teaching scenarios, (for example through the design and development of electronic materials), or through commercial business activities (which involved website building and social networking activities), had placed me in a position to develop interpretations of students’ and teachers’ EOT experiences that were authentic, realistic, reliable, and consistent with the reality of the phenomena. The relevance of my varied experiences to the phenomena, and their influence on the interpretations I made are discussed further under the following three areas: 1) Education experiences, 2) research experiences, and 3) career experiences.

\textsuperscript{31} Word clouds give greater prominence to ‘words’ that appear more frequently.
1. Education experiences

**Relevance to phenomena:** The relevance of my student education experiences to the interpretations made were evident in two key areas: 1) the programme content (*what* I had learned), and 2) the environment and interactions (*where* I had learned, and from *whom* I had learned).

1) **The programme content:** The study programmes I had completed as a student included a Masters in Digital Media (MDM), Bachelors Degree in Computing Systems (BCS), Diploma in Multimedia and Web Development (DipMWD), Diploma in Information and Communication Technologies (DipICT), Diploma in e-Business Support (DipeBus), Certificate in Adult Education (L5), and Certificate in Business Computing (L4).

The focus of these programmes on building knowledge and proficiency in the area of computing technology had helped me to develop a rigorous, deep and broad skill set, which expanded across a range of computing areas and developed through continued use. These skills involved the application of various EOTs, some of which were identified in *this* research; a feature that proved a direct relationship between my own EOT learning and experiences, and those of the research participants.

The content of the programmes I undertook attracted me towards research that would further develop my understandings about the use of EOTs. It also contributed towards my *knowledge* of the topic, an important personal characteristic in qualitative research (Yin, 2015, p. 30). My own EOT-based learning and skills provided me with a solid basis for understanding others’ experiences with technology. In addition to subject knowledge, the level of EOT efficacy I had acquired was also an advantage, especially when having to make sense of participants’ technical and functionality challenges. Their EOT problems, encounters, and concerns were familiar. I knew ‘what it was’ to handle such issues, having learned about and experienced such things myself.

2) **The environment and interactions:** My experiences as a student and frequent EOT user enabled me to identify effectively with the thoughts, feelings and expressions of student participants. I understood, for example, their challenges in dealing other students who did not contribute to group LMS discussions, their frustrations with teachers who did not respond to online messages about assessments, and their irritations about content inaccessibility. For me, their experiences created the sensation of *déjà vu*, as my own memories were reinforced through their experiences.
Like many of the student participants, I also had studied both part-time and full-time, on and off campus, in traditional face-to-face settings and in distance learning environments, using EOTs to support my learning. Therefore, their experiences within different contexts and modes of study were familiar. Their online, distance, in-class, hybrid, flipped, and blended scenarios were like those of my own. I understood the struggle in juggling full-time work while tuning in to an online lecture, the rush to finish online assignments in the early hours of the morning when technical EOT issues had prevented an earlier submission, the challenge in balancing family commitments with contributing to LMS discussions, and the eternal hunt for relevant content using EOTs which always seemed to ‘break down’ at the worst possible moments. I had ‘walked in their shoes’, and in listening to their experiences I was once again reliving the phenomena. Through their descriptions, I was able to ‘remember’ the world from a students’ perspective, identify with their thoughts and emotional states, and understand their reactions and reasoning about the phenomena of EOT use.

2. Research experiences

Relevance to phenomena: Conducting this PhD research created opportunities for me to meet face-to-face with a variety of key individuals, including blended learning experts, students, and teachers. It involved “talking to people” (Nicholls, 2009a, p. 533), and directly soliciting their perspectives (Lester, 1999; Saldana, 2011, p. 75). As a qualitative researcher, engaging with participants in a real-world context, it was important for me to enter the interview settings with thoughtfulness and care (Yin, 2015). The personable, respectful and friendly manner in which I aimed to conduct the interviews, helped to maintain an open and warm atmosphere in which participants felt free to share. The relaxed interchange, my interest in conversing and their willingness to engage, created a sense of connectedness and an environment in which rich descriptions could emerge. Listening, and being attentive to visual signals, were key personal attributes that help me to maintain good rapport, and produce helpful insights into participants’ thoughts (Yin, 2015, p. 29).

Influence on interpretation: Listening empathetically to participants’ expressions, descriptions and comments enabled me to understand their emotions, build a real sense of meaning about their experiences, and develop a clear perspective on their EOT interactions. A genuine interest in the participant, an element of inquisitiveness and curiosity, which involved prompting their engagement “by talking to people” (Nicholls, 2009a, p. 533) and being mindfully aware of their responses, helped me to imagine personally what the other person had experienced. Asking perceptive questions and adopting an element of sensitivity enabled me to collect critical information while remaining courteous and conversant (Yin, 2015, p. 30). Through these discussions, I was able to acquire a genuine ‘feel’ for their concerns, and discern the meaning behind
their facial expressions, their words, and their movements, and understand how these contributed to the meanings of their experiences. While sometimes mentally exhausting, these close encounters demonstrated to me how “through influence and empathy people [could] understand each other. Experience [was] not just hidden inside the person, but appear[ed] in the words, in our faces, and in our language” (Daniels, 2005, p. 1).

3. Career experiences

Relevance to phenomena: For a significant part of my career I was employed as a Lecturer, and taught in the areas of small business and computing. I also ran a regional training centre which delivered a range of tertiary training programmes. My work involved teaching students how to use computer technology, and required the use of EOTs to facilitate learning, assessments, administrative and operational activities. This type of work, and a desire to help students build their computing skills, led me to develop a large multi-media programme called KiwiWorld, which incorporated over 100 visually rich interactive screens, and games that delivered learning activities based around the use of key computing components, including the mouse, keyboard and screen.

The experiences I had in teaching students about technology provided me with a solid basis for understanding both students’ and teachers’ experiences with EOTs. It nurtured my interest in qualitative research that examined other peoples’ use of EOTs, in “their everyday roles...under real-world conditions” (Yin, 2015, p. 9), and fostered my concern about the gaps in the types of EOT support provided by TEIs. Years of delivering learning had enhanced my ability to identify with the thoughts, feelings and expressions of teachers. I understood, for example, the challenges they faced with students who expected 24-hour support with online activities, their frustrations with other teachers whose online courses were poorly formatted, and the ‘spread-so-thin’ anxieties they had about EOT learning.

After having taught for several years, I entered a consultancy role wherein I undertook various tertiary education-based contracts. One of these involved undertaking research to establish effective numeracy and literacy tablet-based applications to support in-class learning, and delivering this training to teachers to help them use these apps with their students. Another contract involved the use of EOTs to reformat and distribute e-resources via tablet devices. In addition to these contracts, I undertook speaking engagements where the primary aim was to encourage and promote effective use of EOTs for tertiary learning and teaching. My presentations incorporated visually rich graphic designs and illustrations, which I had developed through the use of industry standard design software suites such as Adobe Photoshop, Illustrator, and Flash. These
new professional experiences in learning delivery provided me with a broader sense of the EOT challenges teachers faced with new technologies. It provided me with the opportunity for more varied interactions with different teachers and learning facilitators. This added to my storehouse of knowledge about teachers’ use of EOTs, and the need to “capture their perspectives” and “represent the meanings given to real-world events by the people who live[d] them” (Yin, 2015, p. 9).

In time, I branched into commercial business, extending my efforts into product development, where I managed the design and development of a new product range of decorative glass tiles, called GLINTZ. This start-up process required the use of various online tools to action the design, import, sales, marketing and distribution of the new product range. For example, the GLINTZ marketing activity involved regular use of social network tools such as Twitter, Facebook, Instagram, Skype, Pinterest, and Blogs to launch the range and gain brand exposure. It involved using EOTs to develop online newsletters, create advertising campaigns, interact with customers, network professionally, and communicate with offshore manufacturers. Using the same tools I had applied in an educational context, but now for a different purpose, gave me a broader appreciation and understanding of their use and functionality. I could say with confidence then, that the interpretations I had made in this research were based on comprehensive levels of EOT knowledge, built from experience with EOTs in varied applications and activities.

In addition to this, my business building activity involved using an online e-commerce platform to design and develop the GLINTZ multi-page website (www.glintz.co.nz). This required the application of page design principles similar to those which many teachers were familiar with, from their activities in designing their own LMS coursework pages. With these experiences, I related well to the issues expressed by teachers about online site management and wiki development, and the challenges associated to these, including ineffective course page construction and navigation.”

*Figure 19* presents a picture of a word cloud, which I developed to communicate some of the experiences that had an impact on my interpretations of the EOT phenomena. The cloud assigned larger words to aspects of the experiences that were more significant to me, and which had a greater impact on my perceptions of the experience.
Figure 19: Word cloud
3.4 Sampling and participants

This section describes the methods used to identify, select and recruit participants for the phenomenological research.

A group of ten students and ten teachers from institutes in the Commonwealth countries of New Zealand and Australia were selected as participants using a purposive sampling strategy (Yuksel & Yildirim, 2015). This method ensured that data would be obtained from individuals with first-hand experiences of the phenomena (Waters, 2016), in support of the aim of phenomenology, to understand a particular phenomenon “from the point of view of the lived experience” (Englander, 2012, p. 16). It also meant that experiences would come from a homogenous group (Yuksel & Yildirim, 2015) that would “yield the most relevant and plentiful data” (Yin, 2015, p. 93). The rationale for this number was based on literature about phenomenological research. Englander (2012), for example, indicated that a large sample size, especially when it concerned qualitative research, was not a prerequisite for generalisable results. Nicholls (2009b) explained that “phenomenological studies ... commonly use[d] as few as five ... participants” (p. 639), and Lester (1999) indicated that “a single-figure sample [was] valid” (p. 3). Rawat (2014) similarly stated that normally “four or five respondents” were selected for in-depth interviews, and Padilla-Diaz (2015) indicated that the studied group should consist of 3 to 15 members. It was on this basis that 20 participants were chosen32 (Englander, 2012; Nicholls, 2009b; Padilla-Diaz, 2015).

While the use of 20 participants was not necessary, results generated from the experiences of a wider range of stakeholders were more likely to “fall within acceptable and known parameters” (Yin, 2010, p. 20), and ensure that “no untoward consequences or none that [could] be easily anticipated” (Yin, 2010, p. 47) would arise. Other similar phenomenological studies had used 20 participants (Tuttle, 2012), and up to 16 participants (Schuemann, 2014).

Further criteria were set to refine the selection of participants. To be interviewed, they had to be teachers on full-time tenure with an accredited tertiary institute, delivering an academic course in a blended learning mode. If they were students, they had to be aged 18 years or older, enrolled full time with an accredited tertiary institute and in an academic course delivered in a blended learning mode. Candidates who did not fit this criteria were excluded from the study. Teachers were identified from university website profiles of academic staff teaching in New Zealand or Australia. Students were identified with the assistance of a staff member at each institute. At the University of Newcastle, Australia this staff member was an Associate Professor. At the Eastern Institute of Technology, a Principal Lecturer provided this assistance. These staff members were asked to assist by identifying at least 30 students who matched the

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32 Gathering data from key stakeholders from two different institutions, in two countries was considered an appropriate way of “testing the evidence for consistency across sources” (Yin, 2010, p. 20).
selection criteria and were likely to be willing to participate, and to distribute student information sheets and accompanying consent forms to them. The sheets explained why the research was being conducted, who could participate, what the participants would be asked to do, the risks and benefits of participating, and how the information would be collected and used. Participants were encouraged to read and understand the contents of the information sheet before giving consent. They were asked to contact the researcher if they had questions or sought clarification on any matter. If willing to engage, they were to complete a consent form, which was attached to the information sheet. Participants had the option of providing written consent via letter/post or via scan/email.

The information sheets sent to students contained the same general information as those sent to teachers, with an additional offer to students of a $50 voucher for participation. Some of the consenting students had a genuine interest in the research topic or research activity in general, and others were motivated to engage to get the voucher. The information sheets indicated that participation was voluntary. Attempts were made to recruit both male and female participants.

The rationale for the selection of only teachers and students was based on a study by the author (Tuapawa, in review), which identified key stakeholders in BTEs and described their contributions. Through a review of literature about key stakeholder identification (Chapleo & Simms, 2010; Coleman et al., 2013; Gross & Godwin, 2005a; Leisyte et al., 2013; Mainardes et al., 2013; Power & Morven-Gould, 2011; Sanderson, 1997; Singh & Weligamage, 2012; Tang & Hussin, 2011; Wagner et al., 2008) and qualitative interviews with 13 blended learning experts from New Zealand, Australia and Canada, students and teachers were shown to be among those identified most prominently and frequently as key stakeholders in BTEs.

Students were identified as key stakeholders by 12 of 13 experts because of the need for them to “buy into” blended learning, “participate fully, and be convinced” of its value (p. 5). Their ability to support discussion, deliver feedback, and enhance “connectedness or community” (Balaji & Chakrabarti, 2010, p. 17) contributed significantly to the success and value of learning experiences (Tuapawa, 2016c). Teachers also were identified as key stakeholders by 11 of 13 experts, and considered by nine of them to be among those contributing most significantly to BTE success, due to their immediate and direct involvement in the teaching and learning process and their day-to-day focus on and influence over blended learning experiences.

33 Copies of the letters, information sheets, and consent forms can be viewed in Appendix A.
34 The collection and disbursement of vouchers was organised by the researcher, and funded through their PGRSS fund.
3.5 Data collection

This section describes the methods used to collect data for the phenomenological research.

Phenomenological interviews, known for being “exceedingly common in qualitative research studies” (Nicholls, 2009b, p. 640) were considered appropriate for gathering idiomatic data. “Powerful for understanding subjective experience”, they were effective at “cutting through the clutter of…conventional wisdom” (Lester, 1999, p. 1). The interviews followed a semi-structured format and were conducted via online video-conferencing technology (Skype) and audio recorded using Pamela software. Participants set aside at least 45 minutes of uninterrupted time to engage (Simon & Goes, 2012) and were asked a series of 27 questions (see Tables 7 and 8). They responded with richly detailed first-hand narratives (Dowling & Brown, 2012; Moustakas, 1994; Waters, 2016) and “personal perspective[s] and interpretation[s]” (Lester, 1999, p. 1) of their EOT experiences. These included descriptions about their use of different types of EOTs to interact with different sets of key entities (students, teachers and content). Specifically, participants were asked for a “description of a situation in which [they had] experienced the phenomenon” (Englander, 2012, p. 25) of using an EOT in a BTE. The situational aspects of their descriptions were vital to the research, since understandings of a phenomenon [i.e. using an EOT] had to be “connected to a specific context in which the phenomenon [was] experienced” [i.e., a BTE] (Englander, 2012, p. 25).

To encourage a frank portrayal of the phenomena, the interview questions were carefully constructed to elicit descriptions of experiences that included EOT challenges. Probes were used to clarify the meanings of responses and encourage participants’ in-depth explanations (Lester, 1999; Penner & McClement, 2008; Waters, 2016) and rich descriptions of their “conscious experience” (Martin, 2010, p. 1). As a result, participants detailed “the phenomenon in their consciousness” (Wikispaces, 2015, p. 1), in “a more open interview” (Dowling & Brown, 2012, p. 79), rendering valuable idiomatic narratives that supported understandings of the phenomena.

The questions were also framed to stimulate participants’ recollections of their EOT experiences or encounters with different key entities. These types of encounters were based on the classification by interaction taxonomy augmented by Culatta (2011) and the original classification proposed by Moore (1989). This taxonomy categorised technologies by the relationship between learners and other parties. The first three interaction types of the original taxonomy were learner to expert, learner to learner, and learner to content. Culatta (2011) presented a fourth category: learner to context. Tuapawa, Sher, and Gu (2014, 2016) proposed a

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35 Interpreting the meanings of key stakeholders’ EOT experiences was a key step to understanding their EOT needs. For the interpretations to reflect the phenomena in a realistic manner so that key stakeholders’ needs could be determined authentically, it was necessary that their EOT experiences include descriptions of EOT challenges. As noted in the problem statement, it was the persistence of these challenges that initially indicated a gap in knowledge about stakeholders’ needs.
fifth category: learner to media. These categories were adapted to facilitate and structure interviews with teachers, as follows: (1) teacher to student, (2) teacher to teacher, (3) teacher to content, (4) teacher to context, and (5) teacher to media. The use of the relationship-based classification for structuring the questions helped refine participants’ experiences into relevant and recognisable EOT interactions. It revealed distinctions between phenomena occurring in different key relationships, and set in place a structure through which to organise the themes, or essential meanings, about the phenomena (Waters, 2016). Table 7 outlines the questions asked of students about their EOT experiences with other key entities. These were formatted in sequence to contribute to orderly data collection (Sloan & Bowe, 2014).

Table 7: Structure of student interview questions

<table>
<thead>
<tr>
<th>INTERACTION TYPE</th>
<th>QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner to teacher</td>
<td>Question 1:</td>
</tr>
<tr>
<td>a) Describe an experience in which you used an EOT in a ‘learner to teacher’ interaction while studying in a BTE?</td>
<td></td>
</tr>
<tr>
<td>b) Did you face issues or challenges using the EOT in this case? Explain.</td>
<td></td>
</tr>
<tr>
<td>c) What do you think would have helped you make more meaningful use of this EOT?</td>
<td></td>
</tr>
<tr>
<td>d) What do you think would be a solution to this issue?</td>
<td></td>
</tr>
<tr>
<td>e) Did you experience benefits in using this EOT? Explain.</td>
<td></td>
</tr>
<tr>
<td>Learner to learner</td>
<td>Question 2:</td>
</tr>
<tr>
<td>a) Describe an experience in which you used an EOT in a ‘learner to learner’ interaction while studying in a BTE?</td>
<td></td>
</tr>
<tr>
<td>b) Did you face issues or challenges using the EOT in this case? Explain.</td>
<td></td>
</tr>
<tr>
<td>c) What do you think would have helped you make more meaningful use of this EOT?</td>
<td></td>
</tr>
<tr>
<td>d) What do you think would be a solution to this issue?</td>
<td></td>
</tr>
<tr>
<td>e) Did you experience benefits in using this EOT? Explain.</td>
<td></td>
</tr>
<tr>
<td>Learner to content</td>
<td>Question 3:</td>
</tr>
<tr>
<td>a) Describe an experience in which you used an EOT in a ‘learner to content’ interaction while studying in a BTE?</td>
<td></td>
</tr>
<tr>
<td>b) Did you face issues or challenges using the EOT in this case? Explain.</td>
<td></td>
</tr>
<tr>
<td>c) What do you think would have helped you make more meaningful use of this EOT?</td>
<td></td>
</tr>
<tr>
<td>d) What do you think would be a solution to this issue?</td>
<td></td>
</tr>
<tr>
<td>e) Did you experience benefits in using this EOT? Explain.</td>
<td></td>
</tr>
<tr>
<td>Learner to context</td>
<td>Question 4:</td>
</tr>
</tbody>
</table>
a) Describe an experience in which you used an EOT in a ‘learner to context’ interaction while studying in a BTE?
b) Did you face issues or challenges using the EOT in this case? Explain.
c) What do you think would have helped you make more meaningful use of this EOT?
d) What do you think would be a solution to this issue?
e) Did you experience benefits in using this EOT? Explain.

Learner to media

Question 5:

a) Describe an experience in which you used an EOT in a ‘learner to media’ interaction while studying in a BTE?
b) Did you face issues or challenges using the EOT in this case? Explain.
c) What do you think would have helped you make more meaningful use of this EOT?
d) What do you think would be a solution to this issue?
e) Did you experience benefits in using this EOT? Explain.

Other:

Do you feel as though you are receiving support for the use of EOTs from the institute at which you are enrolled? Please give reasons for your answer. If improvements are needed, what do you think these are, and how do you think these could be made?

Table 8 outlines the questions asked of teachers about their EOT experiences with other key entities.

Table 8: Structure of teacher interview questions

<table>
<thead>
<tr>
<th>INTERACTION TYPE</th>
<th>QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher to learner</td>
<td>Question 1:</td>
</tr>
<tr>
<td></td>
<td>a) Describe an experience in which you used an EOT in a ‘teacher to teacher’ interaction while teaching in a BTE?</td>
</tr>
<tr>
<td></td>
<td>b) Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td></td>
<td>c) What do you think would have helped you make more</td>
</tr>
</tbody>
</table>
### Teacher to teacher

**Question 2:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Describe an experience in which you used an EOT in a ‘teacher to learner’ interaction while teaching in a BTE?</td>
</tr>
<tr>
<td>b)</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>c)</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>d)</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>e)</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

### Teacher to content

**Question 3:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Describe an experience in which you used an EOT in a ‘teacher to content’ interaction while teaching in a BTE?</td>
</tr>
<tr>
<td>b)</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>c)</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>d)</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>e)</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

### Teacher to context

**Question 4:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Describe an experience in which you used an EOT in a ‘teacher to context’ interaction while teaching in a BTE?</td>
</tr>
<tr>
<td>b)</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>c)</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>d)</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>e)</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

### Teacher to media

**Question 5:**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Describe an experience in which you used an EOT in a ‘teacher to media’ interaction while teaching in a BTE?</td>
</tr>
<tr>
<td>b)</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>c)</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>d)</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>e)</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

### Other:

Do you feel as though you are receiving support for the use of EOTs from the institute at which you teach? Please give reasons for your answer. If improvements are needed, what do you think these are, and how do you think these could be made?
As with the preliminary interviews, the phenomenological interviews were held as and when participants could schedule in time. Managing this process efficiently meant not scheduling interviews rigidly in time-slots dictated by the project’s timeline, but holding them at times that were suitable to participants. Due to teachers’ and students’ busy work and study schedules, it was necessary to adjust interview times to accommodate their needs. Interviews with students often took place during the evenings or during study breaks. Interviews with teachers often occurred before or after work, and sometimes during lunch hours or weekends. The time zone differences between New Zealand and Australia (where many participants were located) created obvious challenges, which were overcome through careful coordination, communication and planning.

3.6 Data transcription

The phenomenological interviews were transcribed using the same process as that in the preliminary interviews. Refer to Section 2.3.

3.7 Data analysis

This section describes the methods used to analyse the phenomenological research data.

The methodology of interpretive phenomenology was used to analyse the data and make an interpretation of the meanings of participants’ experiences (Padilla-Diaz, 2015; Sloan & Bowe, 2014; Yuksel & Yildirim, 2015). Aligned to the tenets of Heideggerian philosophy (Reiners, 2012), this study of experience (Friesen et al., 2012) abstracted and articulated emergent themes from key stakeholders’ experiences into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use. Its steps were structured within Yin’s (2015) five phases of qualitative data analysis: compiling, disassembling, reassembling, interpreting, and concluding. Table 9 demonstrates the link between these five phases, and the phenomenological techniques used.

Table 9: Qualitative phases vs interpretive phenomenological research techniques

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage description</th>
<th>Phenomenological research technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compiling</td>
<td>Import and arrange transcripts</td>
</tr>
<tr>
<td>2</td>
<td>Disassembling</td>
<td>Use nodes to code data</td>
</tr>
<tr>
<td>3</td>
<td>Reassembling</td>
<td>Use memos to develop understandings of data</td>
</tr>
<tr>
<td>4</td>
<td>Interpreting (thematic analysis and interpretation of data)</td>
<td>Abstract global and local themes to describe and interpret meanings of experiences. Develop publication output around interpretations of local themes. Local themes presented in Section 3.8.2 and Papers 8,9,10, 11, 12, 13. Develop thesis discussion around interpretations and synthesis of</td>
</tr>
</tbody>
</table>
**Table 5:** Concluding (conclusions and recommendations)  

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Related interview question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Learner to teacher Q1a</td>
<td>Describe an experience in which you used an EOT in a 'learner to teacher' interaction while studying in a BTE?</td>
</tr>
<tr>
<td>2</td>
<td>Learner to teacher Q1b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>3</td>
<td>Learner to teacher Q1c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
</tbody>
</table>

In the first stage of analysis, the data were compiled into a formal database (Yin, 2015), using the same process as that in the preliminary analysis. NVivo software (QSR International, 2015) was used to import and organise the transcripts into a logical structure (Yin, 2015). Refer to Section 2.4 for further details. Figure 20 demonstrates the format of the internal filing structure of transcription documents (student transcription folders on left, teachers folder on right) once they were imported into NVivo.

**Figure 20:** File structure in NVivo

In the second stage of analysis, the data were disassembled using the same process as that in the preliminary analysis. Refer to Section 2.4 for further details. Table 10 demonstrates the link between the node labels used for coding the data, and students’ interview questions.

**Table 10:** Nodes linked to students’ interview questions

---

36 The numbers assigned to the nodes as shown in tables in this section, differ from those displayed in the final papers. A sequential numbering system was applied to the nodes in this section for ease of reference.
<table>
<thead>
<tr>
<th>Q</th>
<th>Type &amp; Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Learner to teacher Q1d</td>
</tr>
<tr>
<td>5</td>
<td>Learner to teacher Q1e</td>
</tr>
<tr>
<td>6</td>
<td>Learner to learner Q2a</td>
</tr>
<tr>
<td>7</td>
<td>Learner to learner Q2b</td>
</tr>
<tr>
<td>8</td>
<td>Learner to learner Q2c</td>
</tr>
<tr>
<td>9</td>
<td>Learner to learner Q2d</td>
</tr>
<tr>
<td>10</td>
<td>Learner to learner Q2e</td>
</tr>
<tr>
<td>11</td>
<td>Learner to content Q3a</td>
</tr>
<tr>
<td>12</td>
<td>Learner to content Q3b</td>
</tr>
<tr>
<td>13</td>
<td>Learner to content Q3c</td>
</tr>
<tr>
<td>14</td>
<td>Learner to content Q3d</td>
</tr>
<tr>
<td>15</td>
<td>Learner to content Q3e</td>
</tr>
<tr>
<td>16</td>
<td>Learner to context Q4a</td>
</tr>
<tr>
<td>17</td>
<td>Learner to context Q4b</td>
</tr>
<tr>
<td>18</td>
<td>Learner to context Q4c</td>
</tr>
<tr>
<td>19</td>
<td>Learner to context Q4d</td>
</tr>
<tr>
<td>20</td>
<td>Learner to context Q4e</td>
</tr>
<tr>
<td>21</td>
<td>Learner to media Q5a</td>
</tr>
<tr>
<td>22</td>
<td>Learner to media Q5b</td>
</tr>
<tr>
<td>23</td>
<td>Learner to media Q5c</td>
</tr>
<tr>
<td>24</td>
<td>Learner to media Q5d</td>
</tr>
<tr>
<td>25</td>
<td>Learner to media Q5e</td>
</tr>
<tr>
<td>26</td>
<td>Learner support TEI Q6</td>
</tr>
<tr>
<td>27</td>
<td>Learner support improvements Q7</td>
</tr>
</tbody>
</table>
Table 1 demonstrates the link between the node labels used to code the data and teachers’ interview questions.

**Table 1:** Nodes linked to teachers’ interview questions

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Related question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teacher to learner Q1a</td>
<td>Describe an experience in which you used an EOT in a ‘learner to teacher’ interaction while studying in a BTE?</td>
</tr>
<tr>
<td>2</td>
<td>Teacher to learner Q1b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>3</td>
<td>Teacher to learner Q1c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>4</td>
<td>Teacher to learner Q1d</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>5</td>
<td>Teacher to learner Q1e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
<tr>
<td>6</td>
<td>Teacher to teacher Q2a</td>
<td>Describe an experience in which you used an EOT in a ‘learner to learner’ interaction while studying in a BTE?</td>
</tr>
<tr>
<td>7</td>
<td>Teacher to teacher Q2b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>8</td>
<td>Teacher to teacher Q2c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>9</td>
<td>Teacher to teacher Q2d</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>10</td>
<td>Teacher to teacher Q2e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
<tr>
<td>11</td>
<td>Teacher to content Q3a</td>
<td>Describe an experience in which you used an EOT in a ‘learner to content’ interaction while studying in a BTE?</td>
</tr>
<tr>
<td>12</td>
<td>Teacher to content Q3b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>13</td>
<td>Teacher to content Q3c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>14</td>
<td>Teacher to content Q3d</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>15</td>
<td>Teacher to content Q3e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
<tr>
<td>16</td>
<td>Teacher to context Q4a</td>
<td>Describe an experience in which you used an EOT in a ‘learner to context’ interaction while studying in a BTE?</td>
</tr>
<tr>
<td>17</td>
<td>Teacher to context Q4b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>18</td>
<td>Teacher to context Q4c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>19</td>
<td>Teacher to context Q4d</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>20</td>
<td>Teacher to context Q4e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
<tr>
<td>21</td>
<td>Teacher to media Q5a</td>
<td>Describe an experience in which you used an EOT in a ‘learner to media’ interaction while studying in a BTE?</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>22</td>
<td>Teacher to media Q5b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>23</td>
<td>Teacher to media Q5c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>24</td>
<td>Teacher to media Q5d</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>25</td>
<td>Teacher to media Q5e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
<tr>
<td>26</td>
<td>Learner support TEI Q6</td>
<td>Do you feel as though you are receiving support for the use of EOTs from the institute at which you teach?</td>
</tr>
<tr>
<td>27</td>
<td>Learner support improvements Q7</td>
<td>If improvements are needed, what do you think these are, and how do you think these could be made?</td>
</tr>
</tbody>
</table>

In the third stage of analysis, the data were reassembled using the same process as that in the preliminary analysis. Refer to Section 2.4 for further details. Due to the complexity of data, significant time was taken to scrutinise the phenomenon (Padilla-Diaz, 2015).

The nodal structure had a bearing on the phenomenological output, and was based on the order of interview questions. This arrangement also provided a framework of categories for the output of phenomenological publications. Tables 12 and 13 demonstrates the link between the first set of 15 nodes (students) and second set of 15 nodes (teachers), and the corresponding phenomenological papers.

**Table 12: Nodes linked to phenomenological publications**

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Preliminary publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Learner to teacher Q1a-Q1e</td>
<td>Paper 8</td>
</tr>
<tr>
<td>6-10</td>
<td>Learner to learner Q2a-Q2e</td>
<td>Paper 9</td>
</tr>
<tr>
<td>11-15</td>
<td>Learner to content Q3a-Q3e</td>
<td>Paper 10</td>
</tr>
</tbody>
</table>

**Table 13: Nodes linked to phenomenological publications**

<table>
<thead>
<tr>
<th>Node</th>
<th>Node label</th>
<th>Preliminary publication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5</td>
<td>Teacher to learner Q1a-Q1e</td>
<td>Paper 11</td>
</tr>
<tr>
<td>6-10</td>
<td>Teacher to teacher Q2a-Q2e</td>
<td>Paper 12</td>
</tr>
<tr>
<td>11-15</td>
<td>Teacher to content Q3a-Q3e</td>
<td>Paper 13</td>
</tr>
</tbody>
</table>

In the fourth stage of analysis, the data were subjected to an interpretation through a thematic analysis, which involved an abstraction and synthesis of local and global themes (Padilla-Diaz, 2015) using a reflexive perspective (Sloan & Bowe, 2014). In this process, themes, the essential meanings of or aspects associated with the phenomena (Saldana, 2011), were discovered through thoughtful engagement with the descriptions of the stakeholders’ experiences (Waters,
2016), into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use.

Interpretations of the global themes, which were broad, delivered high-level understandings about the meanings of stakeholders’ EOT experiences with other students, other teachers and content. They were identified in Section 3.8.1, and discussed in Section 4. The local theme interpretations, which were drawn through a deep but narrow scope, developed meanings that were specific to stakeholders’ use of individual EOTs. These were identified in Section 3.8.2, and discussed across a series of six phenomenological publications. Figure 21 provides a conceptual model that demonstrates how the local themes were organised in relation to the phenomenological papers.

**Figure 21:** Local themes and research output (Papers 8-13)

In the fifth stage of analysis, conclusions were made (Yin, 2015). They were presented through the phenomenological papers to provide a statement of the answers to the research questions (De Chesnay, 2015). In addition, the thematic interpretations were conceptualised, and used to inform a set of recommendations for effective EOT use. They were designed to assist TEIs in their efforts to address EOT challenges and stakeholders’ needs through the provision of relevant and meaningful EOT support. Some of these recommendations were outlined in the publications, and the full list of recommendations is provided in Section 5. They are presented
across six key categories of interactions: student-to-teacher, student-to-student, student-to-content, teacher-to-student, teacher-to-teacher, teacher-to-content.

It was important to note, that the data were not analysed through the various phases in one large cluster. Rather, like the preliminary data, they were processed in nodal sub-sets. The conceptual diagram in Figure 22, illustrates the process followed, using a highlighted example which shows the stages of analysis for the data in nodes 1 to 5 (Refer to Table 10).

**Figure 22:** Process of data analysis for Paper 8

![Conceptual diagram](image)

*Figure 22* conceptualises how the data were gathered, transcribed, sorted and coded and stored using nodes, and refined into a student-to-teacher based memo, as shown in *Figure 23*. This memo, which contained data about students’ EOT experiences with teachers, was organised in sections specific to the types of EOTs students had identified (e.g. Adobe Connect, Blackboard).

**Figure 23:** Excerpt of memo

*Memo: Learner to learner interaction*

Adobe Connect Experience is free, easy, accessible across devices, multifold, but also requires, logging and fraught with technical issues. Distance students viewed their interactions with other students as valuable. ‘It’s free, it’s easy, just follow the link, you don’t have to install it’.

‘there’s no login [required], you can access it as a guest.

It’s accessible learning’

The ability to access learning through Adobe Connect on multiple devices added value to the experiences of students. You can even download Adobe Connect on your Smartphone and stream it on the subway train.

*Blackboard Experience* use of this EOT acceptable and widespread, but also signalled that certain improvements to its notification functionality would significantly enhance its effectiveness.

Used to collaborate with their peers in shared assignments or group work, often ‘posting [or] responding to comments’.

Asynchronous communication methods of the discussions boards, and lack of a notification system resulted in slower communications between students, taking a day, rather than a couple of minutes. In comparison, in Facebook, where a conversation [gets] started on one of the assignments, ‘multiple people [are] talking, posting [and] sharing links to useful info’, and ‘you’re getting notifications all the time’.

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These data were interpreted through an abstraction of local themes. They provided the basis for the discussion in Paper 8. They were delivered as a series of written interpretations of students’ lived experiences (Sloan & Bowe, 2014; Waters, 2016) and organised into five sections according to the EOT types students had identified: online conference tool (Adobe Connect), learning management system (LMS) (Blackboard), LMS (Moodle) blog site (WordPress) and lecture capture/webcast tool (Echo360). Each of these sections included a description of the EOT brand exemplar, a series of local themes related to its use and an interpretation of students’ experiences, which include their comments on EOT issues and challenges, potential usage, solutions and benefits.

The data from nodes 6 to 15 (Table 9) followed the same process of analysis. Data from nodes 6 to 10 were reassembled into a student-to-student based memo about students’ EOT experiences with other students, and interpreted through an analysis of local themes. These provided the basis for the discussion of results in Paper 9. They were delivered as a series of written interpretations of students’ lived experiences and organised into five sections: Online conference tools (Adobe Connect), learning management systems (LMS)(Blackboard, Moodle), online social networks (Facebook), and online collaboration tools (Google Docs).

Data from nodes 11 to 15 (Table 9) were reassembled into a student-to-content based memo, and interpreted through an analysis of local themes. These provided the basis for the discussion of results in Paper 10. They were organised into seven sections: Learning management systems (LMS)(Blackboard, Moodle), online library catalogue (NEWCAT+), lecture capture/web cast tools (Echo 360), wikis (WikiEducator), online collaboration tools (Blackboard Collaborate), and online video platforms (YouTube).

Data from nodes 16 to 27 (Table 9) were reserved for analysis after the submission of this thesis. Discussion of this data is beyond the scope of this PhD. Data from nodes 1 to 5 (Table 10) were reassembled into a teacher-to-student based memo, and interpreted through an analysis of local themes. These provided the basis for the discussion of results in Paper 11. They were organised into four sections: Learning management systems (LMS)(Blackboard), online video platforms (YouTube), and online networking tools (Twitter, LinkedIn).

---

37 Paper 8 is entitled Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Teachers in Blended Tertiary Environments: A Phenomenological Study. (Refer page 266).
38 These EOT categories were based on the multi-dimensional taxonomy, called the Pentexonomy (Tuapawa et al., 2014), a robust, contextualised, and multi-dimensional framework for categorising EOTs.
39 The labels used to describe the EOT types were based on the Pentexonomy (Tuapawa et al., 2014, 2016), a robust, contextualised and multi-dimensional framework for categorising EOTs.
40 Paper 9 is entitled Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments: A Phenomenological Study. (Refer page 280).
41 Paper 10 is entitled Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments: A Phenomenological Study’. (Refer page 296).
42 A large amount of data was expected and received from the phenomenological interviews. In recognition of this, the author stated in Ethics Application (HREC Approval No. H-2014-0257) that the data would ‘be used in a series of publications, during and beyond the submission of this thesis’.
43 Paper 11 is entitled Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments: A Phenomenological Study’. (Refer page 316).
Data from nodes 6 to 10 (Table 10) were reassembled into a teacher-to-teacher based memo, and interpreted through an analysis of local themes. These provided the basis for the discussion of results in Paper 12\textsuperscript{44}. They were organised into three sections: Learning management systems (LMS)(Blackboard), and online networking tools (Twitter, Facebook).

Data from nodes 11 to 15 (Table 10) were reassembled into a teacher-to-content based memo and interpreted through an analysis of local themes. These provided the basis for the discussion of results in Paper 13\textsuperscript{45}. They were organised into two sections: Learning management systems (LMS)(Blackboard), and online video platforms (YouTube).

Data from nodes 16 to 27 (Table 10) were reserved for analysis after the submission of this thesis. Discussion of this data is beyond the scope of this PhD.

\textsuperscript{44} Paper 12 is entitled ‘Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Teachers in Blended Tertiary Environments: A Phenomenological Study’. (Refer page 328).

\textsuperscript{45} Paper 13 is entitled ‘Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments: A Phenomenological Study’. (Refer page 343).
3.8 Thematic analysis

Achieving the aim in a phenomenological study involves making an interpretation of phenomenological data through a process known as thematic analysis. In this process, themes, which are the essential meanings of or aspects associated to the phenomena, are abstracted or discovered through thoughtful engagement with the description of the experiences (Waters, 2016). Theme abstraction constitutes the main basis for obtaining interpretations that are faithful to the meanings of the phenomenon (Padilla-Diaz, 2015). The themes are viewed and articulated as written interpretations of the lived experience (Sloan & Bowe, 2014). Bringing the phenomena to light through interpretation is the result of such research, and the main contribution to knowledge (Sloan & Bowe, 2014, p. 20) in any phenomenological study.

This section provides an analysis of the themes abstracted from students’ and teachers’ EOT experiences with other teachers, other students, and content. Due to the number of themes, and the varying perspectives from which they were understood, they have been divided into two types: global themes, and local themes. Figure 24 provides a conceptual model that demonstrates how these themes have been organised for discussion.

**Figure 24:** Thematic analysis structure of global and local themes
Global themes, often called *superordinate* themes (Wikipedia, 2016) or *collective* themes (Waters, 2016, p. 1) are broader than local themes, and reflect meanings that stretch across the spectrum of phenomenological experiences.

In this analysis, the global themes relate to students’ and teachers’ EOT experiences with other teachers, other students, and content. These are presented in six subsections: 1) students’ EOT experiences with teachers, 2) students’ EOT experiences with students, 3) students’ EOT experiences with content, 4) teachers’ EOT experiences with students, 2) teachers’ EOT experiences with teachers, and 3) teachers’ EOT experiences with content. These themes are not directed at specific EOTs, but use excerpts from stakeholders’ experiences with EOTs to support the interpretations.

Local themes on the other hand, are unique to a few participants (Waters, 2016, p. 1), are more specific than global themes, and contain a tighter granular focus on specific elements within the experiences. In this analysis, the local themes relate to the use of specific EOTs, and include quotations from participants’ descriptions of their experiences with brand exemplars.

The *global* and *local* themes are organised and presented in a tabular format, as demonstrated in *Table 14*. The tables present the themes and theme descriptions. These are followed by direct quotations from the narrative, which supports or illustrates their meaning (Waters, 2016; Wikipedia, 2016).

**Table 14:** *Format of individual themes*

<table>
<thead>
<tr>
<th>Theme:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Description:</td>
<td></td>
</tr>
<tr>
<td>Excerpts:</td>
<td></td>
</tr>
</tbody>
</table>
3.8.1 Global themes

This section identifies and describes the global themes abstracted from students’ and teachers’ EOT experiences with other teachers, other students, and content. These themes are presented across the following six subsections: 1) students’ EOT experiences with teachers, 2) students’ EOT experiences with students, 3) students’ EOT experiences with content, 4) teachers’ EOT experiences with students, 2) teachers’ EOT experiences with teachers, and 3) teachers’ EOT experiences with content.

Note: While this analysis identifies the themes and provides excerpts from the narrative to support their meaning, it does not contain an in-depth discussion. A full synthesis of the global themes is reserved for the Discussion in Section 4. Also, the excerpts provided alongside and in support of each theme do not represent the entirety of text about the theme, but provide a few notable examples of statements from the narrative that support the meaning of the phenomena. Statements are identified through the use of ‘single quotation marks’. Additional words have been added between excerpts to help readers understand the context of participants’ statements. The privacy of participants has been maintained by not referring to them by name, but in a general manner.e.g 'some students felt that...', or in third person, e.g. 'one student said...

### 3.8.1.1 Students’ EOT experiences with teachers

<table>
<thead>
<tr>
<th>Global theme 1: Teachers’ negative EOT attitudes damaged students’ learning experiences</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong> Negative attitudinal characteristics had a greater influence on students’ experiences, than positive characteristics. Evidence of this emerged as their recollections of teachers’ negative attitudes became more frequent, detailed, and expressive. They described challenges involving teachers’ inactivity, response times, and haphazard provision of content. Teachers’ lack of communication left students feeling confused, neglected and abandoned.</td>
</tr>
</tbody>
</table>

| **Excerpts:** Students’ experiences using LMS to interact with their teachers were described as ‘really difficult’, ‘really hard’, ‘frustrating’, and ‘notorious’. They were frustrated with teachers who did not use LMS to respond to questions in a timely manner, or at all. One lecturer failed to ‘respond to anyone. It [was] frustrating.’ ‘You post a question, but you don’t know when you’re going to get a response.’ Another student criticised his teacher’s habit of shovelling ‘everything away online’ by uploading notes which were simply read out during the lecture. ‘If I want[ed] that, I [could have] just sat at home and read what he’s written. I want[ed] the lecture to add value to those notes, not be the notes.’ ‘It’s going to result in poor attendance, which did happen in some cases. The first lecture was always well attended, then less, then attendance went |
down and down.’ ‘I hardly took any notes, there wasn’t much point, it was already there. My preparation for exams consisted of me reading those slides over and over again. The exams were presented in such a way as you could get away with that. If you read all the lecture notes, you were pretty much guaranteed a pass.’ The ‘teacher [was] not very active…, our [video recording would be uploaded] very late.’

Global theme 2: Teachers’ negative methods of EOT engagement damaged students’ learning experiences

**Description:** Negative EOT methods had a greater impact on students than positive methods. Their recollections of teachers’ negative EOT engagement methods were frequent and descriptive. They included descriptions about ineffective EOT use, lack of EOT efficacy, restricted access levels, broken links, design inconsistencies, non-standard page customisations, navigation issues, and lack of communication. Design inconsistencies which occurred across course pages, caused frustration and confusion. Non-generic page designs created navigational issues, which wasted time.

**Excerpts:** The teacher ‘said ‘I’m going to change the assignment’, and so we’re going ‘what is the assignment, do we need to study for something? Is it an online test? Is it a written piece of work? What exactly do we need to prepare for?’ And he’s not responding to anyone. So it’s frustrating.’ Some experienced negative impacts due to ‘rustiness on the lecturer’s part … not clicking on the right things at the right time’. They ‘[tried] to manage [the EOT] while teaching … [often] stopping the class to type [or] shrink windows, [which] … interrupted class time, [consuming] ‘a good 10–15 seconds in limbo’. In LMS, ‘every page…set up [by teachers] is slightly different to the others’, ‘It’s a minefield’, ‘you really have to trawl through it.’

3.8.1.2 Students’ EOT experiences with students

Global theme 1: Students’ positive EOT attitudes enhanced learning experiences

**Description:** Analysis of the frequency and nature of student’s positive interactions indicated that their relationships with each other contributed significantly to the success of peer learning experiences. While negative methods did occur, their impact was comparatively minor to those that encouraged EOT engagement and participation.

**Excerpts:** ‘With exams due at the same time, everyone [kept] in touch, it [was] handy.’ ‘You [could] chat to each other while they’re online’. ‘If they had a question that needed answering, it was quick, you’d get feedback straight away, you’d know that they’re online and they could start typing and see that happening.’ ‘You [would] know where
everyone [was] up to because of the questions they’re asking and the answers.’ ‘You didn’t have to wait 5 minutes to sync, you could just be working on one part of it, and they would be working on the other side, and it work[ed] seamlessly’. It was ‘easy and instant. It [was] acceptable. With the people I chat[ed] with, I wouldn’t necessarily ask for the cell phone number to text them...’ ‘With [the] app on your phone, people [were] a lot more responsive.’ ‘Even guys in class logged in and you could talk to them’ from home.

Global theme 2: Acceptance and toleration promoted active participation amongst peers

Description: A positive correlation effect occurred between aspects of attitude and engagement. Accepting and tolerant attitudes, for example, encouraged active participation in online group discussions. Rather than express outright frustration at perceived deficiencies as they had with teachers, students were less confrontational with their peers, and more accepting. Their descriptions of experiences contained less criticisms, portrayed accommodating attitudes, and revealed ideas about how to improve methods. Essentially, students understood other students’ EOT challenges and made allowances. Their commonality as students in an online community created an atmosphere of acceptance and toleration, which encouraged their peers to engage.

Excerpts: When communications between students via LMS were slower than expected, taking ‘a day, rather than a couple of minutes’, students focussed attention, not on lack of proficiency, but on workaround solutions, such as making a switch to another EOT. To make it easier, we could have ‘take[n] those good things from [EOT]...all of a sudden you [would] have got a much more efficient system...’ ‘With [EOT] app, people [were] a lot more responsive.’ ‘We should [have] add[ed] students, not just from a specific campus group, but [those] who [were] studying this course in all the Universities.’ ‘Students [may] think they’re being helpful’. We could ‘reward ...those who share[d] or help[ed] other students ...’, I [did] sometimes, just to be nice... out of goodwill, I do, but not everyone does...because people [would] do a lot for literally nothing...[reward them with] a little trusted or VIP thing’ which would say to other students ‘oh this guy, he [was] good, he [had] helped a lot of people’.

Global theme 3: Students’ positive EOT methods enhanced their peers’ learning experiences

Description: Certain methods students’ employed made a positive difference to their peers’ learning experiences. They occurred in collaborative group discussions, and through immediate notifications and messaging. Using one particular EOT, students delivered instant messages, and initiated chats with multiple others, which prompted engagement, and intensified interactions between learners. The level and pace at which
interactions took place enabled rapid and progressive discussion. Working together efficiently, users were compelled to share knowledge on topic-relevant threads, exchange and reciprocate feedback, and deliver mutual support on time-sensitive tasks, such as assessments. In this environment, strong engagers interacted enthusiastically, motivating others to participate.

**Excerpts:** ‘Conversation[s] would get] started on one of the assignments’, and involve ‘multiple people [who were] talking‘, ‘post[ing] and shar[ing] links to useful info’. Through notification and instant messaging, students ‘chat[ted] to [their peers] directly’ and ‘got feedback straight away’. ‘If [they] had a question that needed answering…it was’ responded to quickly. ‘You’d know that [other students were] online and they could start typing’ to provide assistance.’ They would ask ‘have you started your assignment...are you going to class?’ One student described her EOT experience in communicating with others as ‘easy and instant’, because ‘you [were] getting notifications all the time’, which was useful ‘hands down...in terms of getting hold of classmates...and for group work...’ it was ‘really [the] best’. ‘Yes absolutely, hands down. In terms of getting hold of classmates and also, for example ... with group work.’ ‘It was easy, did the job. It was user friendly, it was simple. It was just press record, press stop. It asked where you wanted to save it, you just saved it. And then that was it, it was done.’ ‘Often ...another student [would] answer you before the lecturer.’

**Global theme 4: Students’ EOT efficacy enhanced their peers’ learning experiences**

**Description:** High levels of EOT efficacy helped enhance students’ experiences with their peers. In this instance, their familiarity, comfort, and proficiency enabled fluid, cohesive interactions that supported collaborative learning, motivated engagement, and prevented the need for time-consuming ‘ice-breaker’ activities that could potentially slow progress. They understood the rules of engagement, and adapted unhesitatingly. Positive EOT methods stimulated them to consider ways in which other EOTs could be improved.

**Excerpts:** For example, after experiencing benefits using one EOT’s notifications and messaging, students ‘wished that [their LMS] incorporated [a similar] notification and instant messaging’ functionality, to enable them to ‘chat to [other students] directly, because once you realise[d] who [was] on track with what you’re doing, you could...get a lot further very quickly’. They recommended that TEIs ‘take functions from [this EOT]...take those good things from [it], incorporate these into [their LMS], and ‘all of a sudden, you’ve got a much more efficient system’. The logic in doing so was that ‘we’re using [this EOT] to do it anyway’, it’s ‘easy and instant’, a socially acceptable form of engaging in discussion with classmates, ‘you [got] feedback straight away’, and clearly ‘students [were] mostly using [it for] groups’ because ‘hands down...in terms of getting
hold of classmates...and for group work...’ it ‘[was] really [the] best, [and] people [were using it] more’. ‘Being able to edit stuff simultaneously [using another EOT] was good. You didn’t have to wait 5 minutes to sync, you could just be working on one part of it, and they would be working on the other side, and it work[ed] seamlessly.’

### 3.8.1.3 Students’ EOT experiences with content

#### Global theme 1: Good content characteristics contributed positively to students’ learning experiences

**Description:** Students appreciated content that was well laid out and designed, freely accessible from a distance, could be updated quickly, was repeatable (replayable), and easy to understand. Characteristics like these promoted positive experiences and reinforced to students the value of using EOTs for learning. YouTube for example, was valued as a platform for viewing and sharing video content. Video demonstrations of physical tasks delivered quality, practical, and authentic learning experiences.

**Excerpts:** One student found his teacher’s use of a YouTube video, which demonstrated the use of spreadsheets, to be valuable. ‘I liked the way [the presenter] did it... I found that really helpful, because [he]...knew what he was doing...it was visual [and]...a really good thing. Students enjoyed being in close proximity to the task, rather than viewing content that had been shot using ‘a camera at the back of the room’. ‘It’s free. It’s easy, just follow the link.’ ‘It was really good... it was really interesting and good to do something different.’ ‘Listen[ing] to things that you [didn’t] get, listen[ing] over and over again and try[ing to] understand the points’.

#### Global theme 2: Poor content characteristics damaged students’ learning experiences

**Description:** Students did not value EOT experiences in which content was inaccessible, contained inconsistent or dated layout and design, lacked instructions for usage, and contained overuse of or poorly written text. These characteristics caused frustration and dissatisfaction. In Moodle, for example, access to learning content such as online texts and links to other resources sometimes failed.

**Excerpts:** ‘People spen[t] hours and hours trying to find answers to their questions...one of our subjects had over 1000 posts on it’. ‘We [had] some challenges with it, a lot of the time it would freeze up or not let you go past a certain point... That was an issue. It wouldn’t let you rerun without doing a whole lot...but there was a lot of trouble where, it would run through once and lock you out. And then especially the computers on campus would be locked out to run it again, so then you’d have to jig with
it, that was very annoying.’ Although teachers ‘put YouTube videos into their lectures...the links [didn’t always] work or the sound [wouldn’t] work.’ Others complained about the layout, design and general appearance of content in LMS. ‘It look[ed] dated. None of the 18-19 year olds use[d] it...it look[ed] terrible, like something from the nineties’.

3.8.1.4 Teachers’ EOT experiences with students

Global theme 1: Students’ positive EOT methods and participation enhanced their teacher’s experiences

**Description:** Students impacted experiences through their methods of EOT engagement, and participation. For example, their enthusiastic and novel use of Twitter during classroom sessions pleased one teacher, who had used a visualiser to demonstrate her students’ on-topic engagement in class. Students increased contributions in response to teachers’ innovative EOT efforts helped encourage them to continue exploring ways in which to use EOTs to enhance learning and engage learners.

**Excerpts:** ‘When I [saw] that tweets [were] happening, I [would] flick to [it], and everyone [would] have a laugh and we [would] look at what’s on Twitter, and what they’re tweeting.’ ‘Sometimes people [would] ask a question [in a comical but forthright manner]...like ‘what the hell is she talking about today?’ It was encouraging when ‘immediate...feedback [was forthcoming] if you used it right. ‘Instagram [was] great because you [could] crop the image, focus, put filters on, [so that it was] part of the assignment in an indirect way. There [could] be good learning, they [could] use Bloom’s Taxonomy higher levels of learning, in Instagram, through reflection and [by] creating their own...tangible learning.’ ‘As far as supervision, it [was] amazing, it [was] just a really good tool. The main benefit [was] that we [were] live, we [were] together. It [didn’t] cost anything. I [could] do it from my workspace. I love[ed] the way that we [could] share documents. I love[d] the way I [could] use the whiteboard tool to write things. It was just a really good space, and I really enjoy[ed] it.’

Global theme 2: Teachers’ level of EOT activity was not dependent on student contributions

**Description:** While students’ positive EOT methods and participation levels contributed to positive experiences for teachers, interestingly the level of teachers’ EOT activity was not completely dependent on students’ contributions. Notably, teachers’ experiences were not influenced or manipulated by students’ activity as significantly as students’ experiences were influenced by teachers’. The impact that teachers had on
students’ experiences was comparably greater.

**Excerpts:** ‘The key [was] helping them find the answer without relying on me, but also minimising the interactions. Each year I [would] gradually be able to reduce the number of posts...’ ‘I use[d] the discussion forums ... and I [would] set it up in such a way that they end[ed] up talking to each other. I set the requirement that there can’t be any repeats or duplications.’ ‘I anticipated that some students might have [had] problems videoing themselves, so I gave them ample advance warning, “I’m going to expect you to do this, this is your responsibility to sort out a camera and upload it ...’ ‘Rather than a student’s coming to me and complaining, they [could] already see what’s selected and make the decision themselves.’ ‘I like[d] being able to track whether students [had] been interacting with the system, or not, because if not, it’s generally a sign that something [was]wrong. You [could] tell, if they [hadn’t] logged in and done any tutorials... The system [could] generally track this, you [could] say ‘well, you [hadn’t] done this practise, or short test, is everything going ok? ... it [made] things more efficient for me...It [kept] track of everything, it’s a good backup.

**Global theme 3: Technical issues negatively impacted teaching experiences**

**Description:** Teachers did not value experiences in which EOTs were difficult to use or had hardware and technical issues that affected the quality of teaching. These characteristics made teaching difficult. Blackboard’s usability issues and slow operation, for example, caused frustration.

**Excerpts:** ‘I [didn’t] find it a very successful environment at all. Basically, given I [had] 100 distant students, if I [had] ... any more than 4 on the chat, there [were] problems with microphones, it’s very problematic.’ ‘It’s still not developed well enough, there’s time delays on the voices, so it’s not as clear as you and me speaking here, there’s a time delay. With people having to switch on and off microphones, ...it [didn’t] make for a very smooth conversation. I think there [were] technical problems there that need[ed] to be resolved first, although the elements [were] there, it just [was] not working.’ ‘The time lag need[ed] to be developed a little bit. This switching on and off microphones [was] clunky, it’s a clunky system.’ ‘The system was the failure, in the fact that it doesn’t cater to that terribly well. It’s trying, but it [didn’t] do it well enough.’ ‘In chat session[s], sometimes I [got] kicked off, sometimes students [got] kicked off. Of course it crashed, and it was heaps of work, and the interface was crap, and so it ...meant a lot more work.’

### 3.8.1.5 Teachers’ EOT experiences with teachers
Global theme 1: Teacher’s use of social and professional networking tools created positive relationships and development opportunities

**Description:** Teachers impacted their colleagues EOT experiences through their communications, social and professional networking, and resource-sharing. These activities, facilitated through purposeful use of EOTs, like Facebook and Twitter, generated positive experiences between teachers. Teachers who provided willing assistance, support and encouragement promoted active participation in online discussions, which helped create environments that encouraged collaboration, strengthened relationships, and supported growth. Analysis of these positive interactions indicated that teacher to teacher relationships contributed significantly to the success of teaching experiences. Support for work-based activities was provided through direct online conversations. These interpersonal interactions expanded from general communications, on to collegial and peer support. Teachers using Twitter, for example, connected with a variety of individuals including industry professionals. Working in the same field, they valued having ‘that interaction’ with other like-minded individuals. Bonds developed between those engaged in similar activities, maturing into relationships that were characterised by mutual engagement, collaboration, support and respect.

**Excerpts:** ‘Facebook messaging’ said one teacher, was used to facilitate ‘[our] work communications’. ‘You [could] have a conversation about what’s going on,’ and ‘you [could] get to know a lot of people that way.’ One teacher described Twitter as ‘probably my best teacher-to-teacher environment,’ explaining that ‘we [had] a communication list, so that we [could] all see what we [had] tweeted in the previous period.’ With Twitter, ‘everyone [was] easily accessible,’ said one teacher, expressing her confidence in the ability to start relationships with subject experts. Although ‘you might [have thought] ‘oh, I [couldn’t] approach them’, you [simply had to] find something that interest[ed] them, and then get into a conversation that way.’ ‘I use[d] Twitter, more for professional work...so I ha[d] ... buddies on there, a mix of industry and professionals.’ ‘Using these tools mean[t] you [were] not alone, and you [could] collaborate with people outside of your institution. You’re with people who [were] like minded.’ ‘I like[d] ... finding professionals that you want[ed] to work with. I [was] thinking beyond PhD, and [started] approaching people for jobs, professional networking.’

3.8.1.6 Teachers’ EOT experiences with content

Global theme 1: Good content characteristics contributed to positive teaching experiences
**Description:** Teachers valued EOT experiences in which content was easy to download, edit, and maintain, was delivered efficiently, and presented clearly. It was important to teachers that an effective balance be achieved between the content’s aesthetic or visual quality, and download speed.

**Excerpts:** One teacher had a ‘YouTube channel that [she put] videos on’ and also a ‘a class YouTube channel’ that contained ‘links to useful websites and games’ that supported learning. Some valued YouTube’s ability to handle large files. ‘What’s awesome about this, is that...it [would] split... your files up, [and] while it’s uploading, you [could] put all [your supporting video] info up.’ Another valued being able to store files on it ‘instead of using local storage or LMS storage’. ‘I post[ed] all my lectures online before the actual day. I [would] post reading material that [was] useful. I ha[d] a ... channel that I put videos on.’ ‘I use[d] Flip videos, Prezi, Mindomo, PeerWise. I’[d] made flip videos of myself, as an introduction to the course, as students never [saw] me. I’[d] use Prezi as a way of developing a presentation. I’[d] use Mindomo ...very successfully, and shared that around.... ‘I[’d] use Word Cloud ... students love[d] it, it’s great, they[’d] go onto this online site, and put words in, I’[d] ask them to use it as a reflection tool. I tr[ied to] do as many things as possible, [since] discussion forums just [got] really tedious for students.’

**Global theme 2:** Poor content characteristics impacted negatively on teaching experiences

**Description:** Teachers did not value EOT experiences in which access to content was low quality or restricted by technical issues, or where there was a lack of control over linked content. These elements created frustration and dissatisfaction. In YouTube, for example, access to teaching content such as video demonstrations of practical tasks sometimes failed. The lack of control over video content from external sources, also created difficulties.

**Excerpts:** One teacher explained how ‘a ...video’ planned for use during class ‘might [have later] not be[en] there, or might [have been] replaced with something inappropriate.’ ‘I [found it] very annoying having to constantly change tabs and the screen layout [was] messy.’ ‘You [didn’t] have control over what you’re linking to in the longer term.’ ‘The videos I’[d] linked to ha[nd] been made private or taken down for copyright reasons, then I [had to] run around trying to update links.’ ‘I had a link to a commercial site which used a game to teach people how to reference correctly, luckily I checked it again before the lecture, because it [had since been] linked to a spam site, because the game project was over, the URL had been let go, and it was flashing all gawdy advertising, you can buy this URL now, $10, had I flicked that up during the lecture, that would’ve made me look crappy.’
3.8.2 Local themes

This section identifies and describes the local themes abstracted from students’ and teachers’ EOT experiences with other teachers, other students, and content. The themes relate to the use of specific EOTs. These themes are presented across the following six subsections: 1) students’ EOT experiences with teachers, 2) students’ EOT experiences with students, 3) students’ EOT experiences with content, 4) teachers’ EOT experiences with students, 2) teachers’ EOT experiences with teachers, and 3) teachers’ EOT experiences with content.

Note: While this analysis identifies the themes and provides excerpts from the narrative to support their meaning, it does not contain an in-depth discussion. The local themes are discussed and presented as the findings in Papers 8 – 13. Some of these publications also contain recommendations for addressing challenges associated to the use of these EOTs. Also, the excerpts provided alongside and in support of each theme do not represent the entirety of text about the theme, but provide a few notable examples of statements from the narrative that support the meaning of the phenomena. Statements are identified through the use of ‘single quotation marks’. Additional words have been added between excerpts to help readers understand the context of participants’ statements. The privacy of participants has been maintained by not referring to them by name, but in a general manner e.g ‘some students felt that...’, or in third person, e.g. ‘one student said...’

3.8.2.1 Students’ EOT experiences with teachers

<table>
<thead>
<tr>
<th>Online conference tool (Adobe Connect)</th>
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<tbody>
<tr>
<td><strong>Themes:</strong> Easy to use, accessible across devices, afforded flexible learning, technical and hardware issues, bandwidth problems, teachers’ ineffective use.</td>
</tr>
<tr>
<td><strong>Excerpts:</strong> One student acknowledged that he ‘g[ot] more, doing it from home’ than in class. Real-time sessions were described as ‘useful for distance learners’ and ‘beneficial’. Yet one reluctant to interrupt lectures with a question, because ‘you [didn’t] want to put someone who [was] speaking off,’ you’d be ‘stopping the whole class from learning’. Others were annoyed with Adobe Connect’s technical issues, which included ‘problems with positioning of microphone, [sound] quality, bandwidth’. ‘One day we had a power cut. I was at home, that was the end of the class and the end of the recording, and there was absolutely no learning. That was a major setback.’ Sometimes the lecturer failed to ‘[click] on the right things at the right time’. They ‘[tried] to manage Adobe Connect while teaching at the same time’, i.e. stopping class to type, alt tab, shrinking windows.</td>
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<table>
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<tr>
<th>LMS (Blackboard)</th>
</tr>
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100
Themes: Enabled engagement for distance learners, more practical than face-to-face, lack of access to resources caused frustration, broken links, restricted access levels, design inconsistencies, non-standard page customisations, navigation issues, expectations not communicated clearly.

Excerpts: With some ‘[lecturers] you [would] wait a week and hear absolutely nothing, when they finally [got] around to answering, their answer ha[d] nothing to do with the question anyway.’ Their experiences using Blackboard to interact with their teachers ‘really difficult’, ‘really hard’, ‘frustrating’, and ‘notorious’. ‘You’d post a question, but’ weren’t sure ‘when you’re going to get a response.’ One ‘lecturer who [hadn’t] responded in 3 weeks’, the result of which was ‘driving me insane’. ‘Considering this [was] the only way of interacting with the lecturer, you [felt] let down that they’re not answering your questions.’ ‘Every page…set up [in Blackboard was] slightly different to the others’, ‘It [was] a minefield’. However, students recognised that it enabled engagement from distance learners, many of whom ‘work[ed] fulltime’ and ‘found’ using Blackboard ‘more practical than standard face-to-face’. ‘Without Blackboard, I couldn’t be a distance student at all.’

LMS (Moodle)

Themes: Potential for extended features and use, afforded flexible out-of-class learning, easy to use, unrestricted access to learning, teachers’ ineffective use, teachers’ inactivity and response times, dated layout and design, lack of training for tool, platform for ‘shovel-ware’.

Excerpts: Students could use Moodle to engage ‘anytime, [without] having to be there’. It gave ‘the freedom to [post a comment] anytime...You [could] post it up, and not worry about it.’ Students appreciated ‘being able to put a [problem]up there, and free your mind.’ But they expressed frustration against teachers who ‘were not tech savvy...[or not] very active in Moodle.’ Teachers who failed to use it effectively needed ‘more...instruction and training’ to accommodate ‘different age groups’, such as ‘someone in their seventies [who would] absolutely struggle.’ Moodle also ‘look[ed] dated. None of the 18-19 year olds use[d] it...it look[ed] terrible, like something from the nineties’.

Web log site (WordPress)

Themes: Useful authoring capabilities, enabled expression, valuable for communicating feedback and developing e-portfolios, anonymity valued, rules needed to guide conduct.

Excerpts: One student used WordPress to ‘express a viewpoint’, believing it to be a
valuable tool with which to ‘diar[ise] … experience’. Another used it to create an e-Portfolio. One valued ‘the relative anonymity...to make honest judgements’ on specific topics. Using WordPress, he could communicate ‘when I wanted to, [and] say what I wanted to, [without] having to make an appointment to get feedback’. But, there were concerns about the need for ‘stricter guidelines around what we were allowed to say...rules around conduct and behaviour.’

**Lecture capture/web cast tool (Echo 360)**

**Themes:** Afforded flexible learning, value in repetitive recordings, teachers’ ineffective use and attitudes, effects of ineffective use on sound quality

**Excerpts:** ‘They’ll put YouTube videos into their lectures and then the links [didn’t] work or the sound [wouldn’t] work, and they[’d be] like ‘Oh well, just listen to it when you get home, [and] I’ll put the link up.’ But, it helped ‘a lot of guys [who] work[ed] ... [they didn’t] have to work [their] job around [their] lecture times ... just go home and watch it’. Viewing pre-recorded lectures enabled students to ‘listen over and over again and try to understand the points’ without having to ‘miss a lecture’. One complained that ‘the lecturers [were] not good at [using] it’. Some ‘walk[ed] around the room and you los[1] a lot of what they sa[id].’ Others ‘point[ed] to...the slides [using laser pointers], but should [have] use[d] a mouse’ to allow those viewing from a distance to follow along. Microphones and sound equipment need[ed] to be used effectively ‘so that online learners [could] hear the questions and answers.’

3.8.2.2 Students EOT experiences with students

**Online conference tool (Adobe Connect)**

**Themes:** Easy to use, accessible across devices, afforded flexible discussions, potential to set up online study groups, technical and equipment issues.

**Excerpts:** ‘It [was] free, it [was] easy, just follow the link, you [didn’t] have to install it’. ‘There’s no login [required], you [could] access it as a guest. It’s accessible learning.’ ‘You [could] even download Adobe Connect on your Smartphone and stream it on the subway train.’ But, the use of poor quality microphones ‘made it difficult to say ‘hello’ to other students. There were tunnel-vision issues. Students [couldn’t] see everything at once’ which ‘present[ed] difficulties with the dissemination of information.’ ‘It [was] bizarre, because if your camera [was] not good enough you [couldn’t] even see the person asking the question or giving the presentation.’ ‘If I was giving a lecture, I would like to have confidence that the quality ... wasn’t being changed because I was in a different location to the lecture taking place.’
**LMS (Blackboard)**

**Themes:** Enabled immediate engagement with peers, provided a common link to every other student, joined together with a common purpose, potential for student profile use, rewards system, asynchronous means slower communications than Facebook, Facebook is superior, potential to improve Blackboard by incorporating Facebook-like functions

**Excerpts:** Conversations were ‘less instant’, ‘on the forum you [didn’t] know who’s online’, but ‘not with Facebook’. ‘It [was] easier to use Facebook’, ‘Facebook [was] good’, ‘it’s handy’, ‘that’s why we use[d] Facebook, instead [of Blackboard for student-to-student interactions]’. While students recognised that Blackboard discussion boards helped determine ‘whether you [were] on track or not’, and that ‘you still need[ed] the discussion boards...[and that Facebook-like functionality] would [only] be supplementary’, the affordances generated by the addition of such improvements ‘would definitely be helpful’. Students recommended ‘tak[ing] functions from Facebook...take those good things from Facebook’, incorporate them into Blackboard, and ‘all of a sudden, you’[d have] a much more efficient system’. A useful addition would involve ‘a little picture up next to [the other students’] names, because ‘you [didn’t] know who people [were].’

**LMS (Moodle)**

**Themes:** Potential for extended features and use, afforded flexible communication, easy to use, unrestricted access to learning activities, slow response rates with asynchronous methods, lack of system orientation, lack of instructions for forum usage, overuse of text, dated layout and design, lack of training for tool, difficulties understanding students with poor writing skills

**Excerpts:** Discussion forums on Moodle provided an ‘opportunity for people to post links, or items of interest’. ‘Delays in reply’, although common with asynchronous tools, created ‘communication barriers.’ For students, ‘it [was] a pain having to wait for responses, it [wasn’t] instant. ‘There [were] no guidelines on what could be posted’. The ease of obtaining knowledge ‘for one-off information gain’ was valued. Moodle ‘[was] an archive’, which allowed new students to ‘go back and see what people were saying last year about the exam topic.’ This was useful for one student, who ‘cross reference[d] and [studied] exams.’

**Online social network (Facebook)**

**Themes:** Facilitated immediate notification, efficient trusted and responsive channel
for discussion, socially acceptable form of peer engagement, enabled collaborative efforts, enabled group discussions, enabled immediate feedback, potential to extend groups into other institutes, not moderated, can be a distraction.

**Excerpts:** Students’ experiences using Facebook and Messenger to interact with their peers via group and instant messaging were described as ‘working well’, ‘easy and instant’, ‘handy’, a ‘more efficient system [than Blackboard]’, ‘superior’, and ‘the best’. Instant messaging enabled students to ‘chat to [their peers] directly’ and ‘get feedback straight away’. ‘If [students] had a question that needed answering...it was’ responded to quickly. ‘You’d know that [other students were] online and they could start typing’ back to provide assistance. Everyone kept in touch, [which was] handy...’ But ‘[it’s use was] not moderated, and [its presence could] be a distraction.’

**Online collaboration tool (Google Docs)**

**Themes:** Useful for document preparation and collaboration, enabled group chat while updating documents. Format incompatibility, overly automated setup, access issues, and potential for imbalance of work amongst group users, document ‘sharing’ issues.

**Excerpts:** It has ‘not been so great with Internet Explorer. The PowerPoint type of technology that Google use[d] is [in] a different format to [the] usual PowerPoint. It [was] very hard to make a PowerPoint in Google Docs and then store it on a USB and load it for your presentation because [of the] weird format.’ However, it enabled students to ‘pool together information’, and coordinate work efforts by ‘putting notes in...writing out sections...[and] sharing it with each other’. They enjoyed being able to ‘edit stuff simultaneously’ without having ‘to wait five minutes to synchronise’. ‘You could be working on one part of it, [while another student was] working on the other side’. It ‘work[ed] seamlessly' and meant that users could ‘update anything on there at the same time’. The ‘little chat section’ enabled group users to ‘chat to each other while they [collaborated] online.’

3. 8.2.3 Students EOT experiences with content

**LMS (Blackboard)**

**Themes:** Enabled engagement for distance learners, lack of access to learning resources, broken links and restricted access levels, inconsistent policies about access to academic texts, inconsistent page design.

**Excerpts:** ‘Video links [didn’t] work, or the link [was] locked’. While trying to access online resources, ‘a lot of the links [were] bad’, making it difficult to ‘move around without pressing back, back.’ Although the teachers ‘put up good stuff for you, you
[couldn’t] get into it’. Students then had to ‘spend hours and hours trying to find answers to questions’, which was ‘very frustrating’. ‘Every page...set up [in Blackboard was] slightly different to the others’, and so effort was expended on identifying the location of required texts. Regarding direct online access to excerpts ‘some lecturers [said] no, there’s copyright issues, [and] we [couldn’t] post it up’, so ‘you’ll have to go and look for it yourself.’ Other ‘lecturers just put it up there’. Unsure of which rules applied, one student responded apathetically, ‘I [didn’t] know who [was] right, or if they [were] just lazy, or what the policy really [was].’ But the effect was ‘very frustrating.’ ‘You search[ed] for it yourself...[asking] have I got the right article? Because the link didn’t work.’

LMS (Moodle)

Themes: Potential for extended features and use, afforded flexible communication, easy to use, unrestricted access to content, access to archived material useful, denial of access to content, lack of system orientation, lack of instructions for forum usage, overuse of text, dated layout and design, lack of training for tool, difficulties understanding students with poor writing skills

Excerpts: Although teachers had ‘put YouTube videos into their lectures...the links [didn’t always] work or the sound [wouldn’t] work.’ ‘They need[ed] to be more professional about the whole system’, ‘it need[ed] to work all the time’. Discussion forums on Moodle provided an ‘opportunity for people to post links, or items of interest’ and interact with this content. "It wasn’t] easy to move around in, without pressing ‘back’. ‘There [were] no guidelines on what could be posted’. Students found that content presented in a range of formats including ‘video, text, audio...lots of different kinds of information’, ‘extremely helpful in doing assignments’, particularly when those resources had ‘content specific to the assessment you’re doing’. Forums helped ‘articulate...to the entire class, [where]...everyone [got] the same message... rather than [having to] verbalise complex issues’ in class.

Online library catalogue (NEWCAT+)

Themes: Inefficiencies in sourcing literature, unwieldy access and technical issues, timing out issues, broken links, value in access to vast amounts of material

Excerpts: Although ‘a link to a book or a journal’ existed ‘You [would] click on it, you[‘d] go to the final stage, you[‘d] have to click on it about 3 times to finally view the article, then it[‘d] pop up and say ‘its unavailable’. I know that [could] be frustrating.’ ‘The library website...log[ged] you out in a haphazard manner’, which meant ‘you ha[d] to re-login to see everything’. Unfortunately, the ‘e-books you[‘d] opened ha[d] timed out, [so] then you’ve ... to re-login and find the book and reopen the book’, which caused
frustration and wasted time. Wanting to know whether the resources were available, students demanded ‘[did] they have it or not? [Did] anyone [get] this journal article? [Did] anyone [get] access?’ ‘It just waste[d] your time…you los[t] track of where you were’. There were also challenges in locating articles using the search facility. ‘Although you [would] search for exactly the topic, the journal article…[would] not come up as number one.’

**Lecture capture/web cast tool (Echo 360)**

**Themes:** Afforded flexible access to content, value in repeating recordings, ineffective hardware use meant poor content quality

**Excerpts:** ‘It [was]s good to be able to save videos and go and look them up again, look in your history.’ ‘It [was] like you’re sitting in class.’ Viewing pre-recorded lectures enabled students to ‘listen over and over again and try to understand the points’ without missing out. ‘You [could] really listen to the things that you [didn’t]’ understand. Others however, experienced problems in interacting with content. ‘The links [didn’t] work or the sound [wouldn’t] work’. Students had to ‘reload it a few times’. Another criticised having to view a ‘video [which had been recorded] from the back of the room’, which made it difficult to view the content clearly. ‘You [couldn’t] read what [was] on the slides.’

**Wiki (WikiEducator)**

**Themes:** Quick content updates, content easy to add, flexible access to content supports blended learning, facilitates HTML-coding skills

**Excerpts:** ‘You [could] change the content, it was HTML practice, good for HTML skills.’ Students appreciated being able to access ‘more content outside of the Moodle environment, and outside of class’, and enjoyed having control over content to ‘make changes’. ‘Challenge[s involved] ever-changing content’ from a lecturer who would update content ‘on the fly’. Outside ‘users could create a persona for anyone and make comments’ on the wiki, and since ‘this tool [was] not within [the institute’s] boundary of authority, it [became] a problem for the teacher involved…because it [was] the teacher’s initiative.’

**Online collaboration tool (Blackboard Collaborate)**

**Themes:** Technical issues, lag time, functionality issues

**Excerpts:** It ‘[did] not work at all.’ ‘You [couldn’t] hear the video, or the audio [would cut] out, or lag ... a long time.’ ‘Collaborate [was] so bad, it [was] just not holding up to what it [was] supposed to do.’ Disappointed, one student revealed how ‘one of our
assignments got the can because [it was] not good enough. ‘It just wouldn’t work’. So, video content would be uploaded ‘to YouTube instead of Blackboard’ for viewing, it was ‘certainly a lot easier to view’ and did not ‘drop in or cut out’.

**Online video platform (YouTube)**

**Themes:** Useful for sharing video content, easy to use, effective visual learning, close proximity to tasks, control over relevance of material, replayable

**Excerpts:** ‘Lectures uploaded to YouTube were a lot easier to view that way cause you could pause, fast forward and rewind it really simply.’ ‘You could change the quality really easily,’. One ‘lecturer used [YouTube] to explain...[a task using] spreadsheets’, and although able to facilitate this task himself, the lecturer ‘liked the way [the presenter] did it, so he sent us the video’. ‘I found that really helpful, because the [presenter]...knew what he was doing...you could see the computer screen...it was visual [and]...a really good thing.’ Students enjoyed using YouTube’s subscription service to access a content stream on a similar subject. With YouTube, ‘you [could] find out who [was] talking crap’, try and ‘get to the good stuff quickly’, and to support learning 'keep the content good and solid, rather than the waffly stuff.'

### 3. 8.2.4 Teachers EOT experiences with students

This section identifies and summarises the local themes abstracted from teachers EOT experiences with students.

**LMS (Blackboard)**

**Themes:** Enabled flexible learning and engagement, valued for content storage, dissemination and discussion forum features, usability and technical issues, poor design and lack of customisability, lack of platform compatibility, and lack of training for use

**Excerpts:** ‘There were some teething issues to begin with, but the students enjoyed it once they got going.’ ‘I like[d] the structure of Blackboard, it [was] the easiest way for students to find things, as opposed to a newsfeed [on] social media.’ Teachers used discussion forums ‘to facilitate [students’] selection of topics...set[ting] it up in such a way that they [could talk] to each other’ to establish their topic choice. One teacher used the ‘test feature in Blackboard’ to enable ‘instant feedback’ to students ‘in lower stakes assessments’. She valued its ability to ‘test their knowledge on practise questions’. Teachers needed Blackboard to operate effectively ‘across multiple devices’. Although ‘students ha[d] iPads, Smartphones, old and new laptops, Mac and windows... the tools just [wouldn’t] work’. One stated that the Blackboard ‘environment [provided] the only
### Online video platform (YouTube)

**Themes:** Useful for sharing video content, demonstrated hands-on tasks, delivered practical learning experiences, easy to use, appealed to visual learners, transience of video files, other videos created distractions.

**Excerpts:** YouTube provided an additional ‘way of sharing information with students’. Problems arose when file owners removed their video clips, preventing access to learning material. ‘They take it off, so you [had] to be careful...[and] check all the links’ to material intended for class use. ‘Especially if I [taught] a class once a year’, said one teacher, ‘[I had to] make sure the links work(ed) again’. Restrictions on bandwidth caused issues. ‘The bandwidth is abysmal outside of metro areas’, and so if students ‘[didn’t have] good internet...it [would] be hard [for them to access resources, and so] I [had] to be careful of uploading’ to this platform. While ‘related videos’ were ‘really helpful’, teachers admitted that it was ‘easy to get distracted by other videos’. ‘YouTube is great for those who struggle with the printed word’. ‘Young ones {were} more comfortable with YouTube’, than ‘old ones [who were] more comfortable with written’ materials.

### Online networking tool (Twitter)

**Themes:** ‘Added life’ to lectures, stimulated student engagement in and out of class, privacy issues, social equity, lack of technology limits access.

**Excerpts:** One teacher said ‘I encourage[d] students to use Twitter to comment on what we [were] chatting about in lectures.’ In her ‘popular culture course’ she employed a ‘tweet stream’ which engaged students, encouraged on-topic discussion, and provided a means for simultaneous teaching and communication. In-class Twitter activity at times became ‘quite hilarious’. Students could ‘tweet interesting things into [the course] topic...[using] a hash tag as the course code.’ ‘When I [saw] that tweets [were] happening, I [would] flick to the visualiser, and everyone [would] have a laugh and we[’d] look at what was on Twitter, and what they [were] tweeting.’ Students were encouraged to adopt the ‘idea of positive web presence’ and ‘create a digital persona’. Effective engagement without awkward encounters with students on Twitter required finding the ‘right balance between how much of your personal life you intermingle[d] with your professional.’

### Online networking tool (LinkedIn)

**Themes:** Useful communication facilities, provision for networking with professionals.
Excerpts: ‘I [had] ... started a LinkedIn group for current and past students, where I communicate[d] to them and they to me.’ Teachers were ‘happy to connect [with students] on LinkedIn’, and encouraged them to ‘develop a professional LinkedIn page as part of their...course’. Maintaining ‘a profile’ in a ‘professional space’ helped ‘current and past students’ expose themselves to ‘job opportunities’ and ‘stuff they [thought] others might be interested in.’ ‘We [had] ... close to 300 members...and we [had] only been going for 6 months.’ Companies could ‘endorse our courses, [after] having [received] a fabulous graduate.’

3.8.2.5 Teachers EOT experiences with teachers

This section identifies and summarises the local themes abstracted from teachers EOT experiences with teachers.

<table>
<thead>
<tr>
<th>LMS (Blackboard)</th>
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<tbody>
<tr>
<td><strong>Themes:</strong> Facilitated communications, shared teaching resources, content migration. Usability and technical issues, teacher-generated course content</td>
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<tr>
<td><strong>Excerpts:</strong> One teacher explained his experience ‘teaching with another academic...[on] the same course but [with] a different cohort of students’. Sharing knowledge about how to upload and use materials on Blackboard involved collaboration. He explained, that in one instance, ‘we needed to upload a quiz to Blackboard, and [so] we made a bargain that I would figure out how to upload the quiz and ...would give him instructions on how to do that.’ Other teachers used Blackboard ‘mainly...to communicate with tutors’ and other staff. When we prepare the new teaching sessions, ‘we [took] some of last year’s material and...ha[d] to get it into this year’s Blackboard site.’ This required ‘figur[ing] out how to download [the material] and upload it to the [new] site.’ Explaining that this was a joint effort, she continued ‘I’ve done that with my colleague.’ But the process could be ‘kind of tricky’. Teachers felt that for Blackboard to be used effectively, ‘better support and training in general’ needed to be given to their colleagues.</td>
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<tr>
<th>Online networking tool (Twitter)</th>
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<tr>
<td><strong>Themes:</strong> Facilitated networking between teachers and colleagues, information searches and access, professional exposure</td>
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<tr>
<td><strong>Excerpts:</strong> Teachers used Twitter for ‘professional work’, and to connect with other staff members or industry professionals. ‘I [had] ...buddies on there,’ said one teacher, ‘a mix of industry and professional’. Valuable networking opportunities arose for</td>
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teachers using it. ‘I managed to get some good contacts through that’ and ‘[went] along to the occasional educational technology conferences [where]...the attendees [were] usually quite heavy Twitter users.’ Teachers valued having ‘that interaction’ with other like-minded individuals. ‘You [could] have a conversation about what’s going on,’ and ‘you [got] to know a lot of people that way.’ Using Twitter helped teachers realise they ‘[were] not alone’, but could ‘collaborate with people outside of [the] institution’. It was ‘probably my best teacher-to-teacher environment,’ ‘we ha[d] a communication list, so that we [could] all see what we’[d] tweeted in the previous period.’ This led to ‘direct messaging...with other staff and educators.’ We could ‘be quite [topic] specific.’ The exposure Twitter provided was ‘good for your academic career’ Twitter was useful for ‘finding the professionals you want[ed] to work with.’

Online networking tool (Facebook)

Themes: Facilitated social and professional networking between teachers and colleagues, networking with industry professionals

Excerpts: ‘Work communications’ were often facilitated ‘through Facebook messaging’. One teacher used Facebook for work-related discussions, but cautioned against ‘the ephemeral nature of [Facebook]’ messages. ‘It [was] a bit evanescent...[and could] start getting very messy.’ One teacher found ‘it difficult, when I [got] a friend request from another colleague’. Explaining why ‘sometimes it [got] a bit tricky’, she continued ‘I [felt] pressure to be friends with colleagues, [and] then I [would] have to sensor what I [did] on Facebook, ‘and I [didn’t] particularly want them to see [details of] my personal life’.

3. 8.2.6 Teachers EOT experiences with content

This section identifies and summarises the local themes abstracted from teachers EOT experiences with content.

LMS (Blackboard)

Themes: Valued for editing teaching content, provided links to resources, facilitated marking and assessments, usability and technical issues, large file sizes, copyrighted content.

Excerpts: One teacher described Blackboard as the ‘central [means] to formalising content’, and commented on its value for disseminating materials. ‘I like[d] being able to take content from my hard drive and upload [it] to Blackboard, because then it [had] left me, and [it existed] in a virtual area that everyone [could] access.’ There was no
printing out...no formatting’ because ‘it was [all] there online’. Blackboard also
provided an efficient method for ‘online marking’, which ‘[made] it easier’. ‘You [could]
mark and give feedback online, without having to put anything down on paper.’.
‘Blackboard ha[d] quirks’, said one teacher, ‘it suddenly [froze]...it [was] slow’. ‘I found
Blackboard very annoying’ because ‘the screen layout [was] messy’ and required that I
‘constantly change tabs’. ‘You end[ed] up with several different places you [could] enter
marks’. This led to ‘a bit of uncertainty’ about whether ‘comments...[were]...going to get
to the student’. Some disliked Blackboard’s lack of ‘intuitive design’, describing its ‘html
style’ as ‘outdated’. ‘The design of the environment [should] be more customisable.’
‘Copyright issues’ around posting academic content also raised challenges for teachers.
‘We’ve got to be very careful about putting up chapters’. While these users ‘rel[ied]
on...online journals’, help was limited because ‘our copyright rules [got] in our way...and
really slow[ed] things down.’ While ‘having some of the chapters online would [hae
been] good...we [couldn’t] do it.’

<table>
<thead>
<tr>
<th><strong>Online video platform (YouTube)</strong></th>
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<tr>
<td><strong>Themes:</strong> Facility for newer teaching resources, a means to view, edit and upload teaching materials, close proximity to tasks, ability to handle large file uploads, lack of control over linked content, technical issues, low quality footage</td>
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<tr>
<td><strong>Excerpts:</strong> YouTube was used as a repository for teaching content by a teacher who had a ‘YouTube channel that [she] put videos on’ and also ‘a class YouTube channel’ that contained ‘links to useful websites and games’ to support learning. Teachers also valued YouTube’s ability to handle large files. ‘What [was] awesome about this, is that...it split your files up, [and] while it [was] uploading, you [could] put all the [supporting video] info up.’ Similarly, another teacher valued being able to store files on YouTube ‘instead of using local storage or LMS storage’. ‘Technical issues with the screen capture’ meant having ‘to fiddle around...to get it to work.’ ‘Sometimes it would work’, but I needed to know ‘how to make it work reliably’. The potential for technical issues in-class created anxiety. ‘You [didn’t] want to give a half-hour lecture and then find out you didn’t record the sound.’ One teacher thought that the files should have been ‘recorded to the quality of the lectures...on TV or on TED talks’, which filmed using ‘multiple perspectives’, and were more likely to increase ‘engagement’ levels. Otherwise, he asserted, ‘you [would get] people standing up’ and walking out, ‘and it just [wouldn’t] work’.</td>
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### 3.9 Phenomenological output

The phenomenological papers discussed the local themes from students’ and teachers’ EOT experiences with other students, teachers and content. Figure 25 provides a conceptual model that demonstrates how these themes were organised for discussion and presented across the papers.

**Figure 25:** Local themes and research output (Papers 8-13)

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**Paper 8**

Although educational online technologies (EOTs) have transformed the delivery of learning in higher education, significant EOT challenges have impeded their effectiveness, preventing widespread implementation. The persistence of these challenges suggests that tertiary education institutes (TEIs) have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. This research made a phenomenological interpretation of key stakeholders’ EOT experiences, to establish their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. It analysed the EOT experiences of 10 students and 10 teachers from New Zealand and Australia, and interpreted the meanings of these phenomena through an abstraction of local and global themes. The local themes focussed on meanings that were specific to stakeholders’ use of individual EOTs. Paper 8 is the first in a series of six publications that presents these local themes. It documents the interpretations of students’ experiences with teachers, in reference to their use.
of four different types of EOTs: Online conference tools, learning management systems, web log sites, and lecture capture/webcast tools. Included in the interpretations are descriptions of stakeholders’ EOT challenges, which deliver realistic portrayals of the phenomena, and strengthen understandings about stakeholders’ needs. These interpretations helped to inform a set of recommendations for effective EOT use in student-to-teacher interactions, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs through relevant and meaningful EOT support.

**Paper 9**

Paper 9 is the second in a series of publications that presents the local themes. It documents the interpretations of students’ EOT experiences with students, in reference to their use of four EOTs: Online conference tools, learning management systems, online social networks, and online collaboration tools. These interpretations, which include descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use in student-to-student interactions, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs.

**Paper 10**

Paper 10 is the third in a series of publications that presents the local themes. It documents the interpretations of students’ EOT experiences with content, in reference to their use of six EOTs: Learning management systems, online library catalogues, lecture capture/webcast tools, wikis, online collaboration tools, and online video platforms. These interpretations, which include descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use in student-to-content interactions, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs.

**Paper 11**

Paper 11 is the fourth in a series of publications that presents the local themes. It documents the interpretations of teachers’ EOT experiences with students, in reference to their use of three EOTs: Learning management systems, online video platforms, and online networking tools. These interpretations, which include descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use in teacher-to-student interactions, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs.

**Paper 12**

Paper 12 is the fifth in a series of publications that presents the local themes. It documents the interpretations of teachers’ EOT experiences with teachers, in reference to their use of two EOTs: Learning management systems, and online
networking tools. These interpretations, which include descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use in teacher-to-teacher interactions, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs.


Paper 13 is the sixth in a series of publications that presents the local themes. It documents the interpretations of teachers’ EOT experiences with content, in reference to their use of two EOTs: Learning management systems, online video platforms. These interpretations, which include descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use in teacher-to-content interactions, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs.
4 Discussion

This section discusses and synthesises the global themes that emerged from the thematic analysis of key stakeholders EOT experiences in Section 3.8.1. They are delivered as a series of written interpretations of students’ and teachers’ lived experiences (Sloan & Bowe, 2014; Waters, 2016), and organised into six broad sections according to their interactions with other key entities as depicted in the conceptual structure in Figure 26.

In this discussion, links from the interpretations are made to the literature and preliminary research, to help generate ideas and theories that explain the reason for specific occurrences associated to the phenomena. References to various sources, including participants’ personal experiences, the literature, and the preliminary research (Waters, 2016) help to substantiate these theories, and to facilitate triangulation (Yuksel & Yıldırım, 2015), and evoke deeper understandings about the phenomena (Saldana, 2011, p. 8).

Figure 26: Global themes and research output (Discussion)

4.1 Students’ Experiences with Teachers, Students, and Content

The themes that emerged from students’ EOT experiences with their teachers, other students, and content were varied and informative. Their descriptions of the phenomena revealed that effective EOT use contributed to enriched levels of activity and participation, whereas ineffective use created challenges that negatively impacted on learning. Vivid descriptions of their EOT challenges delivered a frank and realistic portrayal of the phenomena, the severity of the issues, and the extent to which these limited engagement in learning. Some expressed frustration, disappointment, and anxiety when grappling with technical or accessibility issues, others voiced indifference or confusion. Despite negative experiences, their general recognition of the role EOTs played in enabling engagement was evident. Positive experiences reinforced to students the value of EOT use, and cemented expectations about online course delivery. Students indicated that improvements to EOT functionality, accessibility and design would reduce certain
challenges, and enhance their interactions with teachers, students, and content. Recommendations given by students for solutions to challenges signalled that they wanted change and relevant support, to ensure their commitment to EOT use.\textsuperscript{46}

4.1.1 Entities influencing students’ experiences

Students’ EOTs experiences were influenced by four primary entities: EOTs, teachers, students, and content. EOTs impacted their experiences through physical use, and through the affordances or issues that enabled or disenabled learning activity. Teachers impacted experiences through their attitudinal characteristics, and methods of EOT engagement with students. Students impacted experiences through their methods of EOT engagement. Content impacted experiences through its tone of format and structure, level of quality in delivery, and level of accessibility.

Students’ experiences indicated their strong expectations of support for and contribution to learning from all entities. Teachers were counted on to use EOTs effectively to communicate, encourage, and assist the learning process, “to master, design, and deliver strategies, techniques, and methods for teaching online courses” (Yang & Cornelious, 2005). Their “roles [were now] more critical in online learning environments” (Moore, 2013, p. 307), and their direct involvement with students, or with the material intended for student use, contributed significantly to the level of success of learning experiences. EOTs were counted on to facilitate the delivery of learning activities in an operationally effective manner. Their ability to function appropriately contributed significantly to the success of students’ learning experiences. Other students were counted on to use EOTs effectively to communicate, notify, share, and collaborate. Their ability to support discussion, deliver feedback, and enhance “connectedness or community” (Balaji & Chakrabarti, 2010, p. 17) contributed significantly to the success of students’ learning experiences. Content was counted on to help present, transmit, build and enhance subject knowledge. Its ability to support learning in an efficient, flexible, “intellectually stimulating” (Origin Learning, 2015), and practical way contributed significantly to the success of students’ learning experiences. The failure of any of these entities to meet students’ expectations, implied or explicit, impacted negatively on their experiences, and resulted in feelings of frustration and anxiety.

4.1.1.1 EOTs as an influencing entity

Students valued experiences in which EOTs were easy to use, afforded flexible learning and unrestricted access to activities, were accessible across devices, delivered practical learning experiences, enabled authoring and self-expression, anonymity, and repetition of activities

\textsuperscript{46} This discussion about students’ phenomenological experiences using EOTs to interact with their teachers was triangulated with literature, and with data from interviews with blended learning experts which verified issues in the literature.
through playback options. These characteristics promoted positive experiences, enhanced “the quality of learning and teaching” (European Union, 2014, p. 11), and reinforced to students the value of EOTs for learning.

Adobe Connect for example, was valued for its ability to support flexible delivery, and enable students to engage while ‘in the class, but at home’, where learning could occur without distraction. Those having online access to real-time class sessions benefited from immersive virtual experiences, and those who missed live sessions could view digital recordings. Describing how he benefited in using Adobe Connect, one student acknowledged that he ‘[got] more, doing it from home’ than in class. Echo 360 was similarly valued, as its play back options enabled students who viewed pre-recorded lectures to ‘listen over and over again…to understand the points’ without ever having to ‘miss a lecture’.

Students did not value experiences in which EOTs were difficult to use, were dated in their layout and design, or had hardware and technical issues that affected the quality of learning. These EOT characteristics generated negative experiences, creating frustration and dissatisfaction (Thiele, Mai, & Post, 2014). For example, Adobe Connect’s various technical problems linked with the ‘positioning of microphone, [sound] quality, [and] bandwidth’ caused frustration. Problems experienced with Blackboard Collaborate reduced confidence in its functionality. For example, one student remarked, ‘Collaborate [was] so bad, it’s just not holding up to what it’s supposed to do.’ Another revealed how ‘one of our assignments got the can because [Blackboard Collaborate was] not good enough.’

Blended learning experts recognised that physical technology constraints created challenges that impaired students’ experiences. One recalled an instance in which Collaborate’s ‘clunkiness’ and ‘unreliability’ made learning difficult, describing its tendency to ‘hiccup…each time [students] needed to do something’ (Tuapawa, 2016a).

4.1.1.2 Teachers as an influencing entity

Teachers impacted experiences through their attitudinal characteristics, and methods of EOT engagement with students. Negative attitudinal characteristics had a greater influence on students’ experiences, than positive ones. Evidence of this emerged as their recollections of teachers’ negative attitudes became more frequent, detailed, and expressive. Noticeably, descriptions of positive teacher attitudes were absent. Reasons to explain this absence varied. It was not necessarily that teachers had failed to exhibit qualities that contributed to positive experiences. It was possible that the significance students had placed on their EOT challenges overshadowed their recall of experiences involving teachers’ positive attitudes. Additionally, positive attitudinal characteristics were an expected component of good teaching. Students anticipated that “those who [taught] online courses should [have]...adjust[ed] their attitudes” (Yang & Cornelious, 2005) and adopted “an encouraging attitude towards e-learning” (Islam et
al., 2015, p. 109) to deliver positive learning experiences. Instances of positive characteristics involving “well-designed and supported instruction” that “increase[d] motivation to engage and learn” (Moore, 2013, p. 130) may not have been explicitly identified, because they were expected. Other expected characteristics included “stimulation of interest, empathy with students’ needs, [and] feedback on work” (Ramsden, 2003, p. 87). Attitudes that worked against these expectations, and included “cumbersome, problematic instruction” (Moore, 2013, p. 130) received attention. The heightened focus on teachers’ negative attitudes was idiosyncratic of “university students [who were] extremely astute commentators on teaching...they [could] understand and [could] articulate clearly what [was] and what [was] not useful for helping them to learn” (Ramsden, 2003, p. 87).

The absence of positive attitude-based experiences could also have been reflective of students’ expectations about teachers’ EOT support. Experts in Tuapawa’s study (2016) noted that high school graduates entering university with misunderstandings about the type and level of learning support provided in BTEs, could experience difficulty. ‘They [thought] that this [was] going to be like everything they[’d] had before’ but once ‘they attend[ed] class, they start[ed] to build an understanding’ of the differences in support at secondary school versus university, and soon realised that a greater level of ‘self-direction’ and independent learning was now necessary.

In addition, the accessibility to learning afforded by mobile technology had created expectations amongst students that teacher engagement would continue after hours and during non-work periods. ‘Generation Z...[were] coming through’ with ‘expectations...that [were] a challenge for [teachers] to keep up with’. They were “students [who had] learned to expect immediate, continuous, all-round support” (Serdyukov, 2015, p. 64). Some “[came] to campus with increased expectations about experience” (Asseo et al., 2016, p. 1). Negative attitudinal traits would more likely stand out and be voiced by students who had “ever-higher expectations” (Newman & Scurry, p. 14), and create difficulties, since “unrealistic expectations [were] likely to remain unmet” (Clinton, 2009, p. 23).

Other reasons for students’ omission of positive experiences could have been forgetfulness, lack of focus, or interview time limits. Conversely, the absence of positive experiences could have signalled that attitudinal problems did exist. These problems could have related to EOT challenges that were known to originate with teachers, and impact on students. Resistance to change, for example, was a significant EOT challenge that occurred in teachers in whom there was ‘no actual desire to change in the first place’, and in those reluctant to expend additional effort to engage new methods (Tuapawa, 2016a). Resistance to change was often symptomatic of more explicit ‘root cause’ beliefs about using EOTs to deliver learning. These included views favouring the superiority of face-to-face delivery, and negative opinions about EOT usage. Some

47 Learner to teacher interactions were an essential part of education, where an expert instructor sought to effectively deliver a program of learning, and encourage learners to succeed (Tuapawa et al., 2014, 2016), which may involve offering learners an explanation, elaboration or simplification of a concept, depending on their need and level of understanding (Moore, 1989).
“believe[d] that they need[ed] to continue to use traditional teaching methods [and were] resistant to changing their instructional methods” (Blumberg & Weimer, 2012, p. 38). Others expected that the rise in technology use would remove the need for teachers (Peppers, 2016), and they therefore resisted embracing the use of EOTs. Still others had developed a widespread prejudice against e-learning viewing it as “inherently inferior to traditional instruction, because it put distance between the learner and the instructor” (Theriault, 2015, p. 1). These attitudinal characteristics impacted negatively on students’ experiences, and in these instances could have prevented recall or reduced cognition of positive EOT experiences.

Attitudinal characteristics of teachers’ that contributed to negative experiences included inactivity, slow response times, and the haphazard provision of content. For example, students’ experiences using Blackboard to interact with their teachers via messaging and discussion forums were described as ‘really difficult’, ‘really hard’, ‘frustrating’, and ‘notorious’. Students expressed frustration with teachers who did not use Blackboard to respond in a timely manner, or at all, to questions they raised. One student asserted that his lecturer failed to ‘respond to anyone. It [was] frustrating.’ Their lack of communication left students feeling confused, neglected and abandoned. ‘You [would] post a question, but [not] know when you’re going to get a response.’

In another example, a student criticised his teacher’s habit of shovelling ‘everything away online’ by uploading notes which were simply read out during the lecture. ‘If I want[ed] that, I [could have] just s[a]t at home and read what he [had] written. I want[ed] the lecture to add value to those notes, not be the notes.’ Experts recognised that these challenges impaired students’ experiences, and explained how some academics only used LMS ‘for content provision’, ‘for the sake of it’, or as a place to ‘shove stuff online’ without due consideration to ‘the pedagogical side’. One termed this style of content provision as ‘Shovelware’. Another claimed that academics ‘clutter[ed] the screen with too much information’ instead of giving the students the essential information’ in the ‘right spot when they need[ed] it’. Successful pedagogy instead required that teachers “understand how students learn[ed], then design and deliver course materials...appropriately” (Islam et al., 2015, p. 105).

The absence of experiences where teachers’ attitudinal characteristics contributed positively could have been indicative of time and workload constraints on teachers. Experts described the delivery of online learning as ‘very time...and resource consuming’, and ‘a huge time limited effort’ in an already hectic schedule that could quickly ‘become unmanageable’. Teachers, although having ‘creative ideas’ on EOT usage, ‘didn’t always have the time...to implement and design...optimally’. Delivering online learning ‘took significantly longer’ if teachers were ‘new to blended learning’ and were ‘still coming to terms with...[the] new tools’. One remarked on the difficulty teachers had securing moments to effectively engage students. ‘Our time [was]...
limited...so we [didn’t] have the time to do our best’ (Tuapawa, 2016a). “Learning how to use” the EOTs, and “finding the time to learn” was made worse for teachers who had received “ineffective training” (Merfert, 2016, p. 1).

Teachers’ methods of EOT engagement also impacted students’ experiences. As with attitudinal characteristics, negative methods had a greater influence on students than positive ones. Students’ recollections of their teachers’ negative EOT engagement methods were frequent and descriptive. It was noticeable that descriptions of positive teacher attitudes were absent. Reasons to explain this absence varied. A lack of positive engagement experiences could have been indicative of technology-overload, a known challenge that affected teachers’ engagement methods. One expert explained how there were ‘so many tools to choose from, you [had] to nail it down to a realistic mix’, but doing so could ‘be more challenging, more confusing’ in light of ‘mobile [and] pure e-learning’. The integration of these systems was described’ as ‘an academic nightmare for workload allocations and balance’, and this was an issue that could impact on teachers’ abilities to contribute to positive experiences for students (Tuapawa, 2016a). “The wide ranging selection of tools, programmes, technologies...[could] make it difficult for teachers to know where to start” (European Union, 2014, p. 17). As with attitudinal characteristics, it was possible that the significance students placed on EOT challenges overshadowed their recall of experiences involving teachers’ positive engagement methods.

Additionally, positive engagement methods were also an expected component of good teaching. Students anticipated that their teachers would “have a good grip on technology” (Islam et al., 2015, p. 109), view “various forms of technology...as key enablers of interactivity” and “use [it] to better communicate expert knowledge” (Roberts, 2004). While “technological proficiencies were of vital important in this process” (Tufan, 2016, p. 163), it was possible that positive methods were not explicitly identified because they were expected. Attitudes that worked against this expectation however, did receive attention.

Teachers’ methods of EOT engagement that contributed to negative experiences included ineffective EOT use and lack of EOT efficacy, restricted access levels, broken links, design inconsistencies, non-standard page customisations, navigation issues, and lack of communication. For example, ineffective EOT use was observed through ‘rustiness on the lecturer’s part...[he wasn’t] clicking on the right things at the right time’. In one instance, students noted how their teacher ‘[tried] to manage Adobe Connect while teaching...[and often] stop[ed] the class to type [or] shrink windows, [which]...interrupted class time, [consuming] ‘a good 10-15 seconds in limbo’. Unfortunately, teachers’ inadequacies in using technical devices could reduce motivation levels in students (Tufan, 2016).

Design inconsistencies which occurred across course pages, and resulted from non-standard customisations applied to page layouts, also caused frustration and confusion. Non-generic page designs created navigational issues, and wasted time. One student, for example, explained
that in Blackboard ‘every page...set up [by teachers was] slightly different to the others’, and so
effort was expended on identifying the location of required texts. ‘It [was] a minefield’, because
to find what was needed, ‘you really ha[d] to trawl through it.’

Reasons for EOT challenges like ineffective EOT use, often related to a lack of training and
development, rather than to attitudinal causes such as resistance to change. Even students
understood that their teachers who ‘were not tech savvy...[or] very active in Moodle’ needed
‘more...instruction and training’. “Teachers often ha[d] inadequate (or inappropriate)
experience with using digital technologies for teaching and learning” (Koehler & Mishra, 2009,
p. 62). Their technical incompetency’s were one of the major problems (Tufan, 2016). They
“need[ed] specific training, guidance and support...to successfully use these new technologies,
and incorporate them into course delivery...” (European Union, 2014, p. 17). This was now
especially important with students and teachers were “living through the ‘bring your own device’
era (BYOD)” (Skiba, 2016). While teachers who were willing to embrace new technologies and
employed EOT strategies produced learners that were more effective (Peppers, 2016), teachers’
who used EOTs ineffectively exacerbated problems for “students [who] arrive[d] on campus
with greater...experience in technology” than them (Newman & Scurry, p. 14).

Conversely, the absence of positive experiences could signal that problems with methods of EOT
engagement did exist. While most experts considered ‘academics [to be] the main contributors’,
one participant remarked that teachers were ‘terrible at engaging’. This was due primarily to the
growing pressure on teachers to spend time undertaking research, with the ‘publish or perish’
expectation resulting in a reduced focus on engaging students. Experts proposed increasing the
use of casual lecturers, since they did not face the same level of pressure to pursue research, and
therefore had the energy to engage more intensively with students. Experts also stated that
there was pressure on teachers to ‘teach more, deliver more’ although being ‘given fewer
resources to do it’. Although teachers might have been ‘lean and mean last year’, they had ‘to be
leaner and meaner this year’ to effectively ‘facilitate the interaction between the physical and
digital learning spaces’ (Tuapawa, 2016a). This in spite of reports “that it [took] more time and
effort...to teach an online course than to teach a corresponding face-to-face course” (Allen &
Seaman, 2015, p. 26).

It was important to note that students’ descriptions were of first-hand experiences of the
phenomena. This approach was in support of the aim of phenomenology, to understand a
particular phenomenon “from the point of view of the lived experience” (Englander, 2012, p.
16). An interpretation of personal experiences did not necessarily reflect the true nature,
capabilities, or affordances of EOTs, rather the first-hand experience of their use. Also, the
views expressed by students reflected the state of development of software at a particular point
in time, the ways in which it was implemented and maintained, and the manner in which it was
used. Notwithstanding these realities, much was gained from participants’ comments.
A similar perspective could also be applied to teachers. An interpretation of personal experiences did not necessarily reflect the true nature, capability, and characteristics of a teacher. “Students respond[ed] to the situation[s] they perceive[d], and it [was] not necessarily the same situation[s] [teachers had] defined. It [was] imperative to be aware of this routine divergence between intention and actuality in university teaching” (Ramsden, 2003, p. 63). In addition, “the complexity and fluid nature of the teaching and learning experience [was] further intensified by personal perspective” (De Courcy, 2015). As such, there would be differences between the way teachers and students described the meanings derived from the same experiences (Idczak, 2007). Nevertheless, much was gained from participants’ comments. “Good teaching and good learning [was] linked through the students’ experiences of what [teachers did]. It follow[ed] that we could not teach better unless we [were] able to see what we [were] doing from their point of view” (Ramsden, 2003, p. 84). This was the point of phenomenology.

4.1.1.3 Other students as an influencing entity

Other students impacted experiences through their attitudinal characteristics, and methods of EOT engagement with their peers. A positive correlation effect occurred between these two aspects of attitude and method. Attitudes of acceptance and toleration, for example, helped to encourage active participation in online group discussions. Students’ positive methods had a greater influence on students’ experiences, than negative methods. They occurred frequently in student-to-student relationships, and contributed significantly to the success of learning experiences. While negative methods did occur, their impact was comparatively minor to those that encouraged EOT engagement and participation.

Particularly noticeable was the way in which students responded to other students’ negative methods of EOT use. Rather than express outright frustration at perceived deficiencies, as they had with teachers, students were less confrontational and more accepting. Their descriptions of such experiences contained less criticisms, portrayed accommodating attitudes, and revealed ideas about how to improve methods. For example, when communications between students via Blackboard were slower than expected, taking ‘a day, rather than a couple of minutes’, students focussed attention, not on their peers’ lack of proficiency, but on workaround solutions, such as using a different EOT to continue their work. Essentially, students understood their peers’ EOT challenges and made allowances. Their commonality as students in an online community created an atmosphere of acceptance and toleration. Being all ‘in the same boat’, students understood the plight of their peers, and accommodated their limitations. These attitudes eliminated potential threats to effective teamwork, and prevented unnecessary disruptions to learning. Learning environments that built a sense of community among students, encouraged shared learning, and supported teamwork were “desirable” (Sher, 2009, p. 116). In contrast, students responded to their teachers’ negative methods with much greater
levels of negativity. This was probably because students expected that effective EOT use was a given component of good teaching.

Students’ methods of EOT engagement that contributed positively to their peers’ experiences included collaborative group discussions, which were facilitated through immediate notifications and messaging. For example, using Facebook, students delivered instant messages, and initiated chats with multiple students. “The immediacy of feedback in the online environment...[gave] a greater opportunity to communicate with...other students, [which led] to enhanced student interactions” (Balaji & Chakrabarti, 2010, p. 17). This prompted considerable engagement and intensified interactions between learners. Explaining how it occurred, students said that ‘conversation[s] [would get] started on one of the assignments’, and involve ‘multiple people [who were] talking’, ‘post[ing] and shar[ing] links to useful info’. Through Facebook’s notification and instant messaging functionality, students ‘chat[ted] to [their peers] directly’ and ‘got feedback straight away’. ‘If [students] had a question that needed answering...it was' responded to quickly. ‘You’d know that [other students were] online and they could start typing’ to provide assistance. One student described her experience using Facebook to communicate with others as ‘easy and instant’, because ‘you [were] getting notifications all the time’, which was useful ‘hands down...in terms of getting hold of classmates...and for group work...’, it was ‘really [the] best’. These positive online interactions reinforced the e-learning principle of collaboration as a primary method for stimulating learning and encouraging interactivity among learners (Theriault, 2015).

The level of engagement and the pace at which interactions occurred enabled rapid and progressive discussion. Working together efficiently, users were compelled to share knowledge on topic-relevant threads, exchange and reciprocate feedback, and deliver mutual support on time-sensitive tasks, such as assessments. In this environment, strong engagers interacted enthusiastically, motivating others to participate. The dynamic nature of these communications significantly enhanced students’ experiences, providing cognitive and social interactions that “enhance[d] the development of student behaviours, attitudes and relationships” (Serdyukov, 2015, p. 68).

A high level of EOT efficacy helped enhance students’ experiences with their peers. In one instance, their familiarity, comfort, and proficiency with Facebook enabled fluid, cohesive interactions which supported collaborative learning, motivated engagement, and prevented the need for time-consuming ‘ice-breaker’ activities that could potentially slow progress. Students understood the rules of engagement, and adapted unhesitatingly. They considered Facebook to be a smart, efficient, trusted, responsive and socially acceptable channel for group discussion. “The [effective] use of technology greatly facilitate[d] and enhance[d] interaction[s] among students” (Sher, 2009, p. 114).
Positive EOT methods stimulated students to consider ways in which other EOTs could be improved. For example, after experiencing benefits using Facebook’s notifications and messaging, students ‘wished that Blackboard incorporated notification and instant messaging functionality similar to that of Facebook, to enable them to ‘chat to [other students] directly, because once you realise[d] who [was] on track with what you’re doing, you could...get a lot further very quickly’. They recommended that TEIs ‘take functions from Facebook...take those good things from Facebook’, incorporate these into Blackboard, because then ‘all of a sudden, you [had] ... a much more efficient system’. The logic in doing so was that they ‘were using Facebook to do it anyway’, that it was ‘easy and instant’, a socially acceptable form of engaging in discussion with classmates, and ‘you [got] feedback straight away’. Clearly, ‘students [were] mostly using Facebook groups’ ... it was ‘really [the] best, [and] people use[d] this more’.

Students presented less of an influence on their peers’ experiences than teachers. While “student-to-student interactions [were] significant contributors to the level of student learning and satisfaction in [this] technology-mediated environment” (Sher, 2009, p. 114), their impact was not as significant as that in interactions with teachers. Reasons to explain this difference varied. One possibility was that teachers occupied a “more critical” (Moore, 2013, p. 307) and influential role than students, so their behaviour generated higher levels of judgement. Teachers were recognised by 9 out of 13 experts as being among key stakeholders who provided the most significant contribution to BTEs (Tuapawa, 2016b). Their importance was recognised because of their immediate and direct involvement in the teaching and learning process, their day-to-day focus on and influence over blended learning experiences, their role in “develop[ing] the content”, and their role as a “conduit” through which knowledge was passed onto students. Teachers guided the blended learning process, from design to delivery, and were “without doubt” considered “key” and “more important than students” because “if they [didn’t] drive it, it [wouldn’t] happen”.

While some participants felt that student buy-in was critical to the success of a BTE, others asserted that student “buy-in [was] directed by teachers”, that “students [were] not the most influential”, nor at “the centre of learning in a BTE”. Instead “they [were] affected by the outcome” generated by teachers, simply “follow[ed] what the teachers want[ed] them to do”, and were “impacted by how well [teachers] design[ed] and [taught] it” (Tuapawa, 2016b). These experiences that were reminiscent of what was described as “instructor-centred teaching [where] the emphasis [was] on what instructors [did]” (Blumberg & Weimer, 2012, p. 3). Factors including teachers’ use of resources, and levels of interactivity’ (Tuapawa, 2016b) contributed to reasons why teachers were more influential on students’ experiences than other students.
4.1.1.4 Response times: students vs. teachers

Students’ experiences indicated that their peers responded more quickly to their communications, than teachers did. They described situations in which their peers had responded immediately, delivering ‘feedback straight way’, but teachers had failed to respond, or had been very slow in doing so. Teachers’ lack of communication had left students feeling confused, neglected and abandoned. Yet, that “direct personal communication...between students and their teacher [was] an indispensable component of any learning” (Serdyukov, 2015, p. 67). Reasons to explain this problem varied. It was not necessarily that teachers always failed to respond in a timely manner. One possibility was that teachers’ responses were lost in threads that contained multiple events. Another possibility was that teachers responded to the entire class in a general post, rather than to individuals.

Conversely, these experiences could have signalled that teachers’ lack of communication did exist. Reasons for this could have related to a lack of time. Experts described the delivery of online learning as ‘very time...and resource consuming’, and ‘a huge time limited effort’ in an already hectic schedule which could quickly ‘become unmanageable’ (Tuapawa, 2016a). One participant remarked on the difficulty teachers had in securing time to engage effectively with students. ‘Our time [was] limited...so we [didn’t] have the time to do our best’. Students did not always understand or appreciate this, as they “[did] not see every aspect of teaching” (Ramsden, 2003, p. 87). High numbers of students generating multiple messages directed at one teacher generated significant workloads. Experts recommended that TEIs adopt strategies for reviewing teachers’ workloads and research commitments, and prioritise and adjust duties to alleviate burdens. A lack of training or professional development also created challenges that impacted on teachers’ abilities to respond online. ‘Not everyone [was] good at’ using EOTs to deliver learning, and ‘unless teachers underst[ood] how to use [these] effectively, there [would] be problems’. Experts recommended that managers urge and facilitate effective needs-based training for EOT use. “Ensure that whoever [was] involved has appropriate tools, training and support,” and allocate time for teachers to undertake training with a focus on “iterative [skill] improvements” (Tuapawa, 2016a). Top down approaches, which involved management advice and guidance, had been recommended for increasing levels of staff web efficacy, and compensating lack of digital competencies (Manca & Ranieri, 2016).

4.1.1.5 Content as an influencing entity

Content impacted experiences through its format and structure, quality of delivery, and level of accessibility. Students valued EOT experiences in which the content, displayed “in a variety of modalities, such as text, audio, visuals, videos, and multimedia” (Serdyukov, 2015, p. 66), was well laid out and designed, freely accessible from a distance, could be updated quickly, was
repeatable, and easy to understand. These content characteristics promoted positive experiences and reinforced to students the value of using EOTs for learning.

YouTube for example, was valued as a platform for viewing and sharing video content. Video demonstrations of physical tasks delivered quality, practical, and authentic learning experiences. One student found his teacher’s use of a YouTube video, which demonstrated the use of spreadsheets, to be valuable. ‘I liked the way [the presenter] did it... I found that really helpful, because [he]...knew what he was doing...it was visual [and]...a really good thing. Students enjoyed being in close proximity to the task, rather than viewing content that had been shot using ‘a camera at the back of the room’. Content containing practical tasks, which were simple to access, and delivered in a YouTube-style manner ‘would be easier to use’.

Students also valued Blackboard, for its ability to provide access to, and engagement with learning content from a distance. Many who ‘work[ed] fulltime’ found using this tool ‘more practical than standard face-to-face’. ‘Without Blackboard’ said one student, ‘I couldn’t be a distance student at all.’ Another remarked that ‘unlike in an offline environment’, the use of content on Blackboard, and the way it had been structured, helped her to understand ‘very broadly where the whole class [was] up to’.

Students did not value EOT experiences in which content was inaccessible, contained inconsistent or dated layout and design, lacked instructions for usage, and contained an overuse of or poorly written text. These characteristics generated negative experiences, and created frustration and dissatisfaction. In Moodle, for example, access to learning content such as online texts and links to other resources sometimes failed. Although teachers ‘put YouTube videos into their lectures...the links [didn’t always] work or the sound [wouldn’t] work.’ Key findings from a 2016 study, which surveyed students in higher education about digital media use, remarked that “students expressed frustration with lack of access to digital media” on and off campus, “with many stating that many of the necessary resources [were] either unavailable or [could] only be accessed from select computer labs on campus ” (Merfert, 2016, p. 1). They also indicated that content navigation proved difficult. ‘It [wasn’t] easy to move around in, without pressing ‘back, back’. Others complained about the layout, design and general appearance of content in Moodle. ‘It look[ed] dated. None of the 18-19 year olds use[d] it...it look[ed] terrible, like something from the nineties’.

The construction and display of content in LMS was influenced by systems capabilities, and teachers’ design abilities. Reasons for EOT content challenges in course or page design and layout often related to a lack of training and development. The responsibility to engage best practices in course design fell on teachers. Developing effective LMS pages involved knowing the audience, maintaining format consistency, using topic summaries and labels, and other general design principles (Moore, 2011). Good user interface design meant clarity, concision, familiarity, consistency, aesthetics, and efficiency. Effective design principles should have
influenced their use of the building blocks such as layout, positioning, shapes, size, colour, contrast, texture, and text (Garton, 2012). When teachers familiarised themselves with the principles and best practices of e-learning design, the creation of courses that failed to maintain student attention would be avoided (Theriault, 2015). Responsibility for the display of external material accessed from other sources fell on teachers to ensure that it was accessible and appropriate for student learning (Tuapawa, 2016d). Examples of external content included YouTube videos.

Some of the same themes were drawn from experiences with different EOTs. For example, the theme of ‘afforded flexible learning’ was abstracted from students’ interactions with LMS (Moodle) and Adobe Connect. Similar affordances were experienced in using EOTs that had similar characteristics, such as LMS (Blackboard) and LMS (Moodle). Similar affordances were also experienced in using EOTs that had different functionalities but which facilitated a similar kind of experience. For example, Moodle and Adobe both enabled flexible learning (theme), but did so differently. Moodle provided easy access to discussion forums that opened opportunities to share opinions or research, whereas Adobe provided easy access to live (or replayable) lectures which enabled students to share in live classes, or ‘catch up’ on missed sessions.

Some of the same themes emerged from students’ experiences with teachers, as with their experiences with other students. For example, the theme of ‘affording flexible communication’ using Moodle emerged with students experiences with their teachers, and also with other students. This EOT afforded students with the same features and benefits in their interactions with different key entities.

### 4.2 Teachers’ Experiences with Students, Teachers, and Content

The themes that emerged from teachers’ EOT experiences with their students, other teachers, and content were varied and informative. Their descriptions indicated that effective EOT use contributed to enriched levels of interactivity, whereas ineffective use created challenges that negatively impacted on teaching. Vivid descriptions of their EOT challenges revealed the severity of teachers’ experiences, and the extent to which these obstacles limited their engagement in teaching. Some expressed frustration, disappointment, and anxiety when faced with technical or accessibility issues, others voiced indifference or uncertainty. Despite negative experiences, their general recognition of the role EOTs played in enabling engagement was evident. Their positive experiences reinforced the value of EOT use, and cemented their expectations about online course delivery. They indicated that improvements to EOT functionality, accessibility and design would reduce certain challenges, and enhance their interactions with other teachers, students, and content. Their recommendations for solutions to various challenges signalled that they wanted change and relevant support, to ensure their commitment to EOT use.
4.2.1 Entities influencing teachers’ experiences

Teachers’ experiences were influenced by four primary entities: EOTs, students, teachers, and content. EOTs impacted experiences through physical use and the affordances or issues that enabled or disenabled teaching activity. Students impacted experiences through their methods of EOT engagement, and levels of participation. Teachers impacted experiences through their communications, social and professional networking, and resource-sharing with colleagues. Content impacted experiences through its tone of format and structure, level of quality of delivery, and level of accessibility.

Teachers’ experiences indicated their expectations of support for teaching from all entities. Students, although expected to assume responsibility for their own learning (Blumberg & Weimer, 2012; Weimer, 2013), were counted on to use EOTs effectively to fulfil their responsibilities as learners, and communicate and participate in the learning process. Their direct involvement with teachers, or with material intended for student use, contributed significantly to the success of teachers’ experiences. EOTs were counted on to facilitate the delivery of learning and teaching activities in an operationally effective manner. Their ability to function appropriately contributed significantly to the success of teachers’ experiences. Peers were counted on to use EOTs effectively to communicate, network, notify, share, and collaborate. Their ability to provide practical advice about teaching practice (Kelly & Antonio, 2016), support social and professional discussion and deliver feedback, contributed significantly to the success of teachers’ experiences. Content was counted on to help present, transmit, build and enhance subject knowledge. Its ability to support learning in an efficient, flexible, “intellectually stimulating” (Origin Learning, 2015), and practical way contributed significantly to the success of teaching experiences. The failure of any of these entities to meet teachers’ expectations, implied or explicit, impacted negatively on their experiences, resulted in feelings of frustration and anxiety.

4.2.1.1 EOTs as an influencing entity

Teachers valued experiences in which EOTs were easy to use, added life to lectures, and stimulated engagement in and out of class. These characteristics promoted positive experiences, enhanced “the quality of learning and teaching” (European Union, 2014, p. 11), and reinforced to teachers the value of EOTs for teaching. Twitter, for example, promoted a pleasant and motivating learning climate (Ricoy & Feliz, 2016), and was used as a tool ‘to liven up lectures’ and as a real-time alternative to giving and receiving feedback during lectures. Explaining its application, one teacher said ‘I encourage students to use Twitter to comment on what we’re chatting about in lectures.’ In her ‘popular culture course’ a ‘tweet stream’ was used to engage students, encourage on-topic discussion, and provide a means for simultaneous teaching and communication. In-class Twitter activity generated a novel means of interactivity with students,
incentivised participation in varied, innovative activities (Ricoy & Feliz, 2016), and at times became ‘quite hilarious’. Both the teacher and students could ‘tweet interesting things into [the course] topic…[using] a hash tag as the course code.’ Twitter, and also LinkedIn, were used to circulate course information or support communications between teachers or students (Manca & Ranieri, 2016).

Teachers also valued experiences in which EOTs enabled flexible engagement with learners, facilitated content storage, and enabled resource sharing. These characteristics enabled them to make learning content easily accessible to their students (Chikerema et al., 2016). Blackboard, for example, was valued for its ability to support participation from distance students, and for its content storage features. One teacher described it as the ‘central [means] to formalising content’, and commented on its value for disseminating learning materials. ‘I like[d] being able to take content from my hard drive and upload to Blackboard,’ he said, ‘because then it ha[d] left me, and [existed] in a virtual area that everyone [could] access.’ Another teacher used Blackboard as an upload point for his lecture recordings, and as a repository for slides that students could later use for course revision. Teachers also used Blackboard for creating discussion boards to enable feedback on specific topics. One used discussion forums ‘to facilitate [students’] selection of topics…set[ting] it up in such a way that they end[ed] up talking to each other’ to establish their topic choice.

Teachers also valued experiences in which EOTs enabled the demonstration of practical tasks and delivered authentic learning experiences. YouTube, for example, was viewed as a useful tool for showcasing hands-on activities. Teachers commonly used it to demonstrate a particular exercise during class. One expressed her satisfaction at finding ‘an absolutely brilliant 7-minute clip’ that supported her students’ learning. Other teachers provided links via Blackboard to video clips for their students to view. ‘It often encourage[d] critical thinking [because] I [got] them to talk about it and share their experiences, what they [thought] of it, [and] how they might [have] use[d] those ideas in their own practise.’ In other instances, teachers required that students video record a task and upload this file to YouTube. Explaining its ease of use, one teacher explained, how using YouTube in this way was ‘pretty simple’, and made students’ demonstration and assessment of tasks ‘easier for everyone’. In addition, YouTube was valued for its ability to facilitate the ‘sharing information with students’.

Teachers also valued experiences in which EOTs facilitated communication between colleagues, and provided opportunities for social and professional networking, resource sharing, and links to other useful content. Twitter, for example, was valued for its ability to enable interaction with other teachers. It also afforded networking opportunities with industry members, generated professional exposure, and provided efficient access to niche teaching or research resources. Teachers used Twitter for ‘professional work’, and to connect with other staff members or those from the industry. ‘I have …buddies on there,’ said one teacher, ‘a mix of industry and professional’. Another advantage in using Twitter involved ‘the shortness of [posts]’ and ability
to link associated material. Although ‘you [had] ... the character limit...you [could] link to other sources.’

Twitter provided easy access and a channel for interaction even during busy periods. ‘If you’re waiting for a bus, you [could] find a story and link to that,’ said one teacher, and you could ‘favourite things you want[ed] to read later.’ The ‘brevity’ and immediacy of information available on Twitter was valued. ‘It [was] a very quickly communication tool.’ LinkedIn was also valued for its communication facilities, and ability to provide professional networking opportunities. Teachers were ‘happy to connect [with students] on LinkedIn’, and encouraged them to ‘develop a professional LinkedIn page as part of their...course’. Maintaining ‘a profile’ in a ‘professional space’ helped ‘current and past students’ expose themselves to ‘job opportunities’ and ‘stuff they [thought] others might be interested in.’ It would also help them improve their digital literacy and “prepare[dness] for 21st century careers” (Merfert, 2016, p. 1).

Teachers did not value experiences in which EOTs were difficult to use, or had hardware and technical issues that affected the quality of their teaching. These characteristics generated negative experiences, and created frustration and dissatisfaction (Thiele et al., 2014). For example, Blackboard’s usability issues and slow operation caused aggravation. It ‘has quirks’, said one teacher, ‘it [would] suddenly freeze...it [was] slow, not as quick as students would [have] like[d], [and] it [did] not allow for many people to interact [at once].’ It was described by others as ‘clunky’. Experts recognised that physical technology constraints created challenges that could impair teachers’ experiences. One described efforts the use of Google Docs as ‘diabolical on the tablet...a dogs breakfast’ (Tuapawa, 2016a).

Teachers did not value experiences in which EOTs contained poor design, lacked customisability, or had platform compatibility issues. Problems experienced with Blackboard reduced confidence in its functionality. Expressing her frustration, one teacher admitted ‘I [found] Blackboard very annoying’ because ‘the screen layout [was] messy’ and required that I ‘constantly change tabs’. Recommendations for addressing such issues involved the need for TEIs to investigate the potential for extending, enabling and improving LMS features to accommodate teachers’ online course delivery and assessment needs (Tuapawa, 2016d). Platform or compatibility issues also created negative EOT experiences. Said one teacher, although ‘students ha[d] iPads, Smartphones, old and new laptops, Mac and Windows... the tools just [wouldn’t] work’. Additionally, ‘[TEIs didn’t] seem to keep them updated for the new browsers,’ which created usage difficulties. ‘These days [institutes] should have responsive technologies that work across devices, especially as [we] rely... on students bringing their own [devices].’ Such experiences contributed to teachers’ dissatisfaction with the teaching process (Thiele et al., 2014).
4.2.1.2 Students as an influencing entity

Students impacted experiences through their methods of EOT engagement, and levels of participation. Their enthusiastic and novel use of Twitter during classroom sessions pleased one teacher, who used a visualiser to demonstrate students’ enthusiastic on-topic engagement using Twitter in class. ‘When I [saw] that tweets [were] happening, I’[d] flick to [it], and everyone [would] have a laugh and we’[d] look at what’s on Twitter, and what they’re tweeting.’ This activity encouraged class buy-in to Twitter use, and enabled shy students to ask questions confidently. ‘Sometimes people [would] ask a question [in a comical but forthright manner]...like ‘what the hell is she talking about today?’ Questions posed in this way provided an opportunity to immediately address confusion, with the response ‘Do you need me to clarify?’ She was encouraged that ‘immediate...feedback [was forthcoming] if you used it right.’

Students increased contributions in response to teachers’ novel EOT efforts helped encourage teachers to continue exploring ways in which EOTs could be used to enhance learning and engage learners. Interestingly, as shown in another study, students’ Twitter participation increased as their technical competence, which built with further use, improved (Ricoy & Feliz, 2016). These engagements suggested that students, whose EOT skills exceeded those of their teachers, could contribute to the creation of effective teaching practices. Such bottom-up approaches could provide the incentive for teachers to re-think implicit pedagogies, and develop more flexible attitudes towards course delivery (Manca & Ranieri, 2016).

Teachers’ descriptions indicated however, that their level of EOT activity was not completely dependent on students’ contributions. While teachers valued and recognised the role EOTs played in enabling participation (Tuapawa, 2016e), their experiences were not entirely shaped by whether students chose to engage or not. This could have been reflective of teachers’ understandings about students’ responsibilities in the role of self-directed study. As noted by Moore (1989), this practise, also known as auto-didacticism, involved learners that self-educated autonomously using subject-specific content. The asynchronous and virtual nature of this method required that learners assume greater control of monitoring and managing their cognitive and contextual elements (Garrison, 2009). It supported claims that “students should [have made] the strongest effort in an online class...should be motivated...take online education seriously, and apply themselves accordingly” (Nash, 2015, p. 85). These views also aligned with principles of student-centred learning, where the responsibility for learning shifted to the student (Blumberg & Weimer, 2012; Weimer, 2013).

Experts recognised however, that while in a heutagogical sense ‘it [was] easy to say that adults should take responsibility for their own learning’, self-directed learning using EOTs was ‘still a big challenge’ (Tuapawa, 2016a). The challenge imposed on students’, however large, would not necessarily dispel teachers’ views of students’ duty towards their own learning. Although “excellent teachers [were] characterised by their ability to co-construct learning with students”
(De Courcy, 2015, p. 1), their expectations about students’ responsibilities for learning were fundamental, and could explain the lack of influence students had on teachers’ EOT experiences. This lack however, was not necessarily evidence of a non-student-centred approach, since student-centred learning, and the measurement of the phenomenon of ‘centredness’ as it related to pedagogy and technology were open to multiple and competing interpretations (Rowan, 2013). In fact, some proposed that “student-centredness as a pedagogic principle...[was] deceptive” as only very few able, highly motivated, dedicated self-directed learners were capable of assuming the responsibilities of independent learning (Serdyukov, 2015, p. 65).

Notably however, teachers’ experiences were not influenced or manipulated by students’ activity as significantly as students’ experiences were influenced by teachers’. The impact that teachers had on students’ experiences was comparably greater. Reasons for this could relate to the perception that teachers occupied a “more critical” (Moore, 2013, p. 307) and influential role than students, “as the central figure in the learning process” (Serdyukov, 2015, p. 66), and as indicated earlier, because of their immediate and direct involvement in the teaching and learning process, their day-to-day focus on and influence over blended learning experiences, their role in ‘develop[ing] the content’, and their role as a ‘conduit’ through which knowledge was passed onto students (Tuapawa, 2016b). Alternatively, it could be symptomatic of the effects of “instructor-centred teaching [where] the emphasis on what instructors [did] often [led] to students’ being passive learners” (Blumberg & Weimer, 2012, p. 3). Or, as indicated earlier, it could have been due to teachers’ expectations that “students should be self-motivated, and operate as self-directed learners” (Nash, 2015, p. 85).

Teachers’ views about their students’ lack of impact, were not necessarily a reflection of the perspectives that TEIs held about students. Appreciably, the difference in roles between that of teachers and TEIs, as far as their levels of oversight and proximity to the experiences went, i.e. one having a global organisational overview, the other having a more operational granular perspective, made a mismatch obvious. TEIs however, would need to value teachers concerns, as described through their experiences. This would be important since TEIs were being forced to rethink their IT and education models, in light of the emergence of a generation of digital students, and their changing expectations (Gibson, Palmer, Brodsky, & Tully, 2015). TEIs bore responsibility for ensuring their key stakeholders receive an appropriate level of support to fulfil their roles. In fact, “having knowledge of stakeholders [would] always be an important responsibility” for TEIs (Avci et al., 2015, p. 53).

4.2.1.3 Teachers as an influencing entity

Teachers impacted their colleagues EOT experiences through their communications, social and professional networking tasks, and levels of resource-sharing. These activities, facilitated through purposeful use of EOTs like Facebook and Twitter, generated positive experiences between teachers. Their provision of willing assistance, support and encouragement promoted
active participation in online discussions, which helped create positive environments that encouraged collaboration, strengthened relationships, and supported growth. An analysis of these positive interactions indicated that the engagement in teacher-to-teacher relationships contributed significantly to the success of their teaching experiences. In one instance, support for work-based activities was provided through direct online conversations. ‘Facebook messaging’ said one teacher, was used to facilitate ‘[our] work communications’. These interpersonal interactions expanded from general communications, on to collegial and peer support. Teachers used Facebook for connecting or convening relationships with other teachers, and for seeking or providing practical advice about teaching practices (Kelly & Antonio, 2016).

Notably, these Facebook interactions took place with those who were already a part of their extended social network (Boyd & Ellison, 2007). This could have been due to the social and professional boundaries within which teachers felt comfortable seeking support. Also, it could have been influenced by the way in which platforms like Facebook connected people, for example, enabling profile visibility to those in the same network. This did not mean however, that teachers only accessed support from those they knew. It was common for teachers to be members of many different networking sites, and members of many different groups (Kelly & Antonio, 2016).

Teachers using Twitter, for example, made connections with a variety of individuals including industry professionals. Working in the same field, they valued having ‘that interaction’ with other like-minded individuals. ‘You [could] have a conversation about what [was] going on,’ and ‘you [got] to know a lot of people that way.’ Using Twitter helped them realise they ‘[were] not alone’, but could ‘collaborate with people outside of [their] institution’. One teacher described Twitter as ‘probably my best teacher-to-teacher environment,’ explaining that they ‘[had] a communication list, so that we [could] all see what we’[d] tweeted in the previous period.’ This led to ‘direct messaging...with other staff and educators.’ Other valuable opportunities arose through the online development of teacher relationships. Through Twitter one teacher ‘managed to get some good contacts’.

Teachers also enjoyed unimpeded communications with those that might otherwise have been difficult to access. ‘Everyone [was] easily accessible,’ said one teacher, expressing her confidence in the ability to start relationships with subject experts. Although ‘you might [have thought] ‘oh, I [couldn’t] approach them’, you [simply looked for a topic] that interest[ed] them, and then [started] a conversation.’ Twitter was useful for ‘finding the professionals you want[ed] to work with’ to build relationships that could be ‘good for your academic career’. Teachers considered Twitter as a channel through which employment opportunities could arise, a platform for ‘approach[ing] people for jobs’. Positive experiences developed through network channels that had been established for accessing current research. Some described Twitter as an excellent platform for ‘posting interesting industry research’ and ‘keep[ing] up to date with industry matters.’ The circulation of knowledge between teachers also helped promote
community building (Manca & Ranieri, 2016). Possibilities also arose through the paradigm of the IoT, which could provide teachers with the flexibility to “connect with experts from around the world and create robust, hybrid learning environments” (Asseo et al., 2016, p. 1).

Resource-sharing also had a predominantly positive influence on teachers’ EOT experiences. Twitter facilitated the link and distribution of content, and allowed users searching for teaching resources to ‘be quite [topic] specific’ and ‘get info that [was] very...niche.’ Interestingly, the support and cooperation apparent between teacher-to-teacher relationships, was similar to that observed between student-to-student relationships. Bonds developed between those engaged in similar activities, maturing into relationships that were characterised by mutual engagement, collaboration, support and respect. While negative experiences did occur, these related primarily to technical or functional EOT issues, and not personal interactions between each other.

4.2.1.4 Content as an influencing entity

Content impacted experiences through its format and structure, quality of delivery, and level of accessibility. Teachers valued EOT experiences in which content, displayed “in a variety of modalities, such as text, audio, visuals, videos, and multimedia” (Serdyukov, 2015, p. 66), was easy to download, edit, and maintain, was delivered efficiently, and presented clearly. It was also important to teachers that an effective balance was achieved between the content’s aesthetic or visual quality, and download speed. These characteristics promoted positive experiences and reinforced to teachers the value of using EOTs for teaching.

YouTube for example, was valued as a platform for viewing, editing, uploading, and sharing video content. Teachers valued the level of ‘currency’ that YouTube content added to their teaching. The difficulty with ‘textbook examples’ was that ‘even if you [were] using a 2014 textbook,’ the examples within these chapters ‘[were] 2013, 2012.’ As one teacher remarked, the advantage of using YouTube videos, was that ‘you [could] use really current examples’. YouTube was used as a repository for teaching content by a teacher who had a ‘YouTube channel that [she put] videos on’. She had had ‘a class YouTube channel’ that contained ‘links to useful websites and games’ to support learning. Teachers also valued YouTube’s ability to handle large files. ‘What [was] awesome about this, is that...it split your files up, [and] while it [was] uploading, you [could] put all the [supporting video] info up.’ Others valued being able to store files on YouTube ‘instead of using local storage or LMS storage’.

Teachers did not value EOT experiences in which access to content was low quality or restricted by technical issues, or where there was a lack of control over linked content. These characteristics generated negative experiences, and created frustration and a loss of control. In YouTube, for example, access to teaching content such as video demonstrations of practical tasks sometimes failed. The lack of control over video content from external sources, also
created difficulties. One teacher explained how ‘a YouTube video’ planned for use during class ‘might [later have] not be[en] there, or might [have been] replaced with something inappropriate.’ File owners occasionally removed files from YouTube, creating issues for teachers who interacted with the same video content on an ongoing basis. Responsibility for the display of external material accessed from other sources fell on teachers to ensure that it was accessible and appropriate for student learning (Tuapawa, 2016d).

It is important to note that teachers’ descriptions were of first-hand experiences of the phenomena. This approach was in support of the aim of phenomenology, to understand a particular phenomenon “from the point of view of the lived experience” (Englander, 2012, p. 16). An interpretation of personal experiences did not necessarily reflect the true nature, capability, or affordances of EOTs, rather the first-hand experience of their use. Also, the views expressed by teachers reflected the state of development of software at a particular point in time, the ways in which it was implemented and maintained, and the manner in which it was used. Notwithstanding these realities, much was gained from participants’ comments.

A similar perspective could also be applied to students. An interpretation of personal experiences did not necessarily reflect the true nature, capability, and characteristics of a student. In addition, “the complexity and fluid nature of the teaching and learning experience [was] further intensified by personal perspective” (De Courcy, 2015). These perspectives challenged the roles, identities, and professions of learners and educators. Amidst complex and changing circumstances, relationships were being affected by various elements. “Technology, e-learning and massification [had] fundamentally changed how faculty [taught] and interact[ed] with students” (De Courcy, 2015). Nevertheless, much was gained from participants’ comments. This was the point of phenomenology.

The next section provides a conclusion to the research.
5 Conclusion

Although EOTs have transformed the delivery of learning in higher education, significant challenges have impeded their effectiveness, preventing widespread implementation. The prevalence of these challenges suggests that TEIs have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. While it is critical that TEIs adapt to meet these needs, doing this effectively requires that they have current, in-depth knowledge of their stakeholders’ EOT challenges and experiences, at a level that enables the delivery of informed, relevant, and meaningful support.

This research aimed to build understandings of key stakeholders’ EOT experiences in BTEs to determine their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. It was completed in two stages. Firstly, the preliminary research, which aimed to establish a robust foundation of current knowledge for the phenomenological research, reviewed and analysed the key issues in the literature (Refer Figure 3: Objective 1, Outcome 1). These issues included EOTs in BTEs, EOT classifications, key stakeholders in BTEs, and stakeholders’ EOT challenges. Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, the research verified and updated these key issues, and presented the outcomes of the analysis across a series of seven preliminary publications (Refer Figure 3: Objective 2, Outcome 2). These papers identified the EOTs in BTEs and discussed their functionality (Tuapawa, 2013; Tuapawa, in press), identified and augmented existing taxonomies for categorising EOTs, and proposed a multi-dimensional EOT classification system (Tuapawa, Sher, & Gu, 2014, 2016), re-evaluated the identity of key stakeholders in BTEs (Tuapawa, 2016b), identified and discussed their EOT challenges (Tuapawa, 2016a), and elaborated on a key EOT challenge (resistance to change) (Tuapawa, 2015).

Secondly, the phenomenological research interpreted key stakeholders’ EOT experiences, to establish their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. Using the methodology of interpretive phenomenology and a 5-step qualitative analysis process, it examined the descriptions of EOT experiences from 10 students and 10 teachers in New Zealand and Australia, to understand their use of different EOTs to interact with other key entities: students, teachers, and content. It then interpreted the meanings of these phenomena through an abstraction and articulation of local and global themes (Refer Figure 3: Objective 3, Outcome 3). The global theme interpretations delivered broad understandings about the meanings of stakeholders’ EOT experiences with other students, other teachers and content49. The local theme interpretations developed meanings that were specific to stakeholders’ use of individual EOTs. These were presented across a series of six phenomenological publications, which documented students’ EOT

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49 The global theme interpretations were presented in the Discussion section of this document.
experiences with teachers (Tuapawa, 2017b), students’ EOT experiences with other students (Tuapawa, 2016c), students’ EOT experiences with content (Tuapawa, 2017a), teachers’ EOT experiences with students (Tuapawa, 2016e), teachers’ EOT experiences with other teachers (Tuapawa, 2016f), and teachers’ EOT experiences with content (Tuapawa, 2016d).

The interpretations included descriptions of stakeholders’ EOT challenges, which contributed to providing a frank and realistic portrayal of the phenomena, and helped to develop an informed detailed set of recommendations for effective EOT use. These were designed to assist TEIs to meet stakeholders’ EOT needs, tackle EOT challenges and deliver relevant and meaningful support (Refer Figure 3: Objective 4, Outcome 4). They were categorised into the six key areas that reflected the nature of stakeholders’ interactions with other key entities50. In addition to the recommendations, the research also proposed the development of a digital tool for conceptualising phenomenological data to help TEIs make practical application of stakeholders’ EOT experiences.

The phenomenological stage of this research produced content which provided answers to all three research questions. **Answers to the first two research questions**, which were: *What are the EOT experiences of key stakeholders in BTEs? and What interpretations could be drawn from their meanings?* were provided through the richly narrated and highly contextualised interpretations of global and local themes from key stakeholders’ EOT experiences. **An answer to the third research question**, which was *How could these meanings be used to support stakeholders’ EOT needs?* was provided through the detailed sets of recommendations for effective EOT use, which TEIs could use to address EOT challenges and support stakeholders’ needs. Evidence to support answers to this question were also provided through discussions about the practical application of phenomenological experiences.

This research developed and unified two extensive systems of data, aggregating a collection of highly contextualised phenomenological interpretations with a spectrum of expertly-verified literature to form an elaborate and multi-dimensional structure of knowledge. Its output was richly narrated across a dual modularised set of publications, which illuminated and synergised a wide array of contemporaneous EOT issues with compelling firsthand insights into the phenomena of EOT use. Its research processes were governed through a two-fold set of qualitative methods, methodology and philosophy, which were set in a robustly structured bilateral framework of preliminary and phenomenological components. From beginning to end, this research provides TEIs, their stakeholders and the higher education community with a storehouse of valuable EOT insights and recommendations, delivering a highly relevant contribution to the body of knowledge about educational technology in higher education.

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50 The recommendations were presented across the phenomenological publications and in the Recommendations section of this document.
6  Recommendations

This section provides TEIs with a detailed set of recommendations for the effective use of EOTs, as informed through the interpretations of key stakeholders’ EOT experiences. These recommendations are supported through the preliminary research and literature, and aim to assist TEIs in their efforts to address EOT challenges, and support stakeholders’ needs. They are categorised into the six key areas that reflect the nature of stakeholders’ interactions with other key entities in this research. These are as follows: student-to-teacher, student-to-student, student-to-content, teacher-to-student, teacher-to-teacher, teacher-to-content51.

6.1 Student-to-teacher

- Teachers to establish ground rules with the class before beginning sessions using Adobe Connect. Remind students to offer the respect and active listening skills to virtual speakers as they would for live speakers. Decide ahead of time how students will interact with other virtual participants (Adobe Systems Inc, 2010).
- Managers urge and facilitate teachers’ ongoing needs-based training for LMS use, to help them adopt the relevant skills for constructing and delivering their online courses effectively.
- Managers urge and facilitate teachers’ ongoing needs-based training for LMS course page design, to help them adopt relevant skills and engage best practices, employing effective design principles such as clarity, concision, familiarity, consistency with layout, positioning, size and colour (Garton, 2012).
- Teachers to employ good usability principles to make content learnable, efficient, memorable (Voyton, 2014). Learn to organise content so it appears and operates in predictable ways through lists, menu items and clear structure.
- Teachers introduce common rules of email and online messaging etiquette at the commencement of course so that students understand rules of online engagement and methods of communication. Engage these methods consistently, demonstrating professionalism and efficiency. Be concise and to the point, try to answer all questions and pre-empt further questions, and use proper spelling, grammar and punctuation.
- Teachers urge and facilitate training for students in using key LMS features and functions, and ensure guidelines to effective LMS use are provided and easily accessible throughout course. It is critical that students learn to use all key LMS features at the beginning of their course, and that this learning is promoted. Learning can be facilitated, for example, through demonstrations using slide casts or screen casts.
- Teachers reflect on how live sessions are organised and recorded to ensure that in-class learning activities are delivered effectively to distance learners. For example, consider

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51 These recommendations also include those presented in the phenomenological papers.
the position and focus of the camera, its use and recording quality during practical activities or during demonstrations, and the position and volume of microphones and sound equipment.

6.2 **Student-to-student**

- Managers and teachers consider facilitating development of a rewards system that encourages students to deliver online support to each other and acknowledges those who contribute positively to their peers’ learning experiences.
- Teachers encourage students to speak clearly and with appropriate volume when engaging distance learners using real-time, or during interactive recorded sessions, so that communications are heard and understood.
- Students ensure that their personal equipment is working effectively before learning sessions begin. Ensure that their devices are switched to silent to prevent unnecessary distractions to others.
- Managers and teachers consider potential and benefits for integration of Facebook-like notification and messaging functionalities into LMS.
- Managers and teachers explore strategies for extended student use of Facebook to support student-to-student interactions, and group work.
- Teachers encourage native English-speaking students to ensure their written online communications are easy to understand and read for students of other cultures by omitting slang and using clear grammar.
- Teachers establish workaround solutions to address format incompatibilities in cloud-based office applications used by students interacting in groups.
- Teachers ensure that all required online learning content is accessible to students at all times. Regularly check links and URLs to internal and external content.

6.3 **Student-to-content**

- Teachers encourage students to develop and maintain a professional LinkedIn profile which outlines their learning activity, supports their search for work and helps them establish connections with members of industry. Their “profiles can be built over the length of their engagement with a campus, [and provides a] ... way for the institution to also assist them as alums, especially when coupled with employment activities post-academia” (Asseo et al., 2016, p. 1).
- Teachers consider using relevant YouTube videos to visually illustrate complex concepts, adding annotations and links to additional resources (Pappas, 2014).
- Teachers establish who the users of a wiki will be and put in place a moderator who will ensure that learning contributions fit the required goal and format (Malamed, 2012).
• TEIs investigate the potential for modernising LMS design features to improve general style and appearance.

• TEIs investigate any access issues with online library catalogue, and increase awareness of policies about access to academic literature. Ensure that library links are updated and material is easily accessible at all times. Ensure that access to training for students in using these systems are provided and easily accessible throughout course.

• TEIs consider the potential for centralising various online systems with a simplified central access point for students, to prevent multiple login efforts and streamline their access to all required resources and information.

• TEIs to ensure they have a quality IT infrastructure to support rising demand for mobile technologies, which include Smartphone’s and WiFi (Asseo et al., 2016).

### 6.4 Teacher-to-student

• Teachers implement strategies to improve the timeliness of their responses to students’ questions, while ensuring methods of engagement are upheld. Students feel “personal help is really important” (Tuapawa, 2016a, p. 10), but must also respect time and workload restrictions. Teachers log in daily to read new discussions and participate where appropriate, responding where necessary within 24 hours to demonstrate faculty presence in course (Northern Illinois University, 2016).

• Teachers to engage students online to help them “innovate in solving challenges and creating opportunities. Bring in industry partners who can help accelerate innovation and also foster career opportunities for students” (Asseo et al., 2016, p. 1).

• Teachers inform students about which devices and platforms are compatible with the EOTs used in their courses, and which features and functions are operational or require updates. Inform students about how to access online or on-campus technical support.

• Teachers encourage engagement outside of class, suggest innovative methods for using mobile technology to engage, invite participation in learning during ‘non-class’ moments via mobile devices. For example, read course outline while riding home on bus, tweet questions about lecture during coffee discussions with peers.

• Managers urge and facilitate teachers’ ongoing needs-based training for LMS use, to help them adopt the relevant skills for constructing and delivering their online courses effectively. “Faculty must be made aware of the... the need for professional development to enhance faculty competencies within e-learning design” (Theriault, 2015, p. 1).

• Teachers consider innovative ways in which to make content interesting for students. “Avoid the creation of e-learning courses composed solely of static images and text—courses that would fail to maintain student attention and interest over time—instructors must familiarize themselves with principles and best practices of e-learning design” (Theriault, 2015, p. 1)
Managers and teachers consider future implications of Internet of Things (IoT), and how it could be used to increase “connectivity that enhance[s] teaching and learning or that provide[s] new modes of operation. For example, ubiquitous access to computing power, high-quality online content, and social media and connections [could] be used to enhance the educational experience” and “bring the subject matter alive” (Asseo et al., 2016, p. 1).

6.5 **Teacher-to-teacher**

- Teachers share and collaborate on EOT methods that have worked effectively, consider communities of practice to promote features and benefits that have generated positive engagement with students. “Faculty must give up the idea that they are solely responsible for designing their courses and begin to collaborate with other professionals on their institution’s e-learning team.” (Theriault, 2015, p. 1).
- TEIs revise strategies for implementing EOT training as part of teachers’ professional development. In “blended learning, the call for professional development is even more important as the tech integration can only be beneficial when teachers know how to handle various technologies... Encourage teachers to join online communities to gain understanding of what makes digital content great” (Gupta, 2016, p. 1). “Professional development opportunities must be made available to all faculty and incentivized if possible”. (Theriault, 2015, p. 1).
- Teachers to use Twitter and other professional networking sites to post links to their research and those of their colleagues.
- Teachers to encourage colleagues who are anxious about engaging with EOTs to try engaging first in a social manner, and then progress towards educational use. Teachers can support their colleagues by explaining how they use EOTs, and offering to communicate with them using these tools. “Instructors, instructional designers, and support staff are involved in these dimensions in overlapping ways and can benefit from a sense of shared responsibility for delivering e-learning resources to students” (Theriault, 2015, p. 1).
- Teachers encourage colleagues to take advantage of available EOT training. Adopt an open and ‘ready-to-learn’ attitude towards new tools. Discuss EOT features and benefits in informal settings to increase familiarity with tools, and encourage peers to engage in innovate ways. Encourage teachers to join online communities to gain understandings of digital content (Gupta, 2016).
6.6 Teacher-to-content

- Managers urge and facilitate ongoing training for teachers in using key LMS features and functions, and ensure guidelines to effective LMS use are provided and easily accessible. It is critical that teachers learn to use all key LMS features, can provide needed assistance to students, and that this learning is promoted. Learning can be facilitated, for example, through demonstrations using slide casts or screen casts. “Administrators, educators, and instructional designers need to work collaboratively to support and promote digital literacy, while universities need to provide adequate funding and support for digital media resources” (Merfert, 2016, p. 1).

- TEIs investigate the potential for improving and extending LMS features to address issues and accommodate teachers’ additional course delivery needs. “Faculty must be made aware of the future potential of e-learning...” (Theriault, 2015, p. 1).

- Teachers consider bandwidth limitations, and accessibility of materials, ensuring that online file sizes do not impede access to learning, but can be easily downloaded

- Teachers investigate the potential and feasibility for delivering higher quality video lecture recordings, within technical limitations of TEI. For example capturing in-class activity from multiple angles

- Teachers reflect on other colleagues’ effective course design work and incorporate similar design principles into own content format and layout. “Faculty must be made aware of the... collaborative nature of e-learning design” (Theriault, 2015, p. 1).

- Teachers practise engaging with content on a variety of devices, to understand the variety of ways in which online material is presented and delivered

The next section proposes the development of a concept that makes practical application of the interpretations of stakeholders’ EOT experiences.
7 Conceptual application

The documented interpretations of phenomenological data provide a basis from which researchers can make sense of human experiences (Sloan & Bowe, 2014) and apply their understandings of the phenomena to practical situations. This knowledge can, for example, be applied to assist the development of new practices or policies (Creswell, 2006), and help organisations negotiate and adjust to change. For organisations impacted by technological developments, the interpretations of phenomena about EOT use can provide significant value and help inform decisions about future activity. “As more data is captured...[and] new sources of data...become available, the potential for actionable intelligence increases exponentially. This poses tremendous opportunities for [those in] higher education ... it can help administrators understand their students better, and help optimise the resources available” (Asseo et al., 2016).

7.1 A concept for presenting key stakeholders’ phenomenological data

This section proposes the development of a concept which makes practical application of the interpretations of key stakeholders’ EOT experiences. In the first instance, it introduces a conceptual model (Figure 27) of an EOT implementation process, to outline the context in which the interpretations from this research could be applied or operationalised. This model was adapted in part from a ‘conceptual framework for the integration of learning technology’ by Stoner (1996), displayed in Appendix A.

Figure 27: A context for the application of EOT interpretations
Each phase (or circle) in this model represents a key entity or activity in the EOT integration/implementation process. The first and second phases represent a TEI’s first steps to adopt and implement an EOT(s). The third phase depicts the teachers’ and students’ use of these EOT(s) for teaching and learning activities. Their EOT experiences are described, analysed and interpreted in phases four and five. These interpretations are then used to build the TEI’s understandings of key stakeholders’ EOT activity, and in phase six used to inform their decisions about EOT support and implementation. Support is delivered in phase seven/one through the adoption, implementation or refinement of EOTs and/or their related processes52.

7.2 Understanding EOT experiences

The ‘understanding’ phase (fifth phase) is a critical component of the process leading up to the provision of EOT support and implementation. It involves making sense of the EOT experiences through thematic analysis and interpretations of the phenomena. These interpretations are generally articulated in a written narrative, a format that facilitates the development of rich, precise, and detailed descriptions about the meanings of the experiences. However, as demonstrated in Sections 3.8 and 4, an entire set of written interpretations can be lengthy, and can take much time to read through and process. This section proposes a model that, in addition to the written narrative, provides an alternative or supplementary method for presenting the interpretations, in which knowledge about the phenomena can be accessed more efficiently. Figure 28 presents a model which demonstrates this idea.

Figure 28: EOT interpretations model: conceptualising EOT experiences

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52 Phase 7 reflects a TEI’s ability to enhance and refine their EOT implementation to adapt to the changing circumstances, or needs of stakeholders.
The model aims to conceptualise the interpretations of the phenomena of EOT use by visually representing key stakeholders’ EOT experiences and activity. Once written phenomenological data has been converted into a visual format, the result is an easy-to-understand pictorial overview of students’ and teachers’ EOT interactions with other primary entities. The interactions in this model are contextualised within the boundaries of a BTE, as represented by the blue dotted border surrounding the model.

The main components in this model are: EOT entities, interaction channels, EOTs, and EOT experiences:

**EOT entities:** The EOT entities include students, teachers, and content. Two of these entities are represented using ‘people-shaped’ figures. The green figures symbolise students as a collective group, and the blue ones represent teachers as a collective group. The third group or entity, depicted using a group of ‘computing components’, symbolises content.

**Interaction channels:** The large grey-coloured lines that link the entities represent channels through which interactions occur. For example, the channel linking the student model to the teacher model represents the internal or external networks through which online interactions between students and teachers take place. The grey arrowheads indicate the source and direction of these interactions. For example, the arrow head that points from student to teacher represents student-to-teacher interactions.

**EOTs:** The green and red lines inside the interaction channels and between the entities represent singular EOTs that entities use to interact with each other. For example, one of the lines between any of the entities could represent Blackboard (LMS).

**EOT experiences:** The line colours represents the nature of the experiences. A green line signifies a positive experience, and a red line signifies a negative experience. Red and green lines can pair together to indicate the occurrence of both good and bad (i.e. red and green) experiences with single EOTs. The widths of the green and red lines indicate the extent

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53 This model does not represent the results of this research. It is based on sample data for demonstration purposes. In reality however, the model would display a visual version of the interpretations of key stakeholders’ EOT experiences.

54 This reflects the need for the experiences to be situated within or “connected to a specific context in which the phenomenon [was] experienced” (Englander, 2012, p. 25).

55 Interaction channels involving the use of EOTs would involve internal or external networks, which include digital software and physical hardware components that facilitate online access to various entities.

56 Interactions with content are one-way, that is, students and teachers interact with content, but content does not interact, or return a conscious response, or experience phenomena.

57 To conserve space, the lines in this example do not contain EOT labels, however, in a real example, labels would be used to identify which EOTs were in use.
to which positive or negative experiences occur. For example, a thick green line paired with a thin red line, represents an instance of many positive experiences, and few negative experiences. A single red line means all negative experiences.

This model has the potential to deliver a range of useful insights, and enable its users to quickly identify important characteristics of key stakeholders’ EOT experiences. These include:

- The types of EOTs in use (e.g. LMS) and their brand exemplars (e.g. Blackboard).
- The quantities of EOTs in use (e.g. 1 x LMS (Blackboard), 1 x web-conferencing tool (Adobe Connect), 3 x social networking tools (Facebook, Twitter, LinkedIn)). The quantities of EOTs in use are determined by the total number of coloured line pairs, each of which represents an EOT.
- The entities using these EOTs (e.g. students, teachers, content).
- The relationships that exist between entities (e.g. students-to-student, student-to-teacher, teacher-to-content).
- The nature of their experiences, specific to certain EOTs (e.g. Moodle = mostly positive).
- The nature of the experiences, specific to certain relationships (e.g. student-to-student = all positive).
- How experiences compare with each other (e.g. teacher-to-student (mostly good, some bad) vs student-to-teacher (mostly bad, some good).

Once identified, these characteristics could be used to translate and interpret a set of experiences. Making basic interpretations would be simple, as demonstrated in the following example:

**Figure 28** shows that students used three different EOTs to interact with each other, two of which provided a mix of both positive and negative experiences. One of the EOTs delivered primarily positive experiences, and had been used to a larger extent than the other EOTs. The third EOT delivered only negative experiences. Students used three different EOTs to interact with their teachers, one of which provided a mix of positive and negative experiences, with a higher proportion of positive experiences. The other two EOTs were both used to a lesser extent than the first EOT, and both provided all negative experiences.

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58 Using binary coloured lines to label interactions simply as ‘good’ or ‘bad’ is a rudimentary method of conceptualising complex phenomenological experiences. One could argue that multi-faceted interactions from different individuals, cannot be expressed appropriately using such primitive elements of representation. Likewise, questions could be raised about the scales used to determine correspondence between line width and the level of positive or negative experiences. Certainly, other colours, gradients, patterns, or symbols could be added to extend the range of identifiers, as could a multi-coloured sliding scale to precisely measure and present the level or nature of experiences. The lack of specific visual measures for qualitative data is a limitation of the current design. Measures that precisely reflect phenomenological results would be encouraged for future development. Nonetheless, the simplicity of its current design, is deliberate. The aim of this concept is not, at this point in its development, to provide an exhaustive list of characteristics by which experiences could be identified. Nor is it to translate this study’s data in to a visual form, which corresponds exactly with the results of participants’ experiences.
This example provides a high level overview of students’ experiences, and therefore contributes, at least in a basic way, to understandings about the phenomena. The ability to obtain deeper insights would require greater levels of access and knowledge than that which would be presently available through the model. As users analysed it more closely, questions about the causes and nature of the EOT experiences would likely arise. Example of such questions might include: What challenges would have caused the negative experiences between students and teachers using EOT a? Why were challenges using EOT b greater in student-to-student interactions, than in student-to-teacher interactions? What benefits could have created positive experiences between the teachers using EOT c?

Other questions could be: How could the benefits experienced between teachers using EOT d be applied to teacher-to-student interactions? Which EOTs were linked to patterns of negative or positive experiences? Which entity interactions were connected to patterns of negative or positive experiences? (Noting, for example, green lines for use of Blackboard in student-to-student interactions, but red lines for use of Blackboard in student-to-teacher interactions). Were there correlations between the types of entities and the types of experiences? (Noting, for example, mostly red lines for Blackboard use in all student-to-student interactions). What kinds of comparisons or contrasts could be drawn from the model to support effective EOT use?

In its current stage of development, the model does not provide the comprehensive layers of analysis needed to support its display. While it offers a highly useful overview, it’s insights are only basic, and this limitation prevents users from being able to ‘get the answers’ without viewing the full written analysis, which presently is the only source deep enough to deliver evidence to support the model. Its contents however, cannot be read through quickly. Moreover, the task of switching between the model and the narrative, and matching data between two separate locations would take much time.

The next section discusses how the model’s functions could be extended to provide efficient access to in-depth narratives.

9.9 Extending the model’s functionality through dual data representation

With some adjustments, the conceptual model could be enhanced to include both written and pictorial data. A dual data representation would not only resolve inefficiencies related to switching between data, but deliver holistic perspectives on phenomenological experiences, doing so at both a global and granular level.

59 Letters such as a, b, and c have been used as EOT examples (e.g. EOT a), to replace what in reality would be the name or brand of a specific EOT.
In search of a practical solution, this research proposes the redevelopment of the model, into a digital format which enables a level of interactivity and customisability, and increases its potential application and practicality across TEI contexts. Displayed on a digital interface, the model would resemble a collection of data organised into a series of interactive pictorial and textual elements. These would be distributed and accessible across the layout through geographically placed hotspots, each of which would link to relevant segments of EOT data.

Having the model in a digital format would enable its contents to be updated periodically to display results of new phenomenological data. In an online format, the data could be shared and edited across networks. Interactive features, such as hotspots, would link the written content to the physical pictorial elements. All pictorial elements in the model, including EOT entities, EOTs lines, and interaction channels would use hotspot functions. When selected through ‘point-and-click’, the hotspots would activate textboxes that display material matching relevant parts of the model. For example, textboxes linked to EOT entities would contain data about students, teachers, and content. Textboxes linked to EOT lines would contain data about specific EOTs, interaction types, and experiences using those EOTs.

*Figure 29* displays data from a (green) textbox, which appears when the hotspot linked to the green and red line representing that EOT entity is selected. It presents data about that entity, including the EOT’s name, interaction type, and also includes headings that link to data about student-to-student experiences, which include their challenges, benefits, issues, and functionality. *Figure 28* also displays another (blue) textbox, which appears when a hotspot linked to a teacher entity is selected. This displays data about teacher-to-teacher experiences.

The EOT lines’ appearance (i.e. colour, width) would be controlled by attributes with variable values. An example of an attribute would be the measurement of positivity or negativity linked to the experience in using it, and the values of the attributes would be based on phenomenological data.

*As Figure 29* demonstrates, the contextual distribution of data, and placement of hotspots across the model would provide an intuitive means for finding and selecting relevant data. It’s simple contextual layout would mean that pinpointing the location of relevant data, based on its geographical positioning, would be easy. Also, the use of textboxes to store and display data would make it easy to access. It would deliver small volumes of material, separating these from the unnecessary additional data that might obscure its meaning. A simple and clear text design would make the analysis easy to read and process.
This research proposes that the textbox content be laid out in an expandable/collapsible structure, similar to that of a PC file management system. This would enable users to control the level of detail on display, easily filter between data segments, and view and hide detail. For example, a user seeking data about the challenges of a specific EOT would need only to select the ‘challenges’ option within the textbox relating to that EOT. Similarly, access to experiences about teachers in teacher-to-teacher interactions would be accessed simply by selecting the ‘experiences’ from the teacher entity in the teacher-to-teacher interaction channel.

This type of structure would also enable simultaneous selections of adjacent data. Users could, for example, select and display data relating to both challenges and benefits for a group of EOTs. The use of an expandable structure would enable users to explore and access data at a granular level, or restrict access to higher levels without cluttering the screen with detail.

The use of a customisable format would enable users to control the formatting of data through the selection of attribute values that controlled data display. For example, users preferring to code elements with specific colours might choose to change the EOT lines (normally red and green) to blue and yellow. Other visual codes such as symbols, patterns, gradients, and emoticons, could be applied to alter the presentation of data and deliver greater levels of customisation.
The features and benefits of structuring the model in a digital, interactive, and customisable format are outlined in the summary below:

**Model developed in digital format**
- Digital format enables data sharing, editing and updating across networks and users

**Model uses interactive hotspots with linked text content**
- Hotspot functionality means easy ‘point-and-click’ access to relevant data
- Contextual placement of hotspots makes it easy and intuitive to pinpoint the location of relevant analysis
- Distribution of data across model means more efficient storage and display of data, i.e. small volume of relevant material
- Expandable/collapsible structure of content means users can control level of detail on display, easily filter between data segments, view and hide detail
- Layout and format of textbox content means data is easy to read

**Model uses customisable display**
- Customisable display enables users to control display of data

### 7.3 Extending the contextual use of the model: beyond BTEs

Although this conceptual model was developed to support understandings about teachers’ and students’ EOT experiences in BTEs, its application is not limited to this context or group of stakeholders. Its framework could easily extend into other organisational settings and contexts to include the experiences of other entities, such as senior managers, technical support staff, and educational support staff. In widening its context, new interaction channels, such as those representing teacher-to-manager or manager-to-advisor relationships could be added. Doing so would extend the model’s practicality to a larger pool of stakeholders within a TEI.

The model could be applied to other institutional settings to contextualise experiences of those within specific departments or faculty contexts. It’s scale of application could be extended into one or more departments or faculties, or ‘deepened’ down into an operational or functional department context where granular perspectives on experiences would be important. Examining the experiences of non-academic staff members, could begin with a separation of administrative, technical support, and educational support stakeholders, and their descriptions refined into the model.

For an institutionally wide and deep context, the model’s application could expand to a maximum level to include all entities and interactions across the entire organisation. It could be enlarged, reduced, augmented and customised to suit specific institutional needs. Its varying
contextual applications could enable comparisons and contrasts of experiences to be drawn between departments or faculties. This could provide answers to questions about how the context influences the stakeholders’ EOT experiences. Are there correlations or patterns in EOT experiences across specific faculties? How do the experiences within these contexts indicate what support is required? Which faculties display positive patterns, and how can these be modelled across the TEI?

As Figure 30 demonstrates, the context of the model could be extended to include other individuals, groups, or departments across a TEI. In this example, the blended context (from Figure 28) which contained only students, teachers and content has been extended to include managers and administrative staff. The two additional entities symbolise managers as a collective group (in red), and administrative staff as a collective group (in pink). The new interaction types are teacher-to-administrative, administrative-to-manager, and manager-to-teacher.

**Figure 30:** Extending the context for EOT entities, interactions and experiences

This type of conceptual model could also be used outside of an EOT context. It could be adapted to represent other types of key stakeholders’ experiences. Within a higher education context, these could include experiences linked to staff performance, professional development and training, health and safety, and human resources.
7.4 Practical use for TEIs

The dynamic nature of the digital environment in which TEIs operate means that their effectiveness is dependent upon delivering meaningful EOT support. This support can be delivered more effectively when based on understandings about the real-life experiences of their primary EOTs’ users, teachers and students. These understandings are developed through a series of qualitative methods, which involve the thematic abstraction of themes from descriptions of first-hand experiences, and the interpretations of phenomena. These interpretations can inform the reality of EOT use, and provide the basis for informed decision-making on EOT support and implementation.

A conceptual model was proposed as an effective means to represent these phenomenological interpretations. Its aim was to conceptualise the nature of teachers and students EOT experiences within the context of a BTE. Figure 31 demonstrates the context in which the application of this model would be relevant in a TEIs implementation process. Its position between the phases of ‘experiences’ and ‘understandings’ demonstrates the point at which its application would deliver practical value as a method for building understandings of EOT experiences.

The model’s ability to provide both a high level overview of EOT activity and interactions, and a detailed view of the phenomena, highlights its practical value to TEIs, whose success in digital transformations depends on their ability to understand, support and implement EOT activity. Its representation of pictorial and written data communicates the phenomena in a highly practical manner, assisting TEIs to understand the reality of teachers and students EOT experiences. These understandings can provide TEIs with the evidence to make informed decisions on EOT use, design approaches to tackle EOT challenges, deliver meaningful EOT support, and inform institutional strategies to strengthen the future of BTEs.
Figure 31: Context for conceptual model
8 Publications

This section contains the 15 publications that form the output of this research\textsuperscript{60}. They are each preceded by a page containing an introduction, which in addition to the abstract, explains their contribution to the research.

8.1 Paper 1

Paper 1 is entitled “Educational Online Technologies in Blended Tertiary Environments: Review of Literature. It was presented at the 2013 International Conference of Educational Technologies (ICEEE), Kuala Lumpur, Malaysia, and published in the conference proceedings. \textit{This paper is included in Appendix A.}

Contribution to research

Paper 1 is a short reflection paper that contributed insights about the usage and capabilities of five popular media-rich EOTs. Through a literature review, it highlighted how these EOTs were being used to support and facilitate learning in BTEs.

Abstract

This is a review of the literature surrounding five popular media-rich educational online technologies (EOTs) currently being used by educationalists to support online learning within a tertiary learning environment. These EOTs are: 1) connective media, 2) interactive gaming, 3) virtual worlds, 4) web conferencing and 5) learning management systems (LMS). The outcomes of this review provide: 1) an insight into the capabilities of these EOTs and how these are being used to facilitate student learning, and 2) a contribution to the growing field of research about integrating EOTs into education. Considering these technologies helps inform educators who seek to understand and apply these tools to meet student learning needs effectively within a blended tertiary environment.

\textsuperscript{60} Paper 1 has been omitted from this section and included in the Appendix, as it is only a short reflection paper.
8.2 Paper 2

Paper 2 is entitled “Educational Online Technologies in Blended Tertiary Environments: Experts’ Perspectives. It was accepted for publication in the International Journal of Information and Communication Technology Education (IJICTE).

Contribution to research

Paper 2 was the second in a series of seven publications that formed the output of preliminary research. It maps directly to research objectives 1 and 2, and outcomes 1 and 2 (see Figure 2). Through qualitative methods of data collection and analysis, this paper identified a number of commonly-used EOTs, and described and verified their application in BTEs. Its insights about these tools, their multi-dimensional aspects and rise in popularity would assist TEIs to keep abreast of the latest technological developments, champion and encourage effective EOT use, and deliver relevant EOT support to key stakeholders.

While Paper 2 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. Its contribution to this research helped to build a strong foundation of current knowledge upon which to ground the phenomenological study, develop its context, extend its application, and triangulate the results.
Educational Online Technologies in Blended Tertiary Environments: Experts’ Perspectives

Kimberley Tapawa, University of Newcastle, Newcastle, Australia

ABSTRACT

Although educational online technologies (EOTs) present an extraordinary range of higher education opportunities, significant gaps in knowledge about their purpose and functionality may impede levels of adoption. As the demand for online learning grows, it is critical that tertiary education institutes (TEIs) address gaps in knowledge by developing their understandings of EOT applications. This paper aimed to identify, and describe the application of a range of EOTs popularly used in blended tertiary environments (BTEs). Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, it verified the use of 35 different EOTs in BTEs, including Adobe Connect, Blackboard, Facebook, Instagram, and YouTube. Their key characteristics were summarised using a multi-dimensional taxonomy, called the Pentonomy, which synergised a range of perspectives into a robust, contextualised, and multi-dimensional framework for categorising EOTs. An outline of recommendations for the effective use of some of these EOTs was also provided. As EOTs advance and usage accelerates, the outcomes of this research will assist TEIs in their efforts to keep abreast of EOT developments, make informed choices about EOT use, and contribute to the delivery of relevant, meaningful EOT support.

KEYWORDS

Blackboard, Blended Learning, E-Learning, Facebook, Higher Education, Instagram, Moodle, Technology Framework, YouTube

INTRODUCTION

Educational online technologies (EOTs) have dynamically transformed the delivery of higher education, creating extraordinary opportunities for enhanced learning and teaching. In an era of great digital growth, their enhanced functionalities and affordances have revolutionised methods of knowledge access and engagement, generating phenomenal increases in the demand for web-based learning and support. Factors including affordability, scalability, ubiquity, and accessibility have bolstered levels of generational acceptance and encouraged growth. Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), and channels of content dissemination have switched from didactically-styled “traditional, face-to-face courses to ... online courses” (Picciano, 2015, p. 148).

This paper aimed to identify, and describe the application of a range of EOTs popularly used in blended tertiary environments (BTEs). Achieved using a qualitative design involving semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, it verified the use of 35 different EOTs in BTEs, including Adobe Connect, Blackboard, Facebook, Instagram, and YouTube. Their key characteristics were summarised using a multi-dimensional taxonomy, called the Pentonomy, which synergised a range of perspectives.

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into a robust, contextualised, and multi-dimensional framework for categorising EOTs. An outline of recommendations for the effective use of some of these EOTs was also provided. As EOTs advance and usage accelerates, the outcomes of this research will assist TEs in their efforts to keep abreast of EOT developments, make informed choices about EOT use, and contribute to the delivery of relevant, meaningful EOT support.

METHODOLOGY

A qualitative system of methods was used to guide the collection and analysis of data (Marelli, 2016). Participants were selected using an expert sampling strategy to ensure that data came from those with specific expertise and experience in the field (Trochim, 2006). This method was similar to the approaches used by Chapleo and Simms (2010), who obtained data from ‘opinion-formers’, and Wagner et al. (2008) who used experts’ feedback. Criteria were set to establish a basis for their selection for interviews. Participants had to fit the criteria of a ‘blended learning expert’. An expert is defined as “one whose special knowledge or skill causes him to be regarded as an authority” (Oxford University Press, 2014). Experts could be selected on relatively simple criteria, such as through certain qualifications or experience (Changing Minds, 2013). Thus, the following criteria established a basis for their selection: 1) the individual must have occupied an academic role for not less than 10 yrs in a tertiary blended learning context, 2) hold a post-graduate qualification, and 3) have conducted published research in the area of blended learning. Candidates without blended learning experience or without post-graduate qualifications were excluded from this study.

A small group of 13 participants were chosen (Saldana, 2011), from TEs in New Zealand, Australia, and Canada. The rationale for this number was based on literature about qualitative research. Saldana (2011), for example, explained that there were varying opinions about the appropriate number of participants. While studying a single individual case in depth would make for a rich profile, the individual was not always representative of the population at large. Therefore, a small group of participants would provide sufficient data, with a minimum of 10-20 needed to ensure credible and trustworthy findings (Saldana, 2011). Accordingly, the use of 13 expert participants fitted within the required range. Obtaining data from a group of several individuals, rather than from one or two, would likely deliver a holistic set of results that were applicable in more than one setting, and ensure that “no untoward consequences or none... easily anticipated” (Yin, 2010, p. 47) could arise. Obtaining data from long-serving experts, from across several institutions and countries, was considered an appropriate way of “testing the evidence for consistency across sources” (Yin, 2010, p. 20). Due to their significant experience, they would render richer contextualised explanations than non-expert candidates. Notably, the credibility of findings were increased when they involved feedback from those with prolonged engagement in the field (Nicholls, 2009). The expectations were that “this particular group of people thought to share a common experience... [would] offer meaningful insights into the phenomenon”, and “talk candidly about their experiences” (Nicholls, 2009, p. 640).

Participants set aside at least 45 minutes of un-interrupted time to complete their interviews, which were conducted via online video-conferencing technology (Skype), and audio recorded using Pamela software. The interview contained 13 questions in total. Question one asked participants to identify “which EOTs were being used in BTEs”. Question two asked for a description of “how these EOTs were being used”. The use of open-ended questions generated deep, meaningful answers, and gave participants an opportunity to state their own opinions (Perren & McClement, 2008). Probes helped to clarify meanings of responses, encourage in-depth explanations, and stimulate participants to expand their original comments (Yin, 2015). A large quantity of data was expected and received.

The data was documented onto pre-formatted question-and-answer templates through a self-transcription process, which enabled the researcher to develop an intimate familiarity with the content (Daniels, 2016). The data was analysed using Yin’s (2015) five phases of qualitative data analysis: 1) Compiling, 2) disassembling, 3) reassembling, 4) interpreting, and 5) concluding. Table 1 demonstrates the link between these five phases and the research techniques used in this research.
NVivo software (QSR International, 2015) was used to import, compile, and organise the transcribed documents into a logical filing structure (Yin, 2015). The data from these documents were disassembled into smaller pieces and coded. Using the Nodes coding function, the data was separated into categories that corresponded to the interview questions. These nodal categories, which were labelled using truncated versions of the questions, represented specific portions of the data. Their use enabled the data to be assigned logically, labelled, referenced, and contained within manageable groupings (Williams, 2003). Table 2 demonstrates the link between the node labels used for coding the data, and the interview questions.

The data was then reassembled, which required that it be transferred from its nodal position into analytic memos (Yin, 2015). A total of 35 memos were used to record ideas and insights about specific EOTs, and develop meaningful thoughts about their use (QRS International, 2015). Interpretations of the memo data were made, and used to form the basis of the discussion in this paper. Its layout is formatted in EOT sections, each of which contains EOT definitions and descriptions of their use, with supporting examples from the narrative.

RESULTS AND DISCUSSION

EOTs were valued for their ease of use, ability to deliver learning in a flexible manner, provision of unrestricted access to content across devices, and ability to demonstrate practical tasks. These characteristics promoted positive experiences, enhanced “the quality of learning and teaching” (European Union, 2014, p. 11), and reinforced to users the value of EOTs for course delivery. These tools were counted on to facilitate the delivery of learning activities in an operationally effective manner. Their ability to function appropriately contributed significantly to the success of learning and teaching experiences.

Participants identified a range of 35 EOTs, these included: Adobe Captivate, Adobe Connect, Blackboard, Blackboard Collaborate, Blogs, Brightspace, Camtasia, Echo 360, Facebook, Google Docs, Google Drive, Google Hangouts, Google Sites, Instagram, Jing, LinkedIn, Microsoft Lync, Moodle, Skype, Twitter, Turnitin, UCROO, WordPress, Yammer, and YouTube. In the following section, these EOTs are defined, and descriptions of their use are provided with supporting examples from the narrative.

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Adobe Captivate

Adobe Captivate is a ‘broadcasting tool’ that enables the authoring of multi-screen responsive e-Learning without programming, and the delivery of content to mobile devices, the web, desktops and LMSs (Adobe Systems Software Ireland Ltd, 2015a). It allows users to create simulations, demonstrations, and training materials that run on screens of varying sizes (Adobe Systems Software Ireland Ltd, 2015a), and is being used to facilitate ‘learner to content’ interactions (Tuapawa, Sher, & Gu, 2014, 2016). Participants indicated that Adobe Captivate was facilitating the delivery of learning material to students in and out of class.

Adobe Connect

Adobe Connect is a type of web conferencing software that offers immersive online meeting experiences from small group collaborations to large scale webinars (Adobe Systems Software Ireland Ltd, 2015b). It is a ‘real time learning and collaborative tool’, which is accessible across devices and is easy to use (Tuapawa, 2017), and is being used in institutes to facilitate ‘learner to expert’ and ‘learner to learner’ interactions (Tuapawa et al., 2014, 2016). Its flexible nature enables students to engage while “in the class, but at home”, where learning can occur without distraction (Tuapawa, 2017). Participants indicated that Adobe Connect was used ‘as an online virtual classroom, but also... in quite flexible ways to capture and enable other conversations often out of time’.

Blackboard

Blackboard is a comprehensive and flexible e-Learning software platform that delivers a complete course management system (Blackboard Inc, 2015b). It’s role in enabling engagement is recognised by distance learners, many of whom “work fulltime” and find using it “more practical than standard face-to-face” sessions (Tuapawa, 2017). Participants indicated that Blackboard was being ‘used for a huge range of activities’. While it could serve as a ‘repository’ for learning resources, it could also be used as ‘an e-learning portal around a particular programme of work, course, or set of activities’. Experts stated that the ‘complexity and centrality’ of LMSs like Blackboard were changing, and were ‘not necessarily the one-stop-shop that [they] used to be, but [instead had become]... more like conduits through which... other technologies... [were linked]’. One participant likened LMSs like Blackboard to ‘hubs’ that ‘were evolving into... relationship management systems’. These had the potential to deliver ‘personalised learning experiences’ for learners. In addition, the same system ‘could be used for any course in any faculty’. Blackboard also facilitated the ‘exchange of ideas’ between discussion groups, enabled students to view or link to pre-recorded video clips, and provided access to online resources. Its modularity, and ability to replicate course formats was especially valued, since ‘the same system [could] be used for any course in any faculty’.

Blackboard Collaborate

Blackboard Collaborate is an online learning and collaboration platform designed for education, and provides a wide spectrum of tools such as web conferencing, mobile collaboration, instant messaging, voice authoring, and integrations (Blackboard Inc, 2015a). EOTIs like Blackboard Collaborate “facilitate the production of group work” (Anderson, 2007, p. 8) and “provide a wide variety of capabilities and perspectives” (Zigurs & Murkved, 2006, p. 144). Participants indicated that this tool was being used in ‘a variety of ways’, to ‘outreach to particular communities’, and to enable ‘a bespoke form of learning’. It added value to the delivery of learning in disciplines such as ‘nursing, accounting, IT, engineering, where there [were] lots of students’. Collaborate was being used ‘as a potential networking facility, online tutorial or informal help system... a mechanism where a teacher and student [could come] together’ when unable to communicate face-to-face.
Blogs

A blog (short for weblog) is a ‘broadcasting and user construction tool’ that serves as a journal, and provides users with the ability to author and publish work online. It is used to facilitate ‘learner to content’ and ‘learner to expert’ interactions (Tuapawa et al., 2014, 2016). Engagement with technologies such as blogs fosters sociability and social presence, that for many “feels real” (Kear, 2011, p. 262). Participants indicated that some ‘academics [had] their own blogs,’ which created potential for engagement and outreach, and also served to reinforce academic impact (Crick & Winfield, 2013). Popular blogging sites included Blogger, Edublogs, Wikiblogs, and WordPress.

Camtasia

Camtasia is an asynchronous learning tool that enables users to record on-screen activity, add imported media, creative interactive content, and share high-quality videos that viewers can watch anytime, on various devices (TechSmith Corporation, 2015). It fosters “a flexible learning approach, which is less fixed to [a] specific time pattern” (Weller, 2013, p. 81) and involves two or more devices that are not continuously synchronised, but which enable learner access to subject specific material “without the potentially exclusionary constraints” otherwise associated with being present at a certain online or physical place and time (Jaffee, 1997, p. 263). Participants indicated that Camtasia was being used to generate video content, which was then uploaded to platforms like YouTube or Vimeo.

Echo 360

The Echo 360 Active Learning Platform provides lecture capture and webcast capabilities, enabling instructors to record, edit and assign instructional videos, create media-rich course content for live or on-demand viewing, record classroom action and interaction, and turn these into lessons that students can replay on a device (Echo360, 2015). It is an ‘asynchronous learning and broadcasting tool’ that facilitates ‘learner to media’ interactions (Tuapawa et al., 2014). Students who miss live sessions can use Echo 360 to view lecture recordings (Tuapawa, 2017). One participant noted that it’s lecture capture function was ‘becoming part of policy at [his] institution’, and procedures were in place to ensure that ‘automated recording’ of lectures occurred. EOTs like Echo 360 enabled teachers to ‘capture what occurred in a physical space, and then share and manage that within a digital sense’.

Facebook

Facebook is a globally popular social networking tool that is being used to facilitate “learner to learner” interactions (Tuapawa et al., 2014, 2016). It provides highly accessible, inexpensive and scalable publishing techniques, and allows the generation and exchange of user content to small or large audiences (The Social Media Guys, 2010). As an EOT, its “significance and potential...in educational terms” cannot be underestimated (Moore, 2013, p. 358). “Facebook is...used regularly by...students to communicate with each other, but to a far lesser extent for communicating with staff. [Its] success may be due, in part, to its high rate of use in everyday life where it is used regularly by 80% of participants” (Gosper et al., 2014, p. 299). Facebook enables collaborative group discussions, which are facilitated through immediate notifications and messaging, prompting considerable engagement and interactions between learners (Tuapawa, 2016b). One participant stated that while Facebook ‘was not part of our mainstream educational channel’, its usage facilitated communications between students enrolled in the same programme. It was also used to ‘advertise jobs or internship opportunities’, or to add links to industry-related updates.

Google Docs

Google Docs is an online word processor that enables users to create and format text documents, collaborate with other users in real time, and store the documents in Google Drive (Google, 2015b). Participants indicated that there had been an increase in the use of ‘synchronous collaborative
platforms’ such as Google Docs, to collaborate with students on group projects. Technologies that supported communication, interaction and collaboration continued to be in demand with greater use being made of ... web tools such as Google Docs” (Gosper et al., 2014, pp. 298, 299).

Google Drive

Google Drive enables users to store, organise and access files, share files with others, and access files even when not connected to the Internet (Google, 2015a). It acts as a repository, providing a digital collection, or “central place in which an aggregation of data is kept and maintained in an organised” manner (Rouse, 2005, p. 1). Repositories like Google drive provide online storage and management of resources enabling users to locate relevant materials based on personal needs, recommendations and popularity (Tuapawa et al., 2014, 2016). Participants indicated that students were ‘using Google Drive as their repository of information’. This supported some Moodle-based activities, which were ‘linked to Google Docs or Google Drawings’, and enabled students to ‘click on the links and go to the Google resource where they could contribute’ to an activity, such as ‘a diagram...or [where they could] create a brainstorming exercise’.

Google Hangouts

Google Hangouts is a free video chat service from Google that enables one-on-one discussions and group discussions with up to ten people at a time. It is similar to EOTs like Skype and FaceTime, but focuses more on face-to-face group interactions as opposed to one-on-one video, and seamlessly switches the focus to the person currently talking (Webopedia, 2015). One participant stated that Google Hangouts was preferable to Skype for video conferencing, because it provided ‘video interaction with Google Video’ and was integrated with other Google products. This meant that users could ‘share their work’ and collaborate while chatting.

Google Sites

Google Sites is a wiki-like tool for collaborating online. It enables users to create a team-oriented website where multiple people can collaborate and share files (About.com, 2015). One participant noted the ‘increase in port-folio systems’ that ‘allowed the accrual or management of learning artefacts or learning outcomes by a student’. Google Sites was the ‘selected...e-portfolio tool, and [at his institute] had been' embedded across ‘all... platforms from levels one to nine’ to provide ‘a range of uses at different levels of study’. It was ‘very much an open source... learner-led and learner focussed’, with ‘the ownership and responsibility for curation’ of content residing primarily ‘with the learner’.

Instagram

Instagram is an online photo sharing ‘social networking, and asynchronous learning tool’ that acts also as a repository, and is used to facilitate ‘learner to learner’ and ‘learner to expert’ interactions (Tuapawa et al., 2014, 2016). It allows users to upload, edit and share photos with other members through its website, email, and other social media sites (TechTarget, 2015a). Participants indicated that Instagram was being used in various ways to support learning, such as ‘recording school excursions... building projects... setting problems for each other in classroom... and sharing problems’. While it was acknowledged that these activities were ‘not always the best way of using the EOT’, institutes could ‘piggy-back on the technologies that had... cultural capital with... students’.

LinkedIn

LinkedIn is a ‘social networking tool’ that allows members to establish and document networks of people they know professionally, and requires connections to have a pre-existing relationship (TechTarget, 2015b). Some teachers use LinkedIn to communicate with their students, while others encourage their students to use it for developing a profile that will attract job opportunities (Tuapawa,
Participants indicated that LinkedIn was being used as ‘a way of... tracking where [students] are going, [and] what they’re doing now’. This post-graduation follow-up formed ‘part of our external evaluation reviews institutional reviews’, and helped institutes establish the activities of alumni. LinkedIn was also used by students and teachers to develop and maintain professional networking opportunities.

**Microsoft Lync**

Microsoft Lync, now known as Skype for Business, is a communications and collaboration platform that offers features including presence, instant messaging, voice and video calls, and online meetings (Microsoft, 2015). This EOT is a ‘real time learning and collaborative tool’ with ‘high levels of physicality’ that is used to facilitate ‘learner to expert’ interactions (Tuapawa et al., 2014, 2016). Participants indicated that Skype for Business enabled ‘more dynamic online discussions’ in learning environments. One noted the benefits of ‘a hub and spoke scenario’ in which students engaged online using Skype for Business, rather than having to ‘fly ... [to the institute] to do an intensive course in the middle of the year’.

**Moodle**

Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system for creating personalised learning environments. It delivers a set of learner-centric tools and collaborative spaces that support both teaching and learning (Moodle, 2015). Participants indicated that institutes were ‘adding more products and custom-made plug-ins’ to address the need for a personalised student learning experience. One stated that at his institute, Moodle, which was being used ‘to house and shape content within discreet course containers’, was being mashed with ‘ Yammer and SharePoint’, to create a system ‘that encompassed both these products’ and would be experienced by students as ‘a singular sign-on environment’.

Various Moodle features were being used, including ‘the chat mode, online forums, online quizzes’, links to ‘pre-recorded videos’, and other activity-based tools. Participants described other commonly used features, such as ‘in-built forums’, which included communications forums, and news forums, which provide one-way communications from the lecturer. These also included chat forums, which were available to every user, and question-and-answers forums, which allowed students to communicate between themselves and the lecturer. Moodle also housed ‘resource material, study guides, links to helpful information... and... other systems’ such as extension of time requests, and academic assistance.

One participant explained that Moodle usage could be understood by envisaging a continuum containing those who used it predominantly for student outlines, and hard documents with minimal interaction, to ‘interactive discussions, and group work... through to dynamic interactive environments’. Another described the level of Moodle support at his institute by referring to a ‘Moodle Unit... called Moodle’s Little Helper’, which had been designed to provide user assistance for staff and students. In some cases, Moodle was used to provide links to ‘additional [learning] resources online’, which students could explore and research, once ‘the actual concepts’ had been taught in class.

**Skype**

Skype is an IP telephony service provider that offers free calling between subscribers. It enables files transfers, texting, video chat, and video conferencing (TechTarget, 2015). This EOT is a ‘real time learning and collaborative tool’ with ‘high levels of physicality’ that facilitates communication and ‘learner to expert’ interactions (Tuapawa et al., 2014, 2016). Participants indicated that Skype was being used to conduct meetings, hold discussions, and collaborate in real-time with teachers or students.
Twitter

Twitter is an information network made up of 140-character messages called Tweets, which registered users can post and read (Twitter Inc, 2015). Twitter’s social networking and asynchronous features facilitate ‘remembering, understanding, applying, and analysing’ techniques (Tuapawa et al., 2014, 2016). “The topology of social networking services” (French, 2010, p. 1) like Twitter provides “direct and indirect support of education-related tasks...to fulfill social learning functions...and to stimulate social...benefits...” (Greenhow, 2011, pp. 1-4). One participant described how she used Twitter ‘as an assessment item in a popular culture course’, which required that students ‘post a tweet’ to give evidence of their subject knowledge. It promoted a pleasant and motivating learning climate (Rico & Félix, 2016), and was used as tool ‘to liven up lectures’, and as a real-time alternative to giving and receiving feedback during lectures (Tuapawa, 2016a).

Twitter was also being used as a ‘two-way communication [tool] between teachers and students’, and often involved providing ‘students with course-related information’, and ‘getting [them] to use it as an assessment tool’. In addition, teachers were using it to develop and maintain professional networking opportunities. They made connections with a variety of individuals including industry professionals. Using Twitter helped them realise they ‘were not alone’, but could collaborate with people outside of [their] institution (Tuapawa, 2016a). One teacher described Twitter as ‘probably my best teacher-to-teacher environment.’ Some described it as an excellent platform for ‘posting interesting industry research’ and ‘keep[ing] up to date with industry matters.’ This led to ‘direct messaging...with other staff and educators.’ The circulation of such information between teachers helped promote community building (Manca & Ranieri, 2016).

WordPress

WordPress is an online, open source website creation tool that provides an easy-to-use, powerful blogging and website content management system (iThemes Media, 2015). It is a ‘broadcasting and user construction tool, and media repository’ with ‘low levels of fidelity’, which is used to facilitate ‘learner to content’ interactions (Tuapawa, 2016a; Tuapawa et al., 2014). WordPress had been used by students to ‘express a viewpoint’, and was considered as valuable for “dist[ing] experiences” (Tuapawa, 2017). Participants indicated that WordPress was being used by both students and teachers to create blogs or websites, which delivered learning material, or provided a platform for writing.

Yammer

Yammer is an enterprise private social network that normally helps employees collaborate across departments, locations and business applications (Yammer, 2015). One participant discussed how at one institute, Yammer was being ‘mashed’ or integrated with the Moodle platform to provide students with greater functionality while operating in a ‘single sign-on environment’. It was “threaded through that [learning] experience”, and students benefited from using a one-stop-shop system ‘comprised of those major products’.

YouTube

YouTube is a popular website platform that is designed to enable users to upload and share videos that can be viewed by anyone (Digital Unite, 2015). It is a ‘social, broadcasting and asynchronous learning tool’, which supports the application of learning, and is being used to facilitate ‘learner to expert’ interactions (Tuapawa et al., 2014, 2016). YouTube also utilises repositories to enable users to manage their profiles, share content and collaborate (Churchill, Wong, Law, Saltor, & Tai, 2009). Participants indicated that YouTube was used extensively to play video clips, which demonstrated practical tasks and supported learning activities through the use of multimedia. ‘One of the trends’ was to ‘put [the media clips] on YouTube...instead of using local storage or LMS’.
Other EOTs

Other EOTs also identified included Brightspace, Jing, PeerWise, Flikkers, Illuminate, MOOCs and micro-MOOCs, Swoodle, Turnitin, UCROO, Viber, Vimeo, WebEx, and Zoom.

Classifying of EOTs

The key characteristics of these EOTs were located within a multi-dimensional taxonomy, called the Pentaxonomy (Tuipawa et al., 2014, 2016). Developed by augmenting five existing taxonomies, the Pentaxonomy synergised a range of perspectives into a robust, contextualised, and multi-dimensional framework for categorising EOTs. Its concise hierarchical configuration progressively refines EOT criteria, creating a sophisticated level of EOT categorisation which facilitates decision-making on EOT activity. Having a basis in both education and technology, the Pentaxonomy is a fitting choice for summarising EOTs’ key characteristics. This framework contains four successive divisions, which are explained in Table 3.

RECOMMENDATIONS

A summary of recommendations for using some of these EOTs is outlined below:

- **Adobe Connect**: Teachers are encouraged to establish ground rules with the class before beginning learning sessions using Adobe Connect. Remind students to offer the respect and active listening skills to virtual speakers as they would for live speakers. Decide ahead of time how students will interact with other virtual participants (Adobe Systems Inc, 2010).

- **Facebook**: Facebook provides students with an efficient, socially acceptable, and responsive channel for student-to-student interactions. Collaborative group discussions can be facilitated through immediate notifications and instant messaging. Teachers can also use it to create groups for particular courses, where they can provide students with coursework tips, and share assignment details (Daren, 2016).

- **Google Docs**: Google Docs supports collaborative group assignments involving document preparation, and enables students to edit documents simultaneously while engaging in group chat. Teachers can also use it to collaborate with colleagues on joint lesson plans or training resources (Teachthought, 2015).

- **Blackboard or Moodle**: Teachers are encouraged to engage best practices in LMS course page design, by employing effective design principles such as clarity, concision, familiarity, consistency with layout, positioning, size, and colour (Garton, 2012). Their content should be guided by usability principles so as to make content learnable, efficient, memorable (Voyton, 2014). Content

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Classifications</th>
<th>EOTs</th>
<th>Brand examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>The dimensions are broad taxonomies which describe the nature of, or less through which EOTs are categorised. They enable users to evaluate and select which aspects a choice in technology will be guided by.</td>
<td>The classifications are physical and theoretical elements of each dimension. They enable users to specify key requirements or characteristics of an EOT.</td>
<td>The EOTs represent multiple aspects or capabilities of a type of online tool. They reveal multiple functions for each type of online tool, indicating in which circumstances or situations an EOT can be used.</td>
<td>The brand examples are proprietary or non-proprietary brand names given to an online tool.</td>
</tr>
<tr>
<td>Example: Functionality</td>
<td>Example: Real-time learning</td>
<td>Example: Social network</td>
<td>Example: Facebook</td>
</tr>
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</table>

Table 3: Dimensions of the Pentaxonomy Framework
should be organised so it appears and operates in predictable ways, and is structured through the
use of lists, menu items.

- **Twitter**: Teachers can use Twitter to stimulate student engagement and enliven lectures about
  a subject, by setting up and encouraging student feedback to a course hash tag, and projecting
  the live feed in class using a visualiser. In this way, they can provide a real-time alternative to
  giving and receiving on-topic feedback during lectures. It can also be used to circulate course
  information, and also to promote community building (Manca & Ranieri, 2016).

- **YouTube**: Teachers are encouraged to consider the use of YouTube videos to visually illustrate a
  complex concept, and add annotations and links to provide additional resources (Pappas, 2014).

CONCLUSION

EOTs have dynamically transformed the delivery of higher education, creating extraordinary
opportunities for enhanced learning and teaching. However, significant gaps in knowledge about
their purpose and functionality may impede levels of adoption. As the demand for online learning
grows, it is critical that TEIs address gaps in knowledge by developing their understandings of EOT
applications. This paper identified and described the application of a range of EOTs used in blended
tertiary environments (BTEs). Achieved using a qualitative design involving semi-structured interviews
with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis
of data, it verified the use of 33 different EOTs in BTEs, including Adobe Connect, Blackboard,
Facebook, Instagram, and YouTube. These EOTs, which each have different capabilities and features,
were used in various or multiple ways to perform activities which fulfilled the learning and teaching
needs of those in BTEs. For example, while Adobe Connect is a web conferencing tool that offers
online meeting experiences between teachers, it may also be used to create a virtual classroom to
facilitate student-to-teacher interactions.

The key characteristics of the EOTs were summarised using a multi-dimensional taxonomy, called
the Pentexonomy, which synergised a range of perspectives into a robust, contextualised, and multi-
dimensional framework for categorising EOTs. This framework provided support for understanding,
prioritising and applying new tools, enabling users to evaluate and select the technologies that best
suited their needs. In addition, a set of recommendations for the effective use of some of these EOTs
were provided. One recommendation, for example, encouraged teachers to use Google Docs as a way to
collaborate with colleagues on joint lesson plans or training resources. These recommendations aimed
to assist TEIs in their efforts to keep abreast of EOTs developments, and contribute to the delivery of
relevant, meaningful EOT support. Future research will make phenomenological interpretations of
key stakeholders' EOT experiences, to establish their current EOT needs and challenges, and provide
a basis from which to recommend methods for effective EOT support.
REFERENCES


11


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**ENDNOTES**

1. The remaining 11 questions, which related to BTIs and other key stakeholder matters were not discussed in this paper. Reporting on them here was outside its scope.

2. In most cases, the participants identified brand exemplars, rather than specific types of EOTs. For example, "Blackboard" (brand exemplar) is identified rather than 'Learning Management System' (LMS).

3. EOTs are listed in alphabetical order.
EOT descriptions are discussed in alphabetical order.

The term Pentecosmology focuses attention on three key aspects of its framework: 1) Pent (to signify the augmentation and integration of five separate taxonomies), 2) Tech (or techs, to signify its relationship to technology) and 3) Xonomy, (to signify its taxonomical purpose).

The application of the Pentecosmology is appropriate within a webfacilitated, blended, or online context, where informed EOT choice and usage is critical.

As online technologies play a significant role in the delivery of online education, it is necessary that a comprehensive taxonomy to guide EOT choice be reinforced and represented through educational theory and technological schemes. “Learning and technology have been intertwined with one another throughout human history” (Harasim, 2012, p. 13). This two-fold relationship apparent in the Pentecosmology. Acknowledging that “a tool should always be used in support of pedagogy” (Pacansky-Brock, 2012, p. 46), the Pentecosmology has a basis in both education and technology. This framework integrates five taxonomies, using these to represent a starting point upon which to build in further theory to broaden and strengthen its educational and technological foundations. These five taxonomies have significant links to educational philosophy (i.e., the three major learning theories that influenced education in the 20th century (behaviourism, cognitivism and constructivism)), and to the online technologies that influence education delivery in the 21st century.

Kimberley Tuapawa is an educator, company director, and PhD student of the University of Newcastle, Australia. She is a published author with extensive teaching experience, and has presented research in countries including New Zealand, Malaysia, and Jakarta. She has developed and managed multi-media projects that have enhanced student learning, consulted on technology projects that support adult literacy and numeracy, and delivered interactive workshops that build technology skills in teachers. Kimberley was a Lecturer and Regional Centre Coordinator for the Eastern Institute of Technology. She holds a Master's Degree in Digital Media (MDM), Bachelor's Degree of Computing Systems (BCS), Diploma in Multimedia and Web Development (DoMW), Diploma in Information and Communications Technology (DiplICT), and Diploma in e-Business Support (DipeBus).
8.3 Paper 3

Paper 3 is entitled “Pentexonomy: A Multi-dimensional Taxonomy of Educational Online Technologies”. It was accepted for publication in the International Journal of Web-Based Learning and Teaching Technologies (IJWLTT).

Contribution to research

Paper 3 was the third in a series of seven publications that formed the output of preliminary research. It maps directly to research objectives 1 and 2, and outcomes 1 and 2 (see Figure 2). This paper developed understandings about different types of EOTs and their characteristics. It also built knowledge about five different existing taxonomies for classifying EOTs, and combined and augmented these to establish a single robust multi-dimensional EOT classification system that would help guide tool selection, and support TEIs and their key stakeholders in understanding, prioritising and applying new tools.

While Paper 3 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. Its contribution to this research helped to build a strong foundation of current knowledge upon which to ground the phenomenological study, develop its context, extend its application, and triangulate results.
Co-author statements

By signing below, I confirm that Kimberley Tuapawa was the primary author of the publication entitled “Pentexonomy: A Multi-Dimensional Taxonomy of Educational Online Technologies” published in the *International Journal of Web-Based Learning and Teaching Technologies*. Sher and Gu reviewed and commented on her work.


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Professor Ning Gu
Date: 01/02/2017

Signature: 
Associate Professor Grant Webber
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Pentexonomy:
A Multi-Dimensional Taxonomy of Educational Online Technologies

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ABSTRACT

Educational online technologies (EOTs) have revolutionised the delivery of online education, making a large contribution towards the global increase in demand for higher learning. Educationalists have striven to adapt through knowledge development and application of online tools, but making educationally sound choices about technology has proved challenging, amidst the extensive and largely unclassified range of tools. The absence of a taxonomy comprehensive enough to guide EOT choice is a concern, given the current extent of online activity. This paper addresses this issue by proposing a new taxonomy framework of EOTs called the Pentexonomy. Developed by augmenting five existing taxonomies, the Pentexonomy synergises a range of perspectives to produce a robust and multi-dimensional classification which facilitates effective decision-making on EOT activity.

Keywords: Authoring Methods, Authoring Tools, Computer-Mediated Communication, Educational Technology System, Pentexonomy

INTRODUCTION

The Internet is a phenomenal digital structure that has revolutionised the application of online technologies. By providing a “ubiquitous and universal means” of interconnection it has enabled a growing populace of over 2.4 billion users to rapidly exploit an expanding array of digital services (Tsantilis et al., 2009). The digital frontiers have extended mankind’s metropolis of “digitation”, with impressive advances hallmarking the global network as an “extraordinarily successful” catalyst for growth (Tsantilis et al., 2009).

Industry-wide the Internet has generated opportunities. Tertiary institutions and educationalists in particular have found the developments occurring within distance and blended education to be significant. Ambitious new endeavours to deliver online education to learners have been bolstered by online technologies, as evidenced through the inauguration of two massively open online course (MOOC) ventures, Udacity and Coursera. Within the
Internet has provided a channel through which students have been recruited at an astonishing rate (The Economist, 2012). In April 2012, Coursera had enrolled one million students. By January 2013, this number had risen to over two million. “It’s most successful class... had attracted over 180,000 students” (The Economist, 2012).

Predictions about future online learning suggest that as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (J. A. Anderson, Boyle, & Raine, 2012). Similar forecasts indicate that the digital delivery of university-level course work via cheaper technologies will revolutionize higher education (J. A. Anderson et al., 2012). For educators, this may elicit “threatening change and unsettling volatility” or “exciting possibilities” (Chandler, 2012). Despite these varying perceptions, the reality of the Internet’s influence is evident. “Academic leaders at all types of institutions” are reporting “increased demand for ... online courses” with “the demand for online offerings... greater than that for the corresponding face-to-face offerings” (Allen & Seaman, 2010). “The power of this form...” of education “works...to engage and inspire people outside of the confines of an institution” (Kerfoot, 2012). “The idea that learning occurs only within” the “confines of an institution is becoming obsolete” (Annetta, Folia, & Klesath, 2010). “The trend toward blended learning systems will increase” to become “subsequently that we will eventually drop the word blended and just call it learning” (Bonk & Graham, 2006).

Factors including the affordability, affordances and accessibility of online technologies are contributing to the shift away from traditional in-class methods of delivery to more digitally-driven systems which accommodate a wider range of students. Distance learners who as part of a “new learning context, an interconnected community, rather than a series of individual learners” being dispersed geographically and separated by distance, stand to benefit greatly from the advancements being made (Gooch & Lockwood, 2012).

As online technologies continue to advance and as distance end-users become more familiar with the capabilities of online learning, it is likely that improved and expanded applications that “increase connectedness, community and collaboration” will be developed (Benk & Graham, 2006). These will be accompanied by appropriate support for digital tools that strengthen and accelerate learning (Tuapawa & Skelton, 2012). Educationalists understand that “no longer are classes one-dimensional”, but as “modality demands transition from face-to-face to online, an exploitation of digital services must occur to improve traditional methods of delivery, the features of which can be “transferred and... enriched in online environment” (Weller, 2013).

Responsively, higher education institutions, many of whom are “under significant pressure to provide affordable, sustainable approaches” have collaborated to expand their knowledge-base concerning the value of online technologies (Beekm & Watkins, 2012). “Communities of inquiry” are helping to articulate greater understandings into the future potential and capabilities of EOTs in recognition of how “portals into the virtual world are now surpassing the doors to the traditional university” (Gregory et al., 2010). Propelled by the need to become highly adaptive under changing economies and effective student expectations, such institutes are seeking to gentrify traditional teaching approaches and rapidly assimilate the use of modern tools into programmes of distance learning.

Educationalists have responded to “the opportunities to harness” the potential benefits by developing their knowledge of rapidly evolving technologies and “by demonstrating innovative uses of technology to adapt or transform ... for future needs of learners and teachers” (Gregory et al., 2010). Technologies such as connective media, interactive gaming, virtual worlds and web conferencing, have gained value amongst those whose education ideologies entail an adaptive approach to improved learning and whose practical sense dictates that the needs of a greater number of distance students be accommodated.
The task of selecting an appropriate technology amidst an extensive and largely unclassified range of tools can be challenging. Without a formal guide or classification system, making sound EOT-based decisions can be difficult for educationalists who “struggle to keep up with the ever-increasing...tools available” (Ko & Rosson, 2010). While “there are numerous...technologies”, often these exist as singular “tool box” entities and are not necessarily selected through the use of a taxonomy comprehensive enough to guide EOT choice (Singh, Mangalaraj, & Taneja, 2010). For educationalists the lack of a robust EOT classification system is significant. “As educators...we need a method of ordering phenomena...in ways which will reveal some of their essential properties as well as the interrelationships among them” (B. S. Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). “Although there are new tools for learning, we still need a framework in which to conceptualise learning support in networked learning environments” (Gooley & Lockwood, 2012).

Amidst an abundance of emerging technologies, “a taxonomy can be a productive step in the process of understanding and explaining...the familiar in new ways”, enabling the making of sense amidst “a confusing array of phenomena”. An appropriate and comprehensive classification system “reduces the complexity and richness” (Bruce & Levin, 1997). In light of increased online uptake and activity, access to a taxonomy which facilitates effective decision-making on EOTs and provides support in understanding, prioritising and applying new tools is important to minimising costs, increasing efficiencies and meeting ‘student learning’ needs.

Traditionally the term taxonomy has been used in relation to biological classification and nomenclature (Godfrey, Clark, Kitching, Mayo, & Scofield, 2007). Linnæan taxonomy produced a system that was “universally accepted” as a stable means of naming species (Godfrey et al., 2007). Contemporary practice has expanded the term’s application to encompass the classification of ‘things’ more general in nature. In an extended definition, Webster’s Online Dictionary (2013) states that the term taxonomy “may refer to a classification of things” and “principles underlying such a classification”, in fact, “almost anything including “properties and relationships...may be classified according to some taxonomic scheme”.

In an area as significant as tertiary education “the idea of an orderly, international naming system” (Bruce & Levin, 1997) associated to technology is a key ingredient. A robust classification system requires substantially more than single existing taxonomies currently provide. Whilst able to inform some aspects of EOT usage, single taxonomies are limited by uni-dimensionality, being unable to characterise a technology using a multiplicity of perspectives, or filter between the variety of ways in which an EOT can be used. More comprehensive understandings can be achieved by classifying technologies using a framework that integrates varying perspectives, is guided by specific criteria and underpinned by educational theory and technological schemes. An effective taxonomy must have the ability to robustly categorise the range, nature and extent of rapidly evolving technologies in an effective and accessible way. “The ultimate aim...” in such a case should be “...to provide the most useful classification system” (Wheeler, 2008) which enables users to contextualise EOTs and make informed decisions on usage.

This paper describes the development of an overarching taxonomy which addresses the aforementioned requirements. The first section reviews and describes the augmentation of five existing taxonomies currently used to characterise EOTs. The second section proposes that these be integrated into a new multi-dimensional framework called the Pentaxonomy, a robust taxonomic model for categorising tertiary-level distance EOTs. This paper explains the basis and structure for the Pentaxonomy and outlines why specific taxonomies were chosen for review, augmentation and integration within the framework. This paper comments on the features and benefits, demonstrates how the re-engineered taxonomies within the
Pentecostomy link to educational philosophies and technological schemes, and provides an example of the Pentecostomy. Its application and usefulness is significant within a distance education context, where informed EOT choice and usage is critical. As educationalists across institutes focus on technology as a way to maximise costs, increase efficiencies and meet student learning needs, the Pentecostomy can support them in understanding, prioritising and applying new tools.

However the application and usefulness of the Pentecostomy has the potential to extend beyond the realms of distance education to include “formal (primary, secondary, tertiary) and non-formal (training, certification, professional development)” special and corporate and into varied business industries where effective decisions on technology and digital media are important (Harsim, 2012). As business leaders across all industries focus on technology as a way to gain competitive advantage, the use of emerging EOTs is “commanding organisations to assess and manage the impact those technologies may have on their business” (PricewaterhouseCoopers LLC, 2013). The Pentecostomy can support them in understanding, prioritising and applying new tools “within the context of... business goals” (PricewaterhouseCoopers LLC, 2013). The next section reviews and describes the augmentation of existing taxonomies that have been used to classify technologies.

Current Taxonomies for Characterising EOTs

This section “encourage[s] and evaluate[s] educational innovation” (Goochey & Lockwood, 2012) by reviewing and augmenting five existing taxonomies that characterise EOTs used within tertiary-level distance learning environments. The taxonomies focus on: 1) Interaction, as proposed originally by Moore (1989), augmented by Culatta (2011), 2) Functionality, as proposed by Culatta (2011) and Lewitt, 3) Technical affordances, as proposed by Bonk and Graham (2006), clarified with reference to a four-part framework presented by Weller (2013), 4) Inquiry-based learning, as proposed by Dewey (1943), augmented by Bruce and Levin (1997) and 5) Cognitive objectives, as proposed originally by Etem (1956), augmented by Anderson and Krathwohl (2001), and Church (2007). These taxonomies provide valuable insights into previous efforts to classify technologies, inform the educational and technological basis of the new taxonomical framework and lay a foundation for future research. The augmentation of these taxonomies has been conducted in response to technological advances and enlightened understandings.

The next section proposes a new multi-dimensional framework called the Pentecostomy, a robust taxonomic model for categorising tertiary-level distance EOTs.

Classification by Interaction

This section describes the “Classification by Interaction” taxonomy, augmented by Culatta (2011) and based on the original classification proposed by Moore (1989). It classifies technologies by the relationship between learners and other parties. This relationship, known also as an interaction, is a “complex multifaceted phenomena” occurring within the learning process, having been enabled through sophisticated mediums which engage, motivate and stimulate learners. Distinguishing between these “types of interactions will elicit conceptual benefits”, differentiate between and yield to a more comprehensive understanding of the four separate taxonomical groups (Moore, 1989).

The first three interaction types of the original taxonomy consists of the following relationships: 1) Learner to Expert, 2) Learner to Learner, and 3) Learner to Content. Culatta presented a fourth category: 4) Learner to Content. This paper proposes a fifth category: 5) Learner to media. A summary of each category follows, supported by features and examples which elucidate the classification methodology.

Moore (1989) originally described three forms of interaction in distance education: 1) students and teachers, 2) student and student, and 3) student and content. “Given the elegant simplicity and broad relevancy of these forms of interaction” all three are used as a foundation.
upon which the taxonomy had “two additional permutations” (Moore, 2013, 1) not discussed in this paper.

**Learner to Expert**

This type of interaction in a traditional learning setting is expounded as an essential part of education, where an expert instructor seeks to not only effectively deliver a program of learning but to motivate and encourage learners to succeed. Incumbent upon the expert is the need to facilitate learning. Experts may offer learners an explanation, elaboration and/or simplification of a concept, depending on the need and level of understanding evident (Moore, 1989). The importance of social presence, the degree to which a person is perceived as real in a mediated environment, is asserted as a strong predictor of satisfaction (Gunawardena & Zittle, 1997) and in contemporary times is considered synonymous with a user-constructed and productive space in which collaboration and social learning practices occur (Oztok & Brett, 2011). Examples of EOTs through which ‘learner to expert’ interactions can be facilitated include web and video conferencing, discussion forums and live text chat. Popular platforms exemplars include Skype, Adobe Connect, Facebook and Twitter.

**Learner to Content**

This type of interaction is described as a valuable resource for learning which provides an experience through peer to peer group work that is essential for “effective functioning in modern society” (Moore, 1989). Particularly useful is the way in which this method of interaction has developed and tested the expertise of adult learners in “the nature of knowledge” and of the scholarly role of creating knowledge (Moore, 1989). The Internet has enabled educators to facilitate collaborative and cooperative learning by using online methods, where in many cases their role has become “less directive and more facilitative” (Gooley & Lockwood, 2012).

Creating an inherently social context in which to engage, these tools provide learners with the means to collaborate successfully despite being physically separated by distance. Various tools enable “learners to be connected through a variety of means... to support the learning of their peers... via “scaffolding... and... collaborative and cooperative activities, those involving discussion and dialogue... peer assessment and peer-tutoring” (Gooley & Lockwood, 2012).

EOTs which support peer interaction help extend the boundaries of traditional engagement not possible in conventional or historical settings. Examples of EOTs through which “learner to learner” interactions can be facilitated and where “peer support” helps generate “meaningful learning” (Gooley & Lockwood, 2012) include discussion forums and wikis. Popular platforms include Facebook, a social platform whose “significance and potential... in educational terms” cannot be underestimated, CNET forums and Wikispaces (Moore, 2013).

**Learner to Learner**

This type of interaction is a defining characteristic of education, wherein a learner utilises an internally didactic method of conversation to create sense and meaning from content. Following the advancement from historically and purist instructional learning techniques, the practise of self-directed study or auto-didacticism, wherein adult learners autonomously self-educate using subject-specific content, has become particularly widespread (Moore, 1989). The asynchronous and virtual nature of this method requires learners to assume greater control of monitoring and managing their cognitive and contextual elements (Garrison, 2009). Interaction with educational content remains a significant aspect of distance education (Moore, 2013). Examples of EOTs through which “learner to content” interactions can be facilitated include streaming video, educational applications, journal databases, “interacting with multimedia, participating in simulations...”

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or using cognitive support software” (Abrami, Bernard, Bures, Borokhovski, & Tamim, 2011). Popular platforms include Youtube, iTunesU, and Educreations.

**Learner to Context**

This type of interaction facilitates engagement between a learner and a virtual environment into which they have obtained entry. Experiential learning within contextually rich virtual environments has enabled learners to benefit from exposure to more practical and immersive ways of interacting. Modern technologies enabling contextual-based learning have provided powerful ways to manipulate visual information, opening up the vast instructional potential of dynamic, interactive imagery (Gooley & Lockwood, 2012). An example of an EOT through which ‘learner to context’ interaction can be facilitated includes Alternate Reality Games (ARG) which link “intense player involvement with a story that takes place in real-time and evolves” according to the response of the learner (Culatta, 2012). Other examples can include virtual 3D immersive and persistent worlds and gaming environments such as MMORPGs and 3D collaborative programs. Popular platforms include Second Life and Minecraft.

**Learner to Media**

This type of interaction is a defining characteristic of modern-day learner engagement, especially with online technologies that facilitate the generation of media content by learners as a means of expression and/or to accomplish a specific learning task. These interactions showcase the “mediational function of technologies”, according centrality to the task but rending the “technology as substrate” to describe its restrictive nature (Bruce & Levin, 1997). Examples of EOTs through which ‘learner to media’ interactions can be facilitated include video, audio and image creation and manipulation sites, e-portfolios, mind-mapping programs, document-creation tools and various tablet applications. Popular platforms include Educreations, Audacity, Voki and the iPad camera application.

**Classification by Similar Functionality**

This section describes the ‘Classification by Similar Functionality’ taxonomy, developed by Culatta and Leavitt (2011). This taxonomy outlines “common functional uses of emerging technologies in learning” (Paschosky-Brock, 2012) using seven key categories: 1) Real time learning tools, 2) Collaborative tools, 3) Asynchronous learning tools, 4) Assessment and evaluation tools, 5) Broadcasting (networking) tools, 6) Social tools, 7) Media repositories, each of which contain various subcategories representative of specific technology-types. Each technology-type in turn contains exemplars of actual brands (Culatta, 2011). This paper expands each category and proposes an additional eighth category: 8) User construction tools.

**Real-Time Learning Tools**

EOTs within this category enable subject information to be released and received by learners in an immediate and reciprocal manner. These EOTs enable mutual understandings and meaningful interactions and are connected to push technologies where communications are initiated by a server and where learners receive instantaneous feedback (Park & Bonk, 2007). The social element of synchronous tools such as instant messaging enables “remote students to engage in... informal communication... an important component” to on-campus and face-to-face instruction (Weller, 2013). Live demonstrations and instruction, instantaneous and time-saving communications are features of some or all of these technologies, which also contain subcategories including: immersive, whiteboarding, webinars and live video. Brand exemplars include: Second Life, Adobe Connect, Livestream and RealWorld.

**Collaborative Tools**

EOTs within this category “comprise[s] one or more computer-based tools that support the communication, coordination and/or information processing needs of two or more people working together on a common task” (Zigurs &
Munkvold, 2006). Collaborative technologies “facilitate[s] the production of group work” (P. Anderson, 2007) and have “provide[d] a wide variety of capabilities and perspectives” (Zigurs & Munkvold, 2006) as evidenced by the development of frameworks and typologies emerging from widely varying perspectives. Zigurs and Munkvold (2006) recommend a classification based on the functional tasks or activities that the technology supports, and in four broad groups identifies these tasks as “communication, information sharing, process support and coordination” (Zigurs & Munkvold, 2006). Collaboration provides an “opportunity for intrinsic feedback” (Laurillard, 2008) and the associated technologies also provide an experience wherein the pedagogies of constructionism and social learning are combined (Laurillard, 2008). Subcategories include: collaborative writing, discussion forums, file sharing, portals and mind maps. Brand exemplars include: Wikipedia, Moodle, Google Docs and Ning.

Asynchronous Learning Tools

These environments foster “a flexible learning approach, which is less fixed to [a] specific time pattern” (Weller, 2013) and involves two or more devices that are not continuously synchronised but which enable learner access to subject specific material “without the potentially exclusionary constraints” otherwise associated with being present at a certain online or physical place and time (Jaffee, 1997). Although enabling flexibility and having a somewhat ubiquitous presence, these tools may lack immediacy and drama, and require that learners assume greater control of monitoring and managing the cognitive and contextual elements of engagement (Garrison, 2009). The higher levels of anonymity associated with asynchronous tools enable students who are less confident to successfully make contributions that in face-to-face environments would not be forthcoming (Weller, 2013). Subcategories include web-based training, discussion forums and screen casters. Brand exemplars include: Moodle, Blackboard, Jing and Screencaster.

Assessment and Evaluation Tools

The advancement and higher utilisation of technology within distance education environments has prompted innovation in the areas of assessment. Methodologies including interactive assessments are being used to engage students in “collaborative and negotiated learning experiences” (Gooley & Lockwood, 2012). EOTs within this category provide a greater variety and authenticity in assessment design, efficient submission, marking, moderation and data storage processes, immediate feedback and accurate, time and accessible evidence on the effectiveness of delivery (JISC, 2010). Subcategories include testing, surveys and analytics. Brand exemplars include: Poll Anywhere, Survey Monkey, and Socrative.

Broadcasting (Networking) Tools

EOTs within this category enable the contributed content to be broadcast as it is uploaded, a concept similar to that of live television broadcast (Social Media Guys, 2010). These tools may enable efficient connections and relationships between individuals (Safko, 2012). Subcategories include location sharing, microblogs, blogs, social bookmarking and media casting. Brand exemplars include: Vimeo, TuneIn, Reddit, and Wordpress.

Social Tools

EOTs within this category provide highly accessible, inexpensive and scalable publishing techniques and allow the generation and exchange of user content with capability to reach small or large audiences (The Social Media Guys, 2010). Safko (2012) classifies social tools into 15 categories: social networking, publishing, photo sharing, audio, video, micro blogging, live casting, virtual worlds, gaming, productivity applications, aggregators, RSS, search, mobile, and interpersonal (Safko, 2012). “The massive topology of social networking services” (French, 2010) provides a choice in using EOTs for “direct and indirect support of education-related tasks... to fulfill
social learning functions...and to stimulate social...benefits. “ (Greenhow, 2011). Brand exemplars include: Twitter, Facebook, Myspace and LinkedIn.

**Media Repositories**

EOTs within this category provide a digital collection, a “central place in which an aggregation of data is kept and maintained in an organised” manner (Rouse, 2005). Repositories provide a powerful way of working with online content by enabling online storage and management of resources that are freely accessible via any web-enabled device and which enable users to locate relevant resources based on personal needs, recommendations and popularity. The popular platforms Youtube and Delicious utilise repositories and enable users to manage their profiles, share content and collaborate (Churchill, Weng, Law, Salter, & Tai, 2009). Subcategories include text, audio, images and video. Brand exemplars include YouTube “which receives over 65,000 videos per day” having become a “user-generated library that sustains over 100 million views per day” (Currah, 2007). Squidoo.com, Delicio.us to “keep, share and discover the best of the web” (Del.icio.us, 2013), and Dropbox.

**User Construction Tools**

This paper proposes an eighth category: User Construction. EOTs within this category enable the generation of digital information, objects or products by the user. Through the use of specific online tools, users are able to express an element of control in the design of their work, but within the limits that have already been set as stipulated by the design of the technology. Subcategories include digital video, blogging, audio. Brand exemplars include: Voki, iMap, Educreations, Prezi and Jing.

**Classification by Technical Affordances**

This section describes the “Classification by Technical Affordances” taxonomy, developed by Bonk and Graham (2006) who presented four dimensions of interaction. Figure 1 illustrates the four dimensions, each being represented using a sliding scale on which a single point can be marked to indicate the extent of the interaction. The dimensions were initially used to compare the type and extent of interaction within a face-to-face versus distributed learning environment. The dimensions are identified as 1) space, 2) time, 3) fidelity and 4) humanity. This paper proposes a fifth category: 5) Control. A summary of each dimension follows, supported by an explanation of the affordance differences between interactions within a face-to-face learning environment and a distributed learning environment. The dimensions are further clarified with reference to a separate taxonomy presented by Weller (2013), which contains a four-part framework of pedagogy versus technology as represented by the following quartiles: 1) High technology didactic, 2) High technology constructivist, 3) Low technology didactic, and 4) Low technology constructivist. Exemplars and brands that elucidate the classification methodology are also outlined below.

**Space**

This dimension refers to the physical reality of space occupied by a technology. Historically, face-to-face environments operated at the highly physical end of the scale, whereas distributed learning environments functioned in a highly virtual manner. The “high technology didactic” category is associated with the traditionally high virtual end of the scale which solicits a “high degree of functionality and interactivity” and requires “little educator input beyond the initial production” (Weller, 2013). EOTs functioning with a high level of virtuality (low physicality) include Virtual Worlds and MMORPGs such as Second Life and Minecraft. EOTs functioning with a high level of physicality (low virtuality) include video casts and webinars.

**Time**

This dimension refers to the level of synchronicity or asynchronicity that the technology affords. Historically, face-to-face environments...
operated at the highly synchronous end of the scale, whereas distributed learning environments functioned in a highly asynchronous manner. The “high technology didactic” category is associated with the traditionally high asynchronous end of the scale where learners assume greater control of monitoring and managing the cognitive and contextual elements (Garrison, 2009). EOTs functioning with a high level of synchronicity include discussion forums/platforms such as Moodle and wikis such as Wikipedia. EOTs functioning with a high level of synchronicity include Virtual Worlds such as SecondLife and live web-conferencing such as Skype.

**Fidelity**

This dimension refers to the level of media richness that a technology affords. Historically, face-to-face environments operated at the high fidelity end of the scale, whereas distributed learning environments functioned in a low fidelity manner. The technology-rich constructivist approach is considered by some as “the desirable goal” having “a rich technological environment” with functions that allow exploration of “ideas and concepts” and a “form of legitimate peripheral participation…” (Weller, 2013). EOTs functioning with a high level of fidelity include 3D immersive virtual worlds such as SecondLife. EOTs functioning with a low level of fidelity “requiring an active part in the reading process” (Weller, 2013) include live text chat such as Skype Text or Messenger.

**Humanness**

This dimension refers to the level of human physicality and interaction that the technology affords. Historically, face-to-face environments operated at the highly human end of the scale.
underpinned with the “didactic pedagogy of face to face lecturing” (Weller, 2013), whereas distributed learning environments functioned in a highly machine-oriented manner. The ‘low technology constructivist’ is associated with the contemporary ‘high human end of the scale and does “not necessarily require a rich mix of technology”, is not “technologically oriented, but involve[s] a good deal of debate”, “promote[s] collaborative learning” and is supported by an educator who is “actively engaged throughout the course” (Weller, 2013). EOTs functioning with a high level of humanness (low machine) include 3D immersive virtual worlds such as Second Life. EOTs functioning with a high level of machine support (low human) includes email and blogs.

Control

This dimension refers to the level of customisation and control that the technology affords to the user. Historically, face to face environments operated as the high control end of the scale, whereas distributed learning environments functioned in a low customisation–highly automated manner. The ‘high technology constructivist’ category is associated with the traditionally high control and customisation end of the scale in which ‘the ability to create different communication spaces’ is supported (Weller, 2013). EOTs functioning with a high level of control and customisation (low automation) include 3D immersive virtual worlds such as Second Life. EOTs functioning with a high level of automation (low customisation) include email.

Classification by Inquiry-Based Learning

This particular taxonomy was augmented by Bruce and Levin (1997) and is based on the original four-part division of media for 1) inquiry, 2) communication, 3) construction, and 4) expression, proposed by Dewey (1943), who identified the greatest educational resource as “the natural impulses to inquire” (Bruce & Levin, 1997). The taxonomy proposes “many legitimate ways to conceive of educational technology” (Bruce & Levin, 1997) and emphasises the “mediative aspect of technologies” to connect participants by reflecting the utility of specific digital tools. This paper proposes a fifth media category: 5) Media for Recreation

Media for Inquiry

This dimension refers to that which utilises technology as media for theory building (thinking), data access (connecting to the worlds of text, video, data), data collection (extending the senses), and data analysis. Examples of technologies classified into the theory building category include visualisation software, virtual reality environments and simulation toolkits. Examples of technologies classified into the data access category include hypermedia environments and digital libraries. Examples of technologies classified into the data collection category include survey makers and video recording. Examples of technologies classified into the data analysis category include image processing and spreadsheets.

Media for Communication

This dimension refers to that which utilises technology as media for document preparation, communication with other participants, collaborative media and teaching media. Examples of technologies classified into the document preparation category include word processing and presentation graphics. Examples of technologies classified into the communication category include email and computer conferencing. Examples of technologies classified into the collaborative media category include group decision support systems and shared document preparation. Examples of technologies classified into the teaching media category include instructional simulations and tutoring systems.

Media for Construction

This dimension refers to that which utilises technology as media for control systems, robotics, control of equipment, computer-aided
design and construction of graphs and charts. EOTs within this category are extended to enable "personal publishing" or the generation of digital information, objects or products by the user. "With minimal cost... these products can be created... and distributed via the Internet... an environment with a low-cost of production... low technical skill requirements, minimal capital needs, and low-cost distribution" enabling “ordinary people to reach large audiences". Content creation “with the Internet is dramatically easier, faster, and cheaper” (Blank, 2013).

Media for Expression

This dimension "combines construction and communication" and refers to that which utilises technology as media for expression, including drawing and painting programs, musicmaking, composition and editing, interactive video and hypermedia, animation software and multimedia composition. These online tools enable users to “contribute broader content” (Blank, 2013) and “play a[n]... active role in the creation, appropriation and dissemination of creative works...” (Currah, 2007).

Media for Recreation

This dimension refers to that which utilises technology as media for recreational engagement, for which a large scope of individual activities exist, “from proactive to passive pursuits and from personal productivity to ostentatious consumption.” The “hallmark of most leisure-time activities... has been the interpenetration of leisure and technology” (Poser, 2011). EOTs within this category include gaming and social websites and interactive forums.

Classification by Cognitive Objectives

This taxonomy was revised by Anderson and Krathwohl (2001), augmented by Churches (2007) and is based on the original taxonomy proposed by Bloom (1956), whose taxonomy followed the thinking process by categorising and ordering thinking skills and objectives. The original taxonomy contains a series of levels, described using nouns, which ascend from the lower order thinking skills to higher order thinking skills: 1) knowledge, 2) comprehension, 3) application, 4) analysis, 5) synthesis and 6) evaluation. This taxonomy was revised by Anderson and Krathwohl (2001), who not only rearranged the sequence of the original taxonomy but utilised verbs instead of nouns to identify the specific levels: 1) remembering, 2) understanding, 3) applying, 4) analysing, 5) evaluating and 6) creating.

This revised taxonomy was augmented by Andrew Church, based on the revised version of Bloom’s work by Anderson and Krathwohl (2001), who incorporated the “cognitive processes used to learn” (Hinton, 2010). Church created a “digital taxonomy map” by extending the list of verbs to incorporate those which related to digital tasks “to account for the new behaviours, actions and learning opportunities emerging through the advancement and increasing ubiquitous nature of technology” (Churches, 2007).

This paper outlines the key verb categories as proposed by Anderson and Krathwohl (2001) in the earlier revision of Bloom’s Taxonomy. A description is provided for each category using explanations from their work. The “digital additions” proposed by Churches and this paper proposes the EOTs that correspond with these digital verbs.

Remembering

This dimension “in[re]trieve[r] the retrieval of material” (Churches, 2007). The “digital additions” include bullet-pointing, highlighting, bookmarking or favouriting, social networking, social bookmarking, searching (Churches, 2007). These actions would be enabled by EOTs including Evernote, Twitter, Pinterest and Google.

Understanding

This dimension involves the “construction of meaning from different types of function...” (Churches, 2007) The “digital additions” include advanced searching, blog journaling, twittering.
categorising, commenting and annotating, and subscribing (Churches, 2007). These actions would be enabled by EOTs including Edublogs, Blogger, Twitter, Delicious, and Google.

**Applying**

This dimension involves the “carrying out or using a procedure through executing or implementing” (Churches, 2007). The ‘digital additions’ include running and operating, playing, uploading and sharing, hacking and editing. These actions would be enabled by EOTs including Flickr, Youtube, Twitter.

**Analysing**

This dimension involves the “breaking [of] material or concepts into parts, determining how the parts relate or interrelate to one another or to an overall structure or purpose” (Churches, 2007). The ‘digital additions’ include mashing, linking, reverse-engineering, cracking, validating, and tagging. These actions would be enabled by EOTs including Twitter and Google.

**Evaluating**

This dimension involves “making judgements based on criteria and standards through checking and critiquing” (Churches, 2007). The ‘digital additions’ include blog/vlog commenting and reflecting, posting, moderating, collaborating, and networking, and testing. These actions would be enabled by EOTs including Edublog, Moodle, Wikipedia, Wikiblogs, Youtube.

**Creating**

This dimension involves “putting the elements together to form a coherent or functional whole; reorganising elements into a new pattern or structure through generating, planning or producing” (Churches, 2007). The ‘digital additions’ include programming, filming, animating, video casting, podcasting, mixing and remixing, directing and producing, and publishing. These actions would be enabled by EOTs including Prezi, Wikiblogs, and Jing.

This section has reviewed and augmented five existing taxonomies. The next section proposes a new multi-dimensional framework called the Pentexonomy, a robust taxonomic model for categorising tertiary-level distance EOTs. The Pentexonomy integrates the re-engineered taxonomies discussed in this section.

**The Pentexonomy**

This section proposes an innovative approach for reaching “the ultimate aim...to provide the most useful classification system...” (Wheeler, 2008) for categorising tertiary-level distance EOTs. This is achieved by using the following two step process: 1) Reviewing and re-engineering the five existing taxonomies, as “to do good taxonomy, a researcher needs... access to the relevant literature” (Godfrey et al., 2007), and 2) Integrating these taxonomies into a new multi-dimensional framework called the Pentexonomy. The term Pentexonomy focuses attention on three key aspects of this framework, as follows: 1) Pent (to signify the augmentation and integration of five separate taxonomies), 2) Tex (or techs, to signify its relationship to technology) and 3) Xonomy, (to signify its taxonomical purpose).

This section explains the basis and structure for the Pentexonomy and then outlines why five specific taxonomies were chosen for review, augmentation and integration with the framework. This section then demonstrates how the re-engineered taxonomies within the Pentexonomy link to key educational philosophies, following which the features and benefits of the framework are explained. Finally, this section provides an example of the Pentexonomy.

**A Basis and Structure for the Pentexonomy: Technology and Education**

As online technologies play a significant role in the delivery of online education, it is necessary that a comprehensive taxonomy to guide EOT choice be reinforced and represented through educational theory and technological schemes. “Learning and technology have been...
intertwined with one another throughout human history” (Harasim, 2012) creating a two-fold relationship significant in the Pentexonomy. Acknowledging that “a tool should always be used in support of pedagogy” (Pacearsky-Brock, 2012), the Pentexonomy has a basis in both education and technology.

Even in “such a technology-driven world, [where] it is critical...to study the intersection of learning theory and technology” the rich educational theory to guide online delivery is limited. “There are few theory-based...guidelines to assist educators to develop more effective pedagogies for online learning environments” and the “practice [of] teaching and learning...lacks a theoretical framework to guide...the use of online technologies” (Harasim, 2012).

In addressing this gap, the Pentexonomy uses taxonomies that contain significant links to the “three major learning theories [that] influence education in the 20th century: behaviourism, cognitivism and constructivism” (Harasim, 2010).

Commenting on how educators can choose the most appropriate technology for their learning environments, Handley suggests a focus towards the “unique capacities of each technology to understand “what the possibilities are”. Choice in “technology...should be driven by...the teaching philosophy...and goals of the lesson” (Oxford University Press English Language Teaching, 2010). Utilising educational theory-based dimensions such as interaction, inquiry and cognitive based learning, means that EOT choice is underpinned by sound educational philosophy.

Five Taxonomies: a Starting Point

The Pentexonomy integrates five taxonomies, using these to represent a starting point upon which to build in further theory to broaden and strengthen its educational and technological foundations. The following are key reasons why these five specific taxonomies (discussed in previous section) have been chosen for review, augmentation and integration within the framework.

1. These five taxonomies have significant links to educational philosophy (i.e. the three major learning theories that influenced education in the 20th century (behaviourism, cognitivism and constructivism, discussed below)), and to the online technologies that influence education delivery in the 21st century. As “the theory we employ shapes how we design and implement our practice” (Harasim, 2010) it is imperative that we consider the theories most relevant to our taxonomical objective.

2. As demonstrated in the previous section, existing research has already extended the application of educational theory within these dimensions, from a traditional classroom environment to online modes.

The integration of multiple taxonomies is used to provide a more comprehensive understanding on EOT usage and adoption than can be achieved using a single taxonomy only. While these re-engineered taxonomies provide valuable insights they should not be viewed as providing a complete or finite answer to a knowledge problem; it is a step on the path to better understanding. Theoretical frameworks of learning improve “with the new technologies that emerge and transform...horizons” (Harasim, 2010).

Linking the Taxonomies to Educational Philosophy: an Example

This section demonstrates how the re-engineered taxonomies within the Pentexonomy link to key educational philosophies. This is achieved through an example selected at random which describes and links behaviourism, one of the key educational philosophies, to two of the five re-engineered taxonomies: i) classification by technical affordance and ii) classification by cognitive objectives.
Classification by Technical Affordance and Behaviourism

Integrating a taxonomy which focuses on technical affordances (Borik & Graham, 2006) is a sensible way to categorize and understand multiple dimensions of an EOT, such as degree of usability or extent of interaction within a certain environment. While having taxonomical roots, this classification is clarified in reference to another four-part framework of pedagogy versus technology (Weller, 2013). The very idea of taxonomy is supported by behaviourist theory since “behaviourism emphasises the ability to analyse the elements or steps of learning by breaking down a task into smaller steps and by specifying behavioural objectives. Taxonomies of learning behaviours are considered to be important” (Harasim, 2012). The link between this taxonomy and educational philosophy is strengthened through consideration of two sub-theories of behaviourism, classical and operant conditioning.

“Behaviourist learning theory emphasises two major types of conditioning: classical conditioning... in which behaviour becomes a reflex response to a stimulus and operant conditioning... which involves the reinforcement of a behaviour by a reward or punishment” (Harasim, 2012). Classical conditioning can happen when the affordances that EOTs provide stimulate engagement in learning. For example, the social nature and accessibility (affordance, stimulus) of social networks (technology) can make engagement (response) replicable and observable. Operant conditioning can also happen when the affordances that EOTs provide stimulate engagement in learning. For example, the action and challenge (gameplay) within interactive games (technology) involves a reward or points systems (reinforcing stimulus). This stimulus has the effect of modifying the behaviour [and by reinforcing] the tendency to repeat the behaviour in the future... a certain response result in a reward” (Harasim, 2012). In gaming, “operant conditioning... shape[s] behaviour through such mechanisms as positive reinforcement (reward) [e.g. points], negative reinforcement [removal of obstacle], non-reinforcement and punishment [loss of points, death of protagonist]” (Harasim, 2012).

Classification by Cognitive Objectives and Behaviourism

Integrating a taxonomy which focuses on cognitive objectives (Anderson et al., 2001; Bloom et al., 1956; Churches, 2007) assists in identifying behaviours and provides “a kind of framework... for categorising human behaviour” (Harasim, 2012). This taxonomy has significant links to the behaviourist philosophy as “the cognitive... six levels of operation [of Bloom’s taxonomy]... can be specified as behavioural objectives” (Woollard, 2010). The revision of this taxonomy (Anderson et al., 2001) also “emphasises... the behavioural aspects of the domain” (Woollard, 2010). “Behaviourist teaching is associated with learning that is... kinaesthetic... visual... efficient and effective”, characteristics of EOTs that support ‘Bloom-based’ action words such as identify, assemble and design (Woollard, 2010).

Features and Benefits of the Framework

This section highlights the features and benefits of the Pentaxonomy using a top-down examination that focuses on each successive stage within the framework. The stages are: 1) Entire framework, 2) Dimensions (representing the five re-engineered taxonomies), 3) Classifications (physical and theoretical aspects of each taxonomy), 4) Technologies (specific types of EOTs), 5) Examples (actual brand exemplars).

Entire Framework

The hierarchical structure of the framework facilitates progressive refinements in search criteria, enabling more focussed EOT choices. Dimensional divisions provide a clear and concise configuration, and range of different perspectives from which to approach decisions on technology usage. This enables us to focus on which physical or theoretical concepts will be used to underpin an EOT-based decision.
Dimensions

The use of five taxonomical dimensions makes a greater range of potential applications evident and enables users to evaluate and select which aspects among a choice in technology will be guided by. It supports decision-making by enabling users to apportion varying values of importance to the different dimensions and classifications. It enables specificity in choosing the desired tools, eliminating those less important through informed decision-making based on the range of classifications available.

Classifications

The classifications focus on specific dimensional aspects, providing a tight filter that enables the aspects to determine the types of technologies to be used. Using classifications provides a basis for comprehensive decision-making, enables choices on EOTs to be specified according to key requirements, and demonstrates how a choice between theoretical underpinnings from dimensions or classifications should influence EOT choice.

Technologies (EOTs)

Searches using different classifications reveal the multiple aspects and usages of singular EOTs. The framework outlines multiple areas under which a technology belongs, providing a holistic understanding of the EOTs varied capabilities and into which environments or situations the EOT might fit.

Demonstration of Pentexonomy

This section demonstrates a working example of the Pentexonomy. Rather than displaying the full taxonomical framework, it provides an overview of the capability and capacity of the taxonomy via three example searches which identify the EOTs and examples with selected dimensions of the taxonomy.

Table 1 displays three separate example searches. The first example (Search 1) displays a list of "live text chat" EOT examples classified within the 'learner to expert' dimension of the 'Interaction' taxonomy. The second example (Search 2) displays a list of 'blogging' EOT examples classified within the 'social tools' dimension of the 'Functionality' taxonomy. The third example (Search 3) displays a list of 'social networking sites' within the 'applying' dimension of the 'Cognitive objectives' taxonomy. Through a defined pathway of filters, the Pentexonomy presents a range of brand examples that can be used to achieve the same or similar outcome as each other to meet the desired stakeholder need.

Noteworthy is the fact that EOT examples can 'belong' under different dimensions and technology categories, being that "tools...show up under multiple categories depending on how they are used" (Culatta, 2011). For example, Facebook appears as an example of an EOT that enables 'live text chat' within the 'learner to expert' classification of the 'Interaction' taxonomy, and also as an example of a 'social networking site' within the 'applying' dimension of the 'Cognitive objectives' taxonomy.

CONCLUSION

Educational online technologies (EOTs) have contributed significantly to the affordability and accessibility of higher education, resulting in a marked increase in demand for online courses. Educationalists have responded by developing their knowledge and application of rapidly evolving technologies. However, the task of selecting an appropriate technology from an extensive range of tools is challenging. The lack of a robust EOT classification system is significant, in light of increased online uptake. This paper describes the development of an overarching taxonomy to address this requirement.

This paper reviewed and described the augmentation of five existing taxonomies and proposed that these be integrated into a new multi-dimensional framework called the Pentexonomy, a robust taxonomic model for categorising tertiary-level distance EOTs. This paper explained the basis and structure for
Table 1. A classification of EOTs using the Pentaxonomy

<table>
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<tr>
<th>Interaction</th>
<th>Social networking sites</th>
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<tr>
<td>Learner to peer</td>
<td>Wiki</td>
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<td>Learner to learner</td>
<td>Microblogging</td>
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<td>Learner to content</td>
<td>Discussion forums</td>
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<td>Learner to media</td>
<td>Live text chat</td>
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<td>Search 1</td>
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<td>Web conferencing</td>
<td>Webinar</td>
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<td>Blogging</td>
<td>RSS</td>
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<td>Virtual Worlds</td>
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<th>Functionality</th>
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<td>Real time learning</td>
<td>Location sharing</td>
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<td>Collaboration</td>
<td>Social networking sites</td>
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<td>Agelessness</td>
<td>Wiki</td>
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<tr>
<td>Assessment, evaluation</td>
<td>Microblogging</td>
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<tr>
<td>Broadcasting, network</td>
<td>Discussion forums</td>
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<tr>
<td>Social tools</td>
<td>Live text chat</td>
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<td>Media repositories</td>
<td>Webinar</td>
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<td>User construction</td>
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<td>Search 2</td>
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<td>Virtual worlds</td>
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<th>Technical affordance</th>
<th>Blogger</th>
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<td>Fidelity</td>
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<td>Heterogeneity</td>
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<td>Control</td>
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<th>Inquiry-based learning</th>
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<td>Pedagogical communication</td>
<td>Media for construction</td>
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<td>Media for construction</td>
<td>Media for expression</td>
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<td>Media for expression</td>
<td>Media for acquisition</td>
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<td>Search 3</td>
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<tr>
<th>Cognitive Objectives</th>
<th>Social networking sites</th>
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<td>Remembering</td>
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<td>Understanding</td>
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<td>Applying</td>
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the Pentaxonomy and outlined why specific taxonomies were chosen for integration within the framework. This paper also commented on the features and benefits of the framework and demonstrated how the re-engineered taxonomies linked to educational philosophies and
technological schemes. It provided an example of the Pentexonomy’s ability to robustly categorise a range of EOTs in an effective and accessible manner.

The application and usefulness of the Pentexonomy is significant within a blended education context, where informed EOT choice and usage is critical. As educationalists across institutes focus on technology as a way to minimise costs, increase efficiencies and meet student learning needs, the Pentexonomy will support them in understanding, prioritising and applying new tools within a learning environment. However the Pentexonomy has the potential to extend beyond the realms of education, and into varied business industries where effective decisions on technology and digital media are important. As business leaders focus on technology as a way to gain competitive advantage, the Pentexonomy can support them in understanding, prioritising and applying new tools within the business context.

ACKNOWLEDGMENT

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Kimberley N. Tuapawa is a consulting developer, researcher and presenter from Hawkes Bay, New Zealand. Kimberley is undertaking doctoral research in a Research Higher Degree programme at the University of Newcastle, Australia. She has a Masters in Digital Media (MDM), Bachelor of Computing Systems (BCS), Diploma in Multimedia and Web Development (DipMWD), Diploma in Information and Communications Technology (DipICT), and Diploma in e-Business Support (DipeBus). Her current research aims to identify and address the disparities that exist to influence stakeholder needs against educational online technologies within a blended tertiary environment. Kimberley previously held a lecturing position with the Eastern Institute of Technology, teaching computing and small business. Since 2013 Kimberley has been involved in the delivery of IT and education-based training to academia, has consulted on multimedia and digital publishing projects, and presented research on a number of educational technology topics.

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8.4 Paper 4

Paper 4 is entitled “Pentexonomy: A Multi-dimensional Taxonomy of Educational Online Technologies”. It was accepted for publication in a newly edited book entitled “Revolutionizing Education through Web-Based Instruction” by Mahesh Raisinghani.

During 2015, IGI Global, publishers of the IJWLTT journal advised the author that this paper had been selected for inclusion as a chapter in a new book entitled “Revolutionizing Education through Web-Based Instruction”61. Paper 4, which is a revised edition of Paper 3, contains new references, and insights from feedback with blended learning experts.

**Contribution to research**

Paper 4 was the fourth in a series of seven publications that formed the output of preliminary research. It maps directly to research objectives 1 and 2, and outcomes 1 and 2 (see Figure 2). Through qualitative analysis of data from blended learning experts, this paper further developed understandings about how the EOTs, previously classified in Paper 3, were being used in BTEs. It not only described their functions using dimensions from existing taxonomies, but verified the extent of their current use. This helped develop the context for the use of the Pentexonomy (proposed in Paper 3), and establish its practical application within BTEs.

While Paper 3 was developed as a *standalone piece* to contribute insights to a *specific segment* of the literature, it also formed part of a *set of components* that as a whole contributed to a *range of areas* across the field of educational technology in higher education. Its contribution to *this research* helped to build a strong foundation of current knowledge upon which to ground the phenomenological study, extend its application, and triangulate results.

61 The book “Revolutionizing Education through Web-Based Instruction” is a comprehensive, multi-disciplinary exploration of the emerging digital opportunities available to educators. It presented contemporary theoretical frameworks as well as practical research findings that supported the use of these new computer-assisted teaching techniques. The myriad of research-based topics featured in this book allowed for a thorough, diverse discussion about education, technology, and the intersection therein.
Co-author statements

By signing below, I confirm that Kimberley Tsapawa was the primary author of the publication entitled “Pentexonomy: A Multi-Dimensional Taxonomy of Educational Online Technologies" published in the book entitled Revolutionizing Education through Web-Based Instruction. Sher and Gu reviewed and commented on her work.


Signature:
Associate Professor William Sher
Date: 27 Feb 2017

Signature:
Professor Ning Gu
Date: 01/02/2017

Signature:
Associate Professor Grant Webber
Faculty Assistant Dean Research Training
Date: 03/02/2017
Chapter 13

Pentoxonomy:
A Multi-Dimensional Taxonomy of Educational Online Technologies

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University of Newcastle, Australia

William Sher
University of Newcastle, Australia

Ning Gu
University of Newcastle, Australia

ABSTRACT

Educational online technologies (EOTs) have revolutionised the delivery of online education, making a large contribution towards the global increase in demand for higher learning. Educationalists have striven to adapt through knowledge development and application of online tools, but making educationally sound choices about technology has proved challenging, amidst the extensive and largely unclassified range of tools. The absence of a taxonomy comprehensive enough to guide EOT choice is a concern, given the current global extent of online activity. This chapter addresses this issue by proposing a new taxonomic framework of EOTs called the Pentoxonomy. Developed by augmenting five existing taxonomies, all of which include current EOT insights gathered during 2014-15 interviews with blended learning experts, the Pentoxonomy synergises a range of perspectives to produce a robust, contextualised, and multi-dimensional classification which facilitates effective decision-making on EOT activity.

INTRODUCTION

The Internet is a phenomenal digital structure that has revolutionised the application of online technologies. By providing a "ubiquitous and universal means" of interconnection it has enabled a growing populace of over 2.4 billion users to rapidly exploit an expanding array of digital services (Tseleitis et al., 2009, p. 9). The digital frontiers have extended mankind's metropolis of 'digitalia', with impressive advances hallmarking the global network as an "extraordinarily successful" catalyst for growth (Tseleitis et al., 2009, p. 9).

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Industry-wide the Internet has generated opportunities. Tertiary education institutions (TEIs) and educationalists in particular have found the developments occurring within distance and blended education to be significant. Ambitious new endeavours to deliver online education to learners have been bolstered by online technologies, as evidenced through the inauguration of two massively open online course (MOOC) ventures, Udacity and Coursera. Herein the Internet has provided a channel through which students have been recruited at an astonishing rate (The Economist, 2012). In April 2012, Coursera had enrolled one million students. By January 2013, this number had risen to over two million. “It’s most successful class... had attracted over 180,000 students” (The Economist, 2012, p.1).

Predictions about future online learning suggest that as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (Anderson, Boyle, & Rainie, 2012, p. 17). This is now happening, as “millions of students [take] online courses...[giving] evidence that this modality is meeting a clear demand” (Allen & Seaman, 2015, p. 21). Similar forecasts indicate that the digital delivery of university-level course work via cheaper technologies will revolutionise higher education (Anderson et al., 2012). For educators, this may elicit “threatening change and unsettling volatility” or “exciting possibilities” (Chandler, 2012, p. 1), congruent outlooks to online education’s “story of amazing successes, coupled with important failures” (Allen & Seaman, 2015, p. 21). Despite these varying perceptions, the reality of the Internet’s transforming influence is evident. “Academic leaders at all types of institutions” are reporting “increased demand for ...online courses” with “the demand for online offerings...greater than that for the corresponding face-to-face offerings” (Allen & Seaman, 2010, p. 5). In fact, the proportion of institutions stating that online learning is critical to their strategy is at an all-time high (Allen & Seaman, 2015). Increasingly evident is the belief in “the power of this form...” of education to “engage and inspire people outside of the confines of an institution” (Kernohan, 2012, p. 1).

Factors including the affordability, affordances and accessibility of online technologies are contributing to the shift away from traditional in-class methods of delivery to more digitally-driven systems which accommodate a wider range of students. Clearly, “the idea that learning occurs only within” the “confines of an institute is becoming obsolete” (Annetta, Foka, & Klesath, 2010, p. 73). Will “the trend toward blended learning systems...increase” to become “so ubiquitous that we will eventually drop the word blended and just call it learning”? (Bonk & Graham, 2006, p. 7). As online technologies continue to advance and as distance end-users become more familiar with the capabilities of online learning, it is likely that improved and expanded applications that “increase connectedness, community and collaboration” will be developed (Bonk & Graham, 2006, p. 562). These will be accompanied by appropriate support for digital tools that strengthen and accelerate learning (Tuapawa & Skelton, 2012). Educationalists understand that “no longer are classes one-dimensional”, but as ‘modality demands’ transition from face-to-face to online, an exploitation of digital services must occur to improve traditional methods of delivery, the features of which can be “transferred and...enriched in online environment” (Weller, 2013, p. 48).

Responsively, higher education institutions, many of whom are “under significant pressure to provide affordable, sustainable approaches” have collaborated to expand their knowledge-base concerning the value of online technologies (Beckem & Watkins, 2012, p. 61). ‘Communities of inquiry’ are helping to articulate greater understandings into the future potential and capabilities of EOTs in recognition of how “portals into the virtual world are now surpassing the doors to the traditional university” (Gregory et al., 2010, p. 410). Propelled by the need to become highly adaptive under changing economies and effective amidst student expectations, such institutions are seeking to gentrify traditional teaching approaches and rapidly assimilate the use of modern tools into programmes of distance learning. Distance learners who
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as part of “an interconnected community, rather than a series of individual learners” being dispersed geographically and separated by distance, stand to benefit greatly from the advancements being made (Gooley & Lockwood, 2012, p. 188).

Educationalists have responded “to the opportunities to harness” the potential benefits by developing their knowledge of rapidly evolving technologies and “by demonstrating innovative uses of technology to adapt or transform … for future needs of learners and teachers” (Gregory et al., 2010, p. 400). Technologies such as connective media, interactive gaming, virtual worlds and video conferencing, have gained value amongst those whose education ideologies entail an adaptive approach to improved learning and whose practical sense dictates that the needs of a greater number of distance students be accommodated.

The task of selecting an appropriate technology amidst an extensive and largely unclassified range of tools can be challenging. Without a formal guide or classification system, making sound EOT-based decisions to support pedagogy can be difficult for educationalists who “struggle to keep up with the ever-increasing tools available” (Ko & Rosen, 2010, p. 16), particularly in a faculty environment plagued with concerns over the demands of online delivery versus face-to-face instruction (Allen & Seaman, 2015). While “there are numerous technologies”, often these exist as singular ‘tool box’ entities and are not necessarily selected through the use of a taxonomy comprehensive enough to guide EOT choice (Singh, Mangalanj, & Tanaja, 2010, p. 309). For educationalists the lack of a robust EOT classification system is significant. “As educators…we need a method of ordering phenomena…in ways which will reveal some of their essential properties as well as the interrelationships among them” (Bloom, Engelhart, Furst, Hill, & Krathwohl, 1956). Sound pedagogical reasoning is also critical to making effective choices. “Although there are new tools for learning, we still need a framework in which to conceptualise learning support in networked learning environments” (Gooley & Lockwood, 2012, p. 150).

Amidst an abundance of emerging technologies, “a taxonomy can be a productive step in the process of understanding and explaining… the familiar in new ways”, enabling the making of sense amidst “a confusing array of phenomena”. An appropriate and comprehensive classification system “reduces the complexity and richness” (Bruce & Levin, 1997, p. 80). In light of increased online uptake and activity, access to a taxonomy which facilitates effective decision-making on EOTs and provides support in understanding, prioritising and applying new tools is important to minimising costs, increasing efficiencies and meeting contemporary expectations and ‘student learning’ needs.

Traditionally the term taxonomy has been used in relation to biological classification and nomenclature (Godfray, Clark, Kitting, Mayo, & Scofield, 2007). Linnaean taxonomy produced a system that was “universally accepted” as a stable means of naming species (Godfray et al., 2007, p. 943). Contemporary practice has expanded the term’s application to encompass the classification of ‘things’ more general in nature. In an extended definition, Webster’s Online Dictionary (2013) states that the term taxonomy “may refer to a classification of things” and “principles underlying such a classification”, in fact, “almost anything” including “properties and relationships...may be classified according to some taxonomic scheme”.

In an area as significant as tertiary education “the idea of an orderly, international naming system” (Bruce & Levin, 1997, p. 80) associated to technology is a key ingredient. A robust classification system requires substantially more than single existing taxonomies currently provide. While stable to inform some aspects of EOT usage, single taxonomies are limited by uni-dimensionality, being unable to characterise a technology using a multiplicity of perspectives, or filter between the variety of ways in which an EOT can be used. More comprehensive understandings can be achieved by classifying technologies using a framework that integrates varying perspectives, is guided by specific criteria and underpinned by peda-
ological principles and technological themes. An effective taxonomy must have the ability to robustly categorise the range, nature and extent of rapidly evolving technologies in an effective and accessible way. “The ultimate aim...” in such a case should be “…to provide the most useful classification system” (Wheeler, 2008, p. 11) which enables users to contextualise EOTs and make informed decisions on usage.

This chapter describes the development of an overarching taxonomy which addresses the aforementioned requirements. Section 1 reviews and describes the augmentation of five existing taxonomies currently used to characterise EOTs. Section 2 outlines the research process and methodology used to gather and analyse data received from blended learning experts during 2014-15. The results provide current and knowledgeable insights on EOTs in TEIs, informing contemporary understandings of how EOTs and educational theory align. Section 3 proposes the integration of the five augmented taxonomies in to a new multi-dimensional framework called the Pentoxonomy, a robust taxonomic model for categorising tertiary-level distance EOTs.

This chapter explains the basis and structure for the Pentoxonomy and outlines why specific taxonomies were chosen for review, augmentation and integration within the framework. This chapter also comments on the features and benefits, demonstrates how the re-engineered taxonomies within the Pentoxonomy link to educational philosophies and technological schemes, and provides an example of the Pentoxonomy. Its application and usefulness is significant within a web facilitated, blended, or online context, where informed EOT choice and usage is critical. As educationalists across institutes focus on technology as a way to minimise costs, increase efficiencies and meet student learning needs, the Pentoxonomy can support them in understanding, prioritising and applying new tools.

However, the application and usefulness of the Pentoxonomy has the potential to extend beyond the realms of online education to include "formal (primary, secondary, tertiary) and non-formal (training, certification, professional development)", special and corporate, and into varied business industries where effective decisions on technology and digital media are important (Harasim, 2012, p. 3). As business leaders across all industries focus on technology as a way to gain competitive advantage, the use of emerging EOTs is "commanding organisations to assess and manage the impact these technologies may have on their business" (PricewaterhouseCoopers LLC, 2013, p. 1). The Pentoxonomy can support them in understanding, prioritising and applying new tools "within the context of "business goals" (PricewaterhouseCoopers LLC, 2013, p. 1). The next section reviews and describes the augmentation of existing taxonomies that have been used to classify technologies.

### 1. CURRENT TAXONOMIES FOR CHARACTERISING EOTS

This section “encourage[s] and evaluate[s] educational innovation” (Gooley & Lockwood, 2012, p. 1) by reviewing and augmenting five existing taxonomies that characterise EOTs used within tertiary-level learning environments. The taxonomies focus on: 1) Interaction, as proposed originally by Moore (1989), augmented by Culatta (2011), 2) Functionality, as proposed by Culatta (2011) and Leavitt, 3) Technical affordances, as proposed by Bonk and Graham (2006), clarified with reference to a four-part framework presented by Weller (2013), 4) Inquiry-based learning, as proposed by Dewey (1943), augmented by Bruce and Levin (1997) and 5) Cognitive objectives, as proposed originally by Bloom (1956), augmented by Anderson and Krathwohl (2001), and Churches (2007). These taxonomies provide valuable insights into previous efforts to classify technologies, inform the educational and technological basis of the new taxonomical framework and lay a foundation for future research. Each of the taxonomies contains clas-
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classifications into which specific technologies and brand exemplars can be categorised. Included in the following discussion of the original taxonomies, are current EOT insights gathered during interviews with blended learning experts in 2014-15. These interviews form part of phenomenological study, which examines the lived experiences of key stakeholders engaged with EOTs in RTFs, being undertaken by Kimberley Taupaw in partial fulfilment of the requirements of her PhD at Newcastle University, Australia.

The augmentation of these taxonomies has been conducted in response to 1) rapid advances in technology, 2) contemporary understandings of educational theory, and the synchronicity that must exist between the two, as historical and contemporary practise realign to inform TEIs in an age of phenomenally large EOT usage. Section 2 outlines the research process and methodology used to gather and analyse data received from blended learning experts, and Section 3 proposes a new multi-dimensional framework called the Pentexonomy, a robust taxonomic model for categorising tertiary-level distance EOTs.

1.1. Classification by Interaction

This section describes the ‘Classification by Interaction’ taxonomy, augmented by Culatta (2011) and based on the original classification proposed by Moore (1989). It classifies technologies by the relationship between learners and other parties. This relationship, known also as an interaction, is a “complex multifaceted phenomena” occurring within the learning process, having been enabled through sophisticated mediums which engage, motivate and stimulate learners. Distinguishing between these “types of interactions will elicit conceptual benefits”, differentiate between and yield to a more comprehensive understanding of the four separate taxonomical groups (Moore, 1989, p. 1).

The first three interaction types of the original taxonomy consists of the following relationships: 1) Learner to Expert, 2) Learner to Learner, and 3) Learner to Content. Culatta presented a fourth category: 4) Learner to Context. This paper proposes a fifth category: 5) Learner to media. A summary of each category follows, supported by features and exemplars which elucidate the classification methodology.

Moore (1989) originally described three forms of interaction in distance education, 1) students and teachers, 2) student and student, and 3) students and content. “Given the elegant simplicity and broad relevency of these forms of interaction” all three are used as a foundation upon which the taxonomy had “two additional permutations...teacher to teacher, and teacher to content” (Moore, 2013, p. 352). These additional interaction types are not discussed in this chapter, because the focus of all interactions in both the original taxonomy by Moore (1989) and augmented taxonomy by Culatta (2011) concern the student, not teacher.

1.1.1. Learner to Expert

This type of interaction in a traditional learning setting is expounded as an essential part of education, where an expert instructor seeks to not only effectively deliver a program of learning but to motivate and encourage learners to succeed. Incumbent upon the expert is the need to facilitate learning. Experts may offer learners an explanation, elaboration and/or simplification of a concept, depending on the need and level of understanding evident (Moore, 1989). The importance of social presence, the degree to which a person is perceived as real in a mediated environment is asserted as a strong predictor of satisfaction (Gunawardena & Zittle, 1997) and in contemporary times is considered synonymous with a user-constructed and productive space in which collaboration and social learning practices occur (Oztok & Brett, 2011, p. 7). Examples of EOTs through which ‘learner to expert’ interactions can be facilitated
include online video conferencing, discussion forums and live text chat. Popular platform exemplars include Blackboard, Skype, Adobe Connect, Facebook, and Twitter. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using EOTs that facilitate ‘learner to expert’ interactions, such as UCROO, a ‘Facebook-like’ social technology designed for Universities, Blackboard Collaborate, Moodle, Zoom, WebEx, Viber, Skype, Adobe Connect, Facebook, and Twitter (Tuapawa, n.d.).

1.1.2. Learner to Learner

This type of interaction is described as a valuable resource for learning which provides an experience through peer to peer group-work that is essential for “effective functioning in modern society” (Moore, 1989, p. 4). Particularly useful is the way in which this method of interaction has developed and tested the expertise of adult learners in “the nature of knowledge” and of the scholarly role of creating knowledge (Moore, 1989, p. 5). The Internet has enabled educators to facilitate collaborative and cooperative learning by using online methods, where in many cases their role has become “less directive and more facilitative” (Gooley & Lockwood, 2012, p. 149). Creating an inherently social context in which to engage, these tools provide learners with the means to collaborate successfully despite being physically separated by distance. Various tools enable “learners [to be] connected through a variety of means...to support the learning of their peers...” via “scaffolding...and...collaborative and cooperative activities, those involving discussion and dialogue...peer assessment and peer-tutoring” (Gooley & Lockwood, 2012, pp. 151-152).

EOTs which support peer interaction help extend the boundaries of traditional engagement not possible in conventional or historical settings. Examples of EOTs through which ‘learner to learner’ interactions can be facilitated and where ‘peer support’ helps generate “meaningful learning” (Gooley & Lockwood, 2012, p. 158) include discussion forums and wikis. Popular platforms include Facebook, a social platform whose “significance and potential...in educational terms” cannot be underestimated, CNET forums and Wikispaces (Moore, 2013, p. 358). Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using EOTs that facilitate ‘learner to learner’ interactions, such as Blackboard, Moodle, UCROO, Adobe Connect, Facebook, Google Docs, Viber, and Twitter (Tuapawa, n.d.).

1.1.3. Learner to Content

This type of interaction is a defining characteristic of education, wherein a learner utilises an internally didactic method of conversation to create sense and meaning from content. Following the advancement from historically and purist instructional learning techniques, the practice of self-directed study or autodidacticism, wherein adult learners autonomously self-educate using subject-specific content, has become particularly widespread (Moore, 1989). The asynchronous and virtual nature of this method requires learners to assume greater control of monitoring and managing their cognitive and contextual elements (Garrison, 2009). Interaction with educational content remains a significant aspect of distance education (Moore, 2013). Examples of EOTs through which ‘learner to content’ interactions can be facilitated include streaming video, educational applications, journal databases, “interacting with multimedia, participating in simulations or using cognitive support software” (Abrami, Bernard, Bures, Borokhovski, & Tamlin, 2011, p. 86). Popular platforms include Youtube, ItunesU, and Educreations. Comments during
Interviews with blended learning experts in 2014-15 indicate that TEIs are using EOTs that facilitate ‘learner to content’ interactions, such as Blackboard, Moodle, Adobe Captivate, Peerwise, Swoodle, Jing, and Camtasia (Tuapawa, n.d.).

1.1.4. Learner to Context

This type of interaction facilitates engagement between a learner and a virtual environment into which they have obtained entry. Experiential learning within contextually rich virtual environments has enabled learners to benefit from exposure to practical and immersive ways of interacting. Modern technologies enabling contextual-based learning have provided powerful ways to manipulate visual information, opening up the vast instructional potential of dynamic, interactive imagery (Gooley & Lockwood, 2012, p. 202). Computer-based simulations are also providing engaging learning environments in which students experience authentic and highly contextualised experiences. In one instance, AROUSAL, a computer simulation package, is being used to help students develop financial management skills by simulating the operations of a hypothetical construction company (Sher & Walker, 2013). Another example of an EOT through which ‘learner to context’ interaction can be facilitated includes Alternate Reality Games (ARG) which link “intense player involvement with a story that takes place in real-time and evolves” according to the response of the learner (Culatta, 2012). Other examples can include virtual 3D immersive and persistent worlds, gaming environments such as MMORPGs, and 3D simulative programs. Popular platforms include Second Life and Minecraft.

1.1.5. Learner to Media

This type of interaction is a defining characteristic of modern-day learner engagement, especially with online technologies that facilitate the generation of media content by learners as a means of expression and/or to accomplish a specific learning task. These interactions showcase the “mediational function of technologies”, according centrality to the task but rendering the “technology as substrate” to describe its restrictive nature (Bruce & Levin, 1997, p. 84). Examples of EOTs through which ‘learner to media’ interactions can be facilitated include video, audio and image creation and manipulation sites, e-portfolios, mind-mapping programs, document-creation tools and various tablet applications. Popular platforms include Edmodo, Audacity, Prezi, and Voki. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using EOTs that facilitate ‘learner to media’ interactions, such as Adobe Captivate, Echo 360, and Jing.

1.2. Classification by Similar Functionality

This section describes the ‘Classification by Similar Functionality’ taxonomy, developed by Culatta and Leavitt (2011). This taxonomy outlines “common functional uses of emerging technologies in learning” (Pacansky-Brock, 2012, p. 46) using seven key categories: 1) Real time learning tools, 2) Collaborative tools, 3) Asynchronous learning tools, 4) Assessment and evaluation tools, 5) Broadcasting (networking) tools, 6) Social tools, 7) Media repositories, each of which contain various subcategories representative of specific technology-types. Each technology-type in turn contains exemplars of actual brands (Culatta, 2011). This paper expands each category and proposes an additional eighth category: 8) User construction tools. Included in this classification discussion, are current EOT insights gathered during interviews with blended learning experts in 2014-15.
1.2.1. Real-Time Learning Tools

EOTs within this category enable subject information to be released and received by learners in an immediate and reciprocal manner. These EOTs enable mutual understandings and meaningful interactions and are connected to push technologies wherein communications are initiated by a server and where learners receive instantaneous feedback (Park & Bonk, 2007). The social element of synchronous tools such as instant messaging enables “remote students to engage in… informal communication…an important component” (to on-campus and face-to-face instruction (Weller, 2013, p. 83). Live demonstrations and instruction, instantaneous and time-saving communications are features of some or all of these technologies, which also contain subcategories including: immersive, whiteboarding, webinars and live video. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using EOTs classed within the ‘real-time learning tools category, including’ on-demand collaboration, online meeting and conferencing tools such as Adobe Connect, Microsoft Lync, Zoom, WebEx, Skype, and Blackboard Collaborate (Tuapawa, n.d.). Other brand exemplars include: Second Life, Livestream and RealWorld.

1.2.2. Collaborative Tools

EOTs within this category “comprise[e] one or more computer-based tools that support the communication, coordination and information processing needs of two or more people working together on a common task” (Zigurs & Munkvold, 2006, p. 144). Collaborative technologies “facilitate[s] the production of group work” (Anderson, 2007, p. 8) and have “provide[d] a wide variety of capabilities and perspectives” (Zigurs & Munkvold, 2006, p. 144) as evidenced by the development of frameworks and typologies emerging from widely varying perspectives. Zigurs and Munkvold (2006) recommend a classification based on the functional tasks or activities that the technology supports; and in four broad groups identifies these tasks as “communication, information sharing, process support and coordination” (Zigurs & Munkvold, 2006, p. 147). Collaboration provides an “opportunity for intrinsic feedback” (Laurillard, 2008, p. 16) and the associated technologies also provide an experience wherein the pedagogies of constructionism and social learning are combined (Laurillard, 2008). Subcategories include: collaborative writing, discussion forums, file sharing, portals and mind maps. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using EOTs classed within the ‘collaborative tools’ category, such as: Zoom, WebEx, Skype, and Blackboard Collaborate, Viber, and Twitter (Tuapawa, n.d.). Other brand exemplars include: Wikipedia, Google Docs and Ning.

1.2.3. Asynchronous Learning Tools

These environments foster “a flexible learning approach, which is less fixed to a specific time pattern” (Weller, 2013, p. 81) and involves two or more devices that are not continuously synchronised but which enable learner access to subject specific material “without the potentially exclusionary constraints” otherwise associated with being present at a certain online or physical place and time (Jaffee, 1997, p. 263). Although enabling flexibility and having a somewhat ubiquitous presence, these tools may lack immediacy and drama, and require that learners assume greater control of monitoring and managing the cognitive and contextual elements of engagement (Garrison, 2009). The higher levels of anonymity assoc-
associated with asynchronous tools enable students who are less confident to successfully make contributions that in face-to-face environments would not be forthcoming (Weller, 2013). Subcategories include web-based training, discussion forums and screencasts. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs classed within the ‘asynchronous learning tools’ category, such as] UCROO, Moodle, Blackboard, Echo 360, Instagram, Facebook, Twitter, Youtube, and Camtasia (Tuapawa, n.d.). Other brand exemplars include: Jing and Screencastor.

1.2.4. Assessment and Evaluation Tools

The advancement and higher utilisation of technology within distance education environments has prompted innovation in the area of assessment. Methodologies including interactive assessments are being used to engage students in “collaborative and negotiated learning experiences” (Gooley & Lockwood, 2012, p. 180). EOTs within this category provide a greater variety and authenticity in assessment design, efficient submission, marking, moderation and data storage processes, immediate feedback and accurate, timely and accessible evidence on the effectiveness of delivery (JISC, 2010). Subcategories include polling, surveys and analytics. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs classed within the ‘assessment and evaluation tools’ category, such as] Turnitin, Picket and Peerwise (Tuapawa, n.d.). Other brand exemplars include: Poll Anywhere, Survey Monkey, and Socrative.

1.2.5. Broadcasting (Networking) Tools

EOTs within this category enable the contributed content to be broadcast as it is uploaded, a concept similar to that of live television broadcast (Social Media Guys, 2010). These tools may enable efficient connections and relationships between individuals (Safko, 2012). Subcategories include location sharing, microblogs, blogs, social bookmarking and media casting. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs classed within the ‘broadcasting (networking) tools’ category, such as] Youtube, Captivate, Echo 360, Facebook, Twitter, Wordpress, Blogger (Tuapawa, n.d.). Other brand exemplars include: Vimeo, Tweetube.com, Scoop.it and Reddit.

1.2.6. Social Tools

EOTs within this category provide highly accessible, inexpensive and scalable publishing techniques and allow the generation and exchange of user content with capability to reach small or large audiences (The Social Media Guys, 2010). Safko (2012) classifies social tools into 15 categories: social networking, publishing, photo sharing, audio, video, micro blogging, live casting, virtual worlds, gaming, productivity applications, aggregators, RSS, search, mobile, and interpersonal (Safko, 2012). “The massive topology of social networking services” (French, 2010, p. 1) provides a choice in using EOTs for “direct and indirect support of education-related tasks…to fulfill social learning functions…and to stimulate social…benefits…” (Greenhow, 2011, pp. 1-4). Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs classed within the ‘social tools’ category, such as] UCROO, Facebook, Twitter, Youtube, Instagram and LinkedIn (Tuapawa, n.d.). Other brand exemplars include: Myspace, Pinterest, and Google+.
1.2.7. Media Repositories

EOTs within this category provide a digital collection, a “central place in which an aggregation of data is kept and maintained in an organised” manner (Rouse, 2005, p. 1). Repositories provide a powerful way of working with online content by enabling online storage and management of resources that are freely accessible via any web-enabled device and which enable users to locate relevant resources based on personal needs, recommendations and popularity. The popular platforms YouTube and Delicious utilise repositories and enable users to manage their profiles, share content and collaborate (Churchill, Wong, Law, Salter, & Tai, 2009). Subcategories include text, audio, images and video. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs classed within the ‘media repositories’ category, such as] Facebook, Twitter, Instagram, Blackboard, Google Drive, Wordpress, and Blogger (Tuapawa, n.d.). Other brand exemplars include YouTube “which receives over 65,000 videos per day” having become a “user-generated library that sustains over 100 million views per day” (Currah, 2007, p. 470), Squidoo.com, Del.icio.us to “keep, share and discover the best of the web” (Delicio.us, 2013), and Dropbox.

1.2.8. User Construction Tools

This paper proposes an eighth category: User Construction. EOTs within this category enable the generation of digital information, objects or products by the user. Through the use of specific online tools, users are able to express an element of control in the design of their work, but within the limits that have already been set as stipulated by the design of the technology. Subcategories include digital video, blogging, audio. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs classed within the ‘user construction tools’ category, such as] Jing, Camtasia, Poerwise, Wordpress, Swoogle, Blogger and Youtube (Tuapawa, n.d.). Other brand exemplars include: Voki, iMap, Edurecreations, and Prezi.

1.3. Classification by Technical Affordances

This section describes the ‘Classification by Technical Affordances’ taxonomy, developed by Bonk and Graham (2006) who presented four dimensions of interaction. Figure 1 illustrates the four dimensions, each being represented using a sliding scale on which a single point can be marked to indicate the extent of the interaction. The dimensions were initially used to compare the type and extent of interaction within a face-to-face versus distributed learning environment. The dimensions are identified as 1) space, 2) time, 3) fidelity and 4) humanness. This paper proposes a fifth category: 5) Control. A summary of each dimension follows, supported by an explanation of the affordance differences between interactions within a face-to-face learning environment and a distributed learning environment. The dimensions are further clarified with reference to a separate taxonomy presented by Weller (2013), which contains a four-part framework of pedagogy versus technology as represented by the following quartiles: 1) High technology didactic, 2) High technology constructivist, 3) Low technology didactic, and 4) Low technology constructivist. Exemplars and brands that elucidate the classification methodology are also outlined below.
1.3.1. Space

This dimension refers to the physical reality of space occupied by a technology. Historically, face-to-face environments operated at the highly physical end of the scale, whereas distributed learning environments functioned in a highly virtual manner. The ‘high technology didactic’ category is associated with the traditionally high virtual end of the scale which elicits a “high degree of functionality and interactivity” and requires “little educator input beyond the initial production” (Weller, 2013, p. 148). EOTs functioning with a high level of virtuality (low physicality) include simulations, and virtual worlds and MMORPGs such as Second Life and Minecraft. EOTs functioning with a high level of physicality (low virtuality) include cloud video conferencing, and online meetings. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of physicality including] Adobe Connect, Blackboard Collaborate, Microsoft Lync, Zoom, WebEx, and Skype (Tuapawa, n.d.).

1.3.2. Time

This dimension refers to the level of synchronicity or asynchronicity that the technology affords. Historically, face-to-face environments operated at the highly synchronous end of the scale; whereas distributed learning environments functioned in a highly asynchronous manner. The ‘high technology didactic’ category is associated with the traditionally high asynchronous end of the scale where learners assume greater control of monitoring and managing the cognitive and contextual elements (Garrison, 2009). EOTs functioning with a high level of asynchronicity include discussion forums on platforms such as Moodle or Blackboard, and wikis such as Wikipedia. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of asynchronicity including] Blackboard, Moodle, Youtube, and Echo360 (Tuapawa, n.d.). EOTs functioning with a high level of
synchronicity include Virtual Worlds such as Second Life, video conferencing, and online meetings.

Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of synchronicity including] Skype, Microsoft Lync, Adobe Connect, and Blackboard Collaborate (Tuapawa, n.d.).

1.3.3. Fidelity

This dimension refers to the level of media richness that a technology affords. Historically, face-to-face environments operated at the high fidelity end of the scale, whereas distributed learning environments functioned in a lower fidelity manner. The technology-rich constructivist approach is considered by some as “the desirable goal” having “a rich technological environment” with functions that allow exploration of “ideas and concepts” and a “form of legitimate peripheral participation…” (Weller, 2013, pp. 149-150). EOTs functioning with a high level of fidelity include 3D immersive virtual worlds such as Second Life, video conferencing, and online meetings. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of fidelity including] Adobe Connect, Captivate, Microsoft Lync, Youtube, Jing, Camtasia, Zoom and WebEx (Tuapawa, n.d.). EOTs functioning with a low level of fidelity “requiring an active part in the reading process” (Weller, 2013, p. 131) include text-based platforms such as that used in online forums and collaborative text-based software. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with low levels of fidelity including] Blackboard, Moodle, Google Docs, Blogger, Wordpress, Wikis, Peerwise, and Twitter (Tuapawa, n.d.).

1.3.4. Humanness

This dimension refers to the level of human physicality and interaction that the technology affords. Historically, face-to-face environments operated at the highly human end of the scale underpinned with the “didactic pedagogy of face to face lecturing” (Weller, 2013, p. 66), whereas distributed learning environments functioned in a highly machine-oriented manner. The “low technology constructivist” is associated with the contemporary “high human end of the scale and does “not necessarily require a rich mix of technology”, is not “technologically oriented, but involve[s] a good deal of debate”, “promote[s] collaborative learning” and is supported by an educator who is “actively engaged throughout the course” (Weller, 2013, p. 149). EOTs functioning with a high level of humanness (low machine) include 3D immersive virtual worlds such as Second Life, video conferencing, online meetings and discussion forums. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of humanness including] Adobe Connect, UCROO, Microsoft Lync, Zoom, WebEx, Skype, Facebook, Instagram, and Blackboard forums and discussion boards (Tuapawa, n.d.). EOTs functioning with a high level of machine support (low human) includes email, blogs and wikis. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of machine support including] Wordpress, Blogger, and Wikis (Tuapawa, n.d.).

1.3.5. Control

This dimension refers to the level of customisation and control that the technology affords to the user. Historically, face-to-face environments operated as the high control end of the scale, whereas distributed
learning environments functioned in a low customisation-highly automated manner. The ‘high technology constructivist’ category is associated with the traditionally high control and customisation end of the scale in which ‘the ability to create different communication spaces’ is supported (Weller, 2013, p. 130). EOTs functioning with a high level of control and customisation (low automation) include simulations, 3D immersive virtual worlds such as Second Life, video conferencing, and online meetings. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of control and customisation including] Zoom, WebEx, and Instagram (Tuapawa, n.d.). EOTs functioning with a high level of automation (low customisation) include email and discussion boards. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs with high levels of automation including] Blackboard forums and discussion boards (Tuapawa, n.d.).

1.4. Classification by Inquiry-based Learning

This particular taxonomy was augmented by Bruce and Levin (1997) and is based on the original four-part division of media for: 1) inquiry, 2) communication, 3) construction, and 4) expression, proposed by Dewey (1943), who identified the greatest educational resource as “the natural impulses to inquire” (Bruce & Levin, 1997, p. 83). The taxonomy proposes “many legitimate ways to conceive of educational technology” (Bruce & Levin, 1997, p. 80) and emphasises the “mediative aspect of technologies” to connect participants by reflecting the utility of specific digital tools. This chapter proposes a fifth media category: 5) Media for recreation.

1.4.1. Media for Inquiry

This dimension refers to media for theory building (thinking), data access (connecting to the worlds of text, imagery, and video data), data collection (extending the senses), and data analysis. Examples of technologies classified into the theory building category include visualisation software, virtual reality environments and simulation toolkits, such as Second Life. Examples of technologies classified into the data access category include hypermedia environments and digital libraries. Examples of technologies classified into the data collection category include survey-makers such as Survey Monkey, and video conferencing and recording tools such as Zoom and WebEx. Examples of technologies classified into the data analysis category include StatCrunch, and data warehouse technologies such as Blackboard Analytics. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that enable ‘theory-building’ such as] Google Docs, [EOTs that enable ‘data access’ such as] Facebook, Blackboard, and Moodle, and [EOTs that enable ‘data collection’ such as] Peerwise and Pickers (Tuapawa, n.d.).

1.4.2. Media for communication

This dimension refers to that which utilises technology as media for document preparation, communication with other participants, collaborative media and teaching media. Examples of technologies classified into the document preparation category include word processing and presentation graphics. Examples of technologies classified into the communication category include email, video conferencing, and online meetings. Examples of technologies classified into the collaborative media category include group decision support systems and shared document preparation. Examples of technologies classified into
the teaching media category include instructional simulations and tutoring systems. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that enable] document preparation such as [Google Docs], [EOTs that facilitate communication] such as [Skype, Zoom, WebEx, and Microsoft Lyne], [EOTs that facilitate collaboration] such as [Google Docs], and [EOTs that facilitate teaching] such as [Adobe Captivate] (Tuapawa, n.d.).

1.4.3. Media for construction

This dimension refers to that which utilises technology as media for control systems, robotics, control of equipment, computer-aided design and construction of graphs and charts. EOTs within this category are extended to enable “personal publishing” or the generation of digital information, objects or products by the user. “With minimal cost…these products can be created…and distributed via the Internet…an environment with a low-cost of production…low technical skill requirements, minimal capital needs, and low-cost distribution” enabling “ordinary people to reach large audiences”. Content creation “with the Internet is dramatically easier, faster, and cheaper” (Blank, 2013, p. 591). Examples of technologies used as a media for construction include online software for slideshow presentations such as Prezi, video creations, image editing and manipulation, and blogs. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate construction] such as Adobe Captivate, Echo 360, Wordpress and Blogger (Tuapawa, n.d.).

1.4.4. Media for expression

This dimension “combines construction and communication” and refers to that which utilises technology as media for expression, including drawing and painting programs, music making, composition and editing, interactive video and hypermedia, animation software, multimedia composition, recordable whiteboards, and blogs. These online tools enable users to “contribute broader content” (Blank, 2013, p. 591) and “play a[nn]…active role in the creation, appropriation and dissemination of creative works…” (Currah, 2007, p. 469). Examples of technologies used as a media for expression include social networking sites such as Facebook and Instagram, blogs, and recordable whiteboards such as Educreations. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate expression] such as Facebook, Instagram, Blogger, and Wordpress (Tuapawa, n.d.).

1.4.5. Media for recreation

This dimension refers to that which utilises technology as media for recreational engagement, for which a large scope of individual activities exist, “from proactive to passive pursuits and from personal productivity to ostentatious consumption.” The “hallmark of most leisure-time activities has been the interpenetration of leisure and technology” (Poser, 2011, p. 1). EOTs within this category include gaming apps, social networking sites, and interactive forums. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate recreation] such as Facebook and Instagram (Tuapawa, n.d.).
1.5. Classification by Cognitive Objectives

This taxonomy was revised by Anderson and Krathwohl (2001), augmented by Churches (2007) and is based on the original taxonomy proposed by Bloom (1956), whose taxonomy followed the thinking process by categorising and ordering thinking skills and objectives. The original taxonomy contains a series of levels, described using nouns, which ascend from the lower order thinking skills to higher order thinking skills: 1) knowledge, 2) comprehension, 3) application, 4) analysis, 5) synthesis and 6) evaluation. This taxonomy was revised by Anderson and Krathwohl (2001), who not only rearranged the sequence of the original taxonomy but utilised verbs instead of nouns to identify the specific levels: 1) remembering, 2) understanding, 3) applying, 4) analysing, 5) evaluating and 6) creating.

This revised taxonomy was augmented by Andrew Church, based on the revised version of Bloom’s work by Anderson and Krathwohl (2001), who incorporated the “cognitive processes used to learn” (Hinton, 2010, p. 1). Church created a ‘digital taxonomy map’ by extending the list of verbs to incorporate those which related to digital tasks “to account for the new behaviours, actions and learning opportunities emerging through the advancement and increasing ubiquitous nature of technology” (Churches, 2007, p. 1).

This chapter outlines the key verb categories as proposed by Anderson and Krathwohl (2001) in the earlier revision of Bloom’s Taxonomy. A description is provided for each category using explanations from their work. The ‘digital additions’ proposed by Churches and this paper proposes the EOTs that correspond with these digital verbs.

1.5.1. Remembering

This dimension “involves the retrieval of material” (Churches, 2007, p. 5). The ‘digital additions’ include bullet pointing, highlighting, bookmarking or favouriting, [digital curation], social networking, social bookmarking, searching (Churches, 2007). These actions would be enabled by EOTs including Scoop.it, Evernote, Twitter, Pinterest, Facebook, Google+, and Google. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate ‘remembering’ such as] Facebook, Instagram, Twitter, and Google Docs (Tuapawa, n.d.).

1.5.2. Understanding

This dimension involves the “construction of meaning from different types of function…” (Churches, 2007, p. 6) The ‘digital additions’ include advanced searching, blog journaling, tweeting, categorising, commenting and annotating, and subscribing (Churches, 2007). These actions would be enabled by EOTs including Edublogs, Youtube, Wordpress, Blogger, Twitter, Delicious, and Google. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate ‘understanding’ such as] Facebook, Twitter, Instagram, UCROO, and Youtube (Tuapawa, n.d.).

1.5.3. Applying

This dimension involves the “carrying out or using a procedure through executing or implementing” (Churches, 2007, p. 7). The ‘digital additions’ include running and operating, playing, uploading and sharing, hacking and editing. These actions would be enabled by EOTs including Flickr, Youtube, Twitter,
Facebook, Educreations, Prezi, Jing, and Camtasia. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate ‘applying’ such as] Youtube, Twitter, Facebook, Jing, Camtasia, Blackboard, Wikis, Blogger and Wordpress (Tuapawa, n.d.).

1.5.4. Analysing

This dimension involves the “breaking [of] material or concepts into parts, determining how the parts relate or interrelate to one another or to an overall structure or purpose” (Churches, 2007, p. 8). The ‘digital additions’ include mashing, linking, reverse-engineering, cracking, validating and tagging. These actions would be enabled by EOTs including simulations, Twitter and Blogs. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate ‘analysing’ such as] Twitter, Facebook, Wordpress, and Blogger (Tuapawa, n.d.).

1.5.5. Evaluating

This dimension involves “making judgements based on criteria and standards through checking and critiquing” (Churches, 2007, p. 9). The ‘digital additions’ include blog/blog commenting and reflecting, posting, moderating, collaborating and networking, and testing. These actions would be enabled by EOTs including simulations, Edublog, Blackboard forums, Wikipedia, Wikiblogs, and Youtube. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate ‘evaluating’ such as] wikis, Blackboard forums, and Youtube (Tuapawa, n.d.).

1.5.6. Creating

This dimension involves “putting the elements together to form a coherent or functional whole; reorganising elements into a new pattern or structure through generating, planning or producing” (Churches, 2007, p. 10). The ‘digital additions’ include programming, filming, animating, video casting, podcasting, mixing and remixing, directing and producing, and publishing. These actions would be enabled by EOTs including Prezi, Wikiblogs, Educreations, Camtasia, and Jing. Comments during interviews with blended learning experts in 2014-15 indicate that TEIs are using [EOTs that facilitate ‘creating’ such as] Adobe Captivate, Echo 360, Jing, Camtasia, Zoom, WebEx, and Youtube (Tuapawa, n.d.).

This section has reviewed and augmented five existing taxonomies. It has also included current EOT insights gathered during interviews with blended learning experts in 2014-15. The next section proposes a new multi-dimensional framework called the Pentexonomy, a robust taxonomic model for categorising tertiary-level distance EOTs. The Pentexonomy integrates the re-engineered taxonomies discussed in this section.

2. METHODOLOGY FOR BLENDED LEARNING EXPERT INTERVIEWS

This section outlines the methodology used to gather and analyse data received from blended learning experts during 2014-15. The results provide current and knowledgeable insights on EOTs in TEIs, informing contemporary understandings of how EOTs and educational theory align. Section 1, which contains a discussion of taxonomies used for classifying EOTs, includes these insights. These insights,
being of an expert nature add a level of credibility to this study, which in turn contributes to the reliability of the proposed Pentonomy.

The research participants were 10 blended learning experts who were selected from TEIs in New Zealand, Australia, and Canada, using the ‘expert sampling’ method. Expert sampling provided an effective way to elicit the views of persons with specific expertise, demonstrable experience and insight into a specific field or topic to support the validity of the inquiry (Trochin, 2006). For inclusion in the interview, the participants had to fit the criteria of a ‘blended learning expert’. An expert is defined as “one whose special knowledge or skill causes him to be regarded as an authority” (Oxford University Press, 2014). Of note, is the fact that it is not uncommon for experts to be selected on relatively simple criteria, which can be defined through certain qualifications or experience (Changin Minds, 2013). Thus, the inclusion criteria which follows was set to establish a basis for the selection of experts: 1) the individual must have occupied an academic role for not less than 10 yrs in a tertiary blended learning context, 2) hold a post-graduate qualification, and 3) have conducted published research in the area of blended learning.

The exclusion criteria for selection were candidates without blended learning experience, candidates without any post-graduate qualifications. The rationale for using at least 10 participants for the first interview was based on literature relating to qualitative research. Saldana (2011) explains that there are varying opinions concerning the appropriate number of participants. Studying the single individual case in depth makes for a rich profile, yet obviously the individual is not always representative of the population at large. It is believed therefore that a small group of participants would provide a broader spectrum of data for analysis, with a minimum of 10-20 participants needed to ensure credible and trustworthy findings (Saldana, 2011).

While many factors were involved in the selection process, the reasons for this number range ensured that sufficient data would be obtained, whether from one person or 20 (Saldana, 2011). Accordingly, the use of at least 10 expert participants fitted within an appropriate range. The use of open-ended questions generated deep, meaningful answers. We expected to and did receive a large quantity of data, making the need for a large number of participants unnecessary. Data was gathered until the point of saturation was met, which in this case occurred with 10 expert participants.

The data were obtained data via semi-structured interviews conducted with each participant via online video-conferencing technology (Skype). It was expected that all participants set aside at least 45 minutes of un-interrupted time to complete the interview. The aim of the interviews was to explore, clarify, and verify issues from the relevant literature. The interview contained 13 questions in total. The first two questions focused specifically on EOTs in BTEs: 1) Which EOTs are being used in BTEs? and 2) Describe how the EOT(s) given in question 1 are being used in BTEs. These questions drew a range of responses which covered the different ways in which EOTs and brand exemplars are being used in BTEs across TEIs. The remaining 11 questions related to stakeholders and BTEs. Reporting on them here is outside the scope of this chapter.

The analysis of the interviews involved sorting, coding, and classifying data. The question-and-answer format of the source transcription documents provided an easy-to-use template from which the data could be coded and classified. The NVivo software application which contains a function involving nodes enabled the process of coding to be undertaken effectively. Several nodes were established for coding the interview questions. Table 1 demonstrates two nodes used to code data relating to the first two interview questions. Table 2 provides an outline of 43 additional nodes used to code the interview data relating to the taxonomic classifications summarised in Section 1.
Table 1. Nodes linked to interview questions

<table>
<thead>
<tr>
<th>Node</th>
<th>Node description</th>
<th>Related question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>EOTs being used</td>
<td>Which (EOTs) are being used (ETEs) Give examples.</td>
</tr>
<tr>
<td>2</td>
<td>How EOTs being used</td>
<td>Please describe how the EOT(s) given in question 1 are being used in ETEs</td>
</tr>
</tbody>
</table>

The EOTs identified by blended learning experts as being used in TEs, were coded into nodal categories which corresponded to parts of the five augmented taxonomies outlined in Section 1. Often, EOT data was coded jointly and severally, due to its relevance to more than one category. For example, the response from the first expert participant to Question 1, contained data about a specific EOT that related to 9 nodes. This demonstrated the multiplicity of ways in which EOTs can be categorised, the opportunity to link small pieces of data to various themes, the challenge in consolidating feedback in one specific area where technology is concerned (and thus why a multi-dimensional taxonomy must be used), and the nature of human communication in that our responses (particularly, and in this case experts, who elicit considerable expertise) are often broad, varied, non-compartmentalised, and somewhat unstructured.

The contents of the nodes which related to the Pentexonomy classifications grew to form rudimentary lists of EOTs that could be used to establish not only which EOTs were being used in TEs, but which pedagogical or technological classification they related to, and thus where they might fit in the Pentexonomy. These lists were used to form memos which recorded ideas, insights, and descriptions about the EOTs being used. Content from the memos was incorporated into specific parts of Section 1 to demonstrate which classifications the EOTs related to, and thus how they would later be structured within the Pentexonomy, which would provide a robust and multi-dimensional classification to facilitate effective decision-making on EOT activity.

3. THE PENTEXOMETRY

This section proposes an innovative approach for reaching “the ultimate aim... to provide the most useful classification system...” (Wheeler, 2008, p. 11) for categorising tertiary-level EOTs. This is achieved by using the following two step process: 1) Reviewing and re-engineering the five existing taxonomies, as “to do good taxonomy, a researcher needs... access to the relevant literature” (Godfrey et al., 2007, p. 945), and 2) Integrating these taxonomies into a new multi-dimensional framework called the Pentexonomy. The term Pentexonomy focuses attention on three key aspects of this framework, as follows: 1) Pent (to signify the augmentation and integration of five separate taxonomies), 2) Tex (or techs, to signify its relationship to technology) and 3) Xonomy, (to signify its taxonomical purpose).

This section explains the basis and structure for the Pentexonomy and then outlines why five specific taxonomies were chosen for review, augmentation and integration within the framework. This section then demonstrates how the re-engineered taxonomies within the Pentexonomy link to key educational philosophies, following which the features and benefits of the framework are explained. Finally, this section provides an example of the Pentexonomy.
### Pentoxonomy

<table>
<thead>
<tr>
<th>Node</th>
<th>Node description</th>
<th>Related Pentoxonomy classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Learner to content</td>
<td>Classification by interaction</td>
</tr>
<tr>
<td>4</td>
<td>Learner to content</td>
<td>Classification by interaction</td>
</tr>
<tr>
<td>5</td>
<td>Learner to expert</td>
<td>Classification by interaction</td>
</tr>
<tr>
<td>6</td>
<td>Learner to learner</td>
<td>Classification by interaction</td>
</tr>
<tr>
<td>7</td>
<td>Learner to media</td>
<td>Classification by interaction</td>
</tr>
<tr>
<td>8</td>
<td>Assessment tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>9</td>
<td>Asynchronous learning tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>10</td>
<td>Browzing tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>11</td>
<td>Collaborative tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>12</td>
<td>Media equips</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>13</td>
<td>Real time learning tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>14</td>
<td>Social tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>15</td>
<td>User construction tools</td>
<td>Classification by similar functionality</td>
</tr>
<tr>
<td>16</td>
<td>Analyzing</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>17</td>
<td>Applying</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>18</td>
<td>Creating</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>19</td>
<td>Brainstorming</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>20</td>
<td>Remembering</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>21</td>
<td>Understanding</td>
<td>Classification by cognitive objectives</td>
</tr>
<tr>
<td>22</td>
<td>Inquiry based learning</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>23</td>
<td>Media for communication</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>24</td>
<td>Collaboration</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>25</td>
<td>Communication</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>26</td>
<td>Document preparation</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>27</td>
<td>Designing</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>28</td>
<td>Media for construction</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>29</td>
<td>Media for expression</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>30</td>
<td>Media for inquiry</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>31</td>
<td>Data access</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>32</td>
<td>Data collection</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>33</td>
<td>Theory building</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>34</td>
<td>Media for reception</td>
<td>Classification by inquiry-based learning</td>
</tr>
<tr>
<td>35</td>
<td>High aerodynamic</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>36</td>
<td>High communication</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>37</td>
<td>High fidelity</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>38</td>
<td>High human low machine</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>39</td>
<td>High machine low human</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>40</td>
<td>High physicality low vanity</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>41</td>
<td>High sympathicity</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>42</td>
<td>Low customization</td>
<td>Classification by technical affordances</td>
</tr>
<tr>
<td>43</td>
<td>Low fidelity</td>
<td>Classification by technical affordances</td>
</tr>
</tbody>
</table>
3.1. A basis and structure for the Pentexonomy: technology and education

As online technologies play a significant role in the delivery of online education, it is necessary that a comprehensive taxonomy to guide EOT choice be reinforced and represented through educational theory and technological schemes. “Learning and technology have been intertwined with one another throughout human history” (Harasim, 2012, p. 13) creating a two-fold relationship significant in the Pentexonomy. Acknowledging that “a tool should always be used in support of pedagogy” (Pacansky-Brock, 2012, p. 46), the Pentexonomy has a basis in both education and technology.

Even in "such a technology-driven world, [where] it is critical...to study the intersection of learning theory and technology" the rich educational theory to guide online delivery is limited. “There are few theory-based... guidelines to assist educators to develop more effective pedagogies for online learning environments” and the “practice [of] teaching and learning...lacks a theoretical framework to guide...the use of online technologies” (Harasim, 2012, p. 2) In addressing this gap, the Pentexonomy uses taxonomies that contain significant links to the “three major learning theories [that] influence education” in the 20th century: behaviourism, cognitivism and constructivism (Harasim, 2010, p. 13).

Commenting on how educators can choose the most appropriate technology for their learning environments, Handley suggests a focus towards the “unique capacities” of each technology to understand “what the possibilities are”. Choice in “technology...should be driven by...the teaching philosophy...and goals of the lesson” (Oxford University Press English Language Teaching, 2010). Utilising educational theory-based dimensions such as interaction, inquiry and cognitive based learning, means that EOT choice is underpinned by sound educational philosophy.

3.2. Five Taxonomies: A Starting Point

The Pentexonomy integrates five taxonomies, using these to represent a starting point upon which to build in further theory to broaden and strengthen its educational and technological foundations. The following are key reasons why these five specific taxonomies (discussed in previous section) have been chosen for review, augmentation and integration within the framework.

1. These five taxonomies have significant links to educational philosophy (i.e. the three major learning theories that influenced education in the 20th century (behaviourism, cognitivism and constructivism, discussed below), and to the online technologies that influence education delivery in the 21st century. As “the theory we employ shapes how we design and implement our practice” (Harasim, 2010, p.3) it is imperative that we consider the theories most relevant to our taxonomical objective.

2. As demonstrated in the previous section, existing research has already extended the application of educational theory within these dimensions, from a traditional classroom environment to online modes.

The integration of multiple taxonomies has been used to provide a more comprehensive understanding on EOT usage and adoption than can be achieved using a single taxonomy only. While these re-engineered taxonomies provide valuable insights they should not “be viewed as providing a complete or finite answer to a knowledge problem; it is a step on the path to better understanding. Theoretical frameworks of learning” improve “with the new technologies that emerge and transform...horizons” (Harasim, 2010, p.9).
3.3. Linking the Taxonomies to Educational Philosophy: An Example

This section demonstrates how the re-engineered taxonomies within the Pentexonomy link to key educational philosophies. This is achieved through an example selected at random which describes and links behaviourism, one of the key educational philosophies, to two of the five re-engineered taxonomies: 1) classification by technical affordance and 2) classification by cognitive objectives.

3.3.1. Classification by Technical Affordance and Behaviourism

Integrating a taxonomy which focuses on technical affordances (Bonsk & Graham, 2006) is a sensible way to categorise and understand multiple dimensions of an EOT, such as degree of usability or extent of interaction within a certain environment. While having taxonomical roots, this classification is clarified in reference to another four-part framework of pedagogy versus technology (Weller, 2013). The very idea of taxonomy is supported by behaviourist theory since "behaviourism emphasises the ability to analyse...the elements or steps of learning...by breaking down a task into smaller steps...and by specifying behavioural objectives. Taxonomies...of learning behaviours [are]...considered to be important" (Harasim, 2012, p. 38). The link between this taxonomy and educational philosophy is strengthened through consideration of two sub-theories of behaviourism, classical and operant conditioning.

"Behaviourist learning theory emphasises two major types of conditioning: classical conditioning...in which behaviour becomes a reflex response to a stimulus and operant conditioning...[which involves] the reinforcement of a behaviour by a reward or punishment" (Harasim, 2012, p. 31). Classical conditioning can happen when the affordances that EOTs provide stimulate engagement in learning. For example, the social nature and accessibility (affordance, stimulus) of social networks (technology) can make engagement (response) replicable and observable. Operant conditioning can also happen when the affordances that EOTs provide stimulate engagement in learning. For example, the action and challenge (gameplay) within interactive games (technology) involves a reward or points systems (reinforcing stimulus). "This stimulus has the effect of...modifying the behaviour...[ad by] reinforcing[s] the tendency to repeat the behaviour in the future...certain response result in a reward" (Harasim, 2012, p. 35). In gaming, "operant conditioning...shape[s] behaviour through such mechanisms as positive reinforcement (reward) [e.g. points], negative reinforcement [removal of obstacle], non-reinforcement and punishment [loss of points, death of protagonist]" (Harasim, 2012, p. 36).

3.3.2. Classification by cognitive objectives and behaviourism

Integrating a taxonomy which focuses on cognitive objectives (Anderson et al., 2001; Bloom et al., 1956; Churches, 2007) assists in identifying behaviours and provides "a kind of framework...for...categorising human behaviour" (Harasim, 2012, p. 40). This taxonomy has significant links to the behaviourist philosophy as "the cognitive...six levels of operation of Blooms taxonomy...can be specified as behavioural objectives" (Woolland, 2010, p. 68). The revision of this taxonomy (Anderson et al., 2001) also "emphasise[s] the behavioural aspects of the domain" (Woolland, 2010, p. 68). "Behaviourist teaching is associated with learning that is...kinesthetic...visual...efficient and effective", characteristics of EOTs that support "Bloom-based" action words such as identify, assemble and design (Woolland, 2010, p. 64).
3.4. Features and Benefits of the Framework

This section highlights the features and benefits of the Pentoxonomy using a top-down examination that focuses on each successive stage within the framework. The stages are: 1) Entire framework, 2) Dimensions (representing the five re-engineered taxonomies), 3) Classifications (physical and theoretical aspects of each taxonomy), 4) technologies (specific types of EOTs), 5) examples (actual brand exemplars).

3.4.1. Entire Framework

The hierarchical structure of the framework facilitates progressive refinements in search criteria, enabling more focussed EOT choices. Dimensional divisions provide a clear and concise configuration, and range of different perspectives from which to approach decisions on technology usage. This enables a user to focus on which physical or theoretical concepts will be used to underpin an EOT-based decision.

3.4.2. Dimensions

The use of five taxonomical dimensions makes a greater range of potential applications evident and enables users to evaluate and select which aspects a choice in technology will be guided by. It supports decision-making by enabling users to apportion varying values of importance to the different dimensions and classifications. It enables specificity in choosing the desired tools, eliminating those less important through informed decision-making based on the range of classifications available.

3.4.3. Classifications

The classifications focus on specific dimensional aspects, providing a filter that enables the aspects to determine the types of technologies to be used. Using classifications provides a basis for comprehensive decision-making, enables choices on EOTs to be specified according to key requirements, and demonstrates how a choice between theoretical underpinnings from dimensions or classifications should influence EOT choice.

3.4.4. Technologies (EOTs)

Searches using different classifications reveal the multiple aspects and usages of singular EOTs. The framework outlines multiple areas under which a technology belongs, providing a holistic understanding of the EOTs varied capabilities and into which environments or situations the EOT might fit.

3.5. Demonstration of Pentoxonomy

This section demonstrates a working example of the Pentoxonomy. Rather than displaying the full taxonomical framework, it provides an overview of the capability and capacity of the taxonomy via three example searches which identify the EOTs and examples within selected dimensions of the taxonomy.

Table 1 displays three separate example searches. The first example (Search 1) displays a list of 'live text chat' EOT examples classified within the 'learner to expert' dimension of the 'interaction' taxonomy.
The second example (Search 2) displays a list of ‘blogging’ EOT examples classified within the ‘social tools’ dimension of the ‘Functionality’ taxonomy. The third example (Search 3) displays a list of ‘social networking sites’ within the ‘applying’ dimension of the ‘Cognitive objectives’ taxonomy. Through a defined pathway of filters, the Pentaxonomy presents a range of brands or examples that can be used to achieve the same or similar outcome as each other to meet the desired stakeholder need.

Noteworthy is the fact that EOT examples can ‘belong’ under different dimensions and technology categories, being that “tools...show up under multiple categories depending on how they are used” (Culatta, 2011, p. 1). For example, Facebook appears as an example of an EOT that enables ‘live text chat’ within the ‘learner to expert’ classification of the ‘Interaction’ taxonomy, and also as an example of a ‘social networking site’ within the ‘applying’ dimension of the ‘Cognitive objectives’ taxonomy.

It is important to note that while during the course of this paper, the term EOT has been used interchangeably to describe either the ‘type’ of technology or the brand exemplar (for example EOT type: social networking site, EOT brand exemplar: Facebook), in the Pentaxonomy, these terms are used quite separately to distinguish between two sets of categories. As demonstrated in Figure 2, the columns for ‘EOTs’ and ‘Brand EOT Examples’ are kept separate to classify out specific types of tools from individual brands.

4. CONCLUSION

Educational online technologies (EOTs) have contributed significantly to the affordability and accessibility of higher education, resulting in a marked increase in demand for online courses. Educationalists have responded by developing their knowledge and application of rapidly evolving technologies. However, the task of selecting an appropriate technology from an extensive range of tools is challenging. The lack of a robust EOT classification system is significant, given the current global extent of online activity. This chapter has described the development of an overarching taxonomy to address this requirement.

This chapter reviewed and described the augmentation of five existing taxonomies, all of which included current EOT insights gathered during 2015 interviews with blended learning experts, and proposed that these be integrated into a new multi-dimensional framework called the Pentaxonomy, a robust taxonomic model for categorising tertiary-level distance EOTs. This chapter explained the basis and structure for the Pentaxonomy and outlined why specific taxonomies were chosen for integration within the framework. This chapter also commented on the features and benefits of the framework and demonstrated how the re-engineered taxonomies linked to educational philosophies and technological schemes. It provided an example of the Pentaxonomy’s ability to robustly categorise a range of EOTs in an effective and accessible manner.

The application and usefulness of the Pentaxonomy is significant within a web facilitated, blended, or online context, where informed EOT choice and usage is critical. As educationalists across institutes focus on technology as a way to minimise costs, increase efficiencies and meet student learning needs, the Pentaxonomy will support them in understanding, prioritising and applying new tools within a learning environment. However, the Pentaxonomy has the potential to extend beyond the realms of education, and into varied business industries where effective decisions on technology and digital media are important. As business leaders focus on technology as a way to gain competitive advantage, the Pentaxonomy can support them in understanding, prioritising and applying new tools within the business context.
Figure 2. A classification of EOTs using the Pentaxonomy
REFERENCES


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8.5 Paper 5

Paper 5 is entitled “Identifying Key Stakeholders in Blended Tertiary Environments”. It was submitted for publication to the International Journal of IJICTE, and is currently in review.

Contribution to research

Paper 5 was the fifth in a series of seven publications that formed the output of preliminary research. It maps directly to research objectives 1 and 2, and outcomes 1 and 2 (see Figure 2). Through qualitative methods of data collection and analysis, this paper re-evaluated the identities of key stakeholders in BTEs. Its insights about the these groups, would assist TEIs to develop and clarify their understandings about the roles of these important groups, their characteristics and contributions to BTEs.

While Paper 5 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole would contribute to a range of areas across the field of educational technology in higher education. Its contribution to this research helped to build a strong foundation of current knowledge upon which to ground the phenomenological study and its selection of participants, and triangulate results.
IDENTIFYING KEY STAKEHOLDERS IN BLENDED TERTIARY ENVIRONMENTS: EXPERTS’ PERSPECTIVES

Abstract

Although key stakeholders in blended tertiary environments (BTEs) fulfil an extraordinary role in advancing of higher education, significant gaps in knowledge about their identities and contributions may impede the provision of appropriate support, limiting their ability to promote effective learning and teaching. As online growth intensifies, changing contexts of learning, it is critical that tertiary education institutes (TEIs) address these gaps in knowledge by developing their understandings of key stakeholder identities. This paper re-evaluates the identity of key stakeholders in BTEs, and describes their contributions. Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, it verified and proposed a current list of key stakeholders in BTEs. They included teachers, senior management staff, students, technical support staff, educational support staff, the institute, other support staff, government bodies, technology infrastructure providers, communities, and the public. Some were considered to be among those who contributed most significantly to BTE success. As learning spaces evolve and technology usage continues to accelerate, the outcomes from this research provide a basis from which TEIs can develop new understandings about their key stakeholders, at a level that enables the delivery of informed, relevant, and meaningful support.

Keywords

E-learning, blended learning, higher education, tertiary education, stakeholder, teachers, students

Introduction

Stakeholders1 have contributed significantly to the success of digital transformations, fulfilling an extraordinary role in the advancement of higher education. In an era of phenomenal growth, their commitment to the use of educational online technologies (EOTs) has helped transform traditional learning spaces into dynamic blended tertiary environments (BTEs). Attitudinal factors including flexibility, innovativeness and creativity have stimulated levels of generational acceptance of online engagement, prompting an increase in interactivity and “collaboration” (Therriault, 2015). For tertiary education institutes (TEIs), this has increased the range of learning and teaching opportunities, enabling them to swiftly adapt to the changing needs of a digitally native generation, and thus ensure institutional relevance in an era of dramatic change.

In this context, tertiary education institutes (TEIs) bear responsibility for ensuring their key stakeholders receive an appropriate level of support to fulﬁl their roles. In fact, “having knowledge of stakeholders will always be an important responsibility” for TEIs (Avio, Ring, & Mitchell, 2015, p. 53). It is achievable when TEIs understand the role of “knowledge management” as it relates to the capabilities of their people, and the complexities of their environments (Mare, 2013). This involves identifying and analysing their key stakeholders, “to realise who [they] are, and what they want” (Mare, 2013, p. 223), and then to “improve its processes to meet their needs” (Kettunen, 2015, p. 56).

TEIs that “can identify and understand the[ir] stakeholders... can greatly enrich their knowledge” (Avio et al., 2015, p. 53), whereas “neglecting stakeholder relationships” will “lead to limited success” (Kettunen, 2013, p. 56). Significant gaps in knowledge about stakeholders’ identities and contributions may impede the provision of appropriate support, and limit their ability to promote perform their roles effectively. Establishing stakeholders’ identities, and determining the extent to which their needs and activities are understood and supported is therefore critical. As online growth intensifies, changing contexts of learning, it is essential that TEIs address their gaps and develop understandings about those groups, at a level that enables the delivery of informed, relevant, and meaningful support. This paper re-evaluates the identity of key stakeholders in BTEs, and describes their contributions.

While some efforts have been made to better understand key stakeholder roles, the number of studies about their identification are relatively few. Mannardes, Aves & Raposo (2013), in a theoretical exploratory case study, identified and ranked 21 distinct groups of university stakeholders. Chapleo and Simms (2010), through stakeholder analysis, identified and ranked 10 higher education groups. Wagner, Hansanam & Heed (2008) compiled a stakeholder list of at least seven

1 In this paper, the term 'stakeholder' refers primarily to those individuals, groups or organisations affected or involved in the learning processes and outcomes of a blended tertiary environment (BTE).
groups, and Sanderson (1997) identified more than 15 distance education stakeholders. An overview of the results from these four studies is outlined in Table 1.

Table 1: Results from existing studies

<table>
<thead>
<tr>
<th>Research approach</th>
<th>Stakeholders identified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maimardes, et al., (2013) This theoretical exploratory case study (ranked, top 10)</td>
<td>Students, teachers, researchers, employers, research and development partners, government, accreditation bodies, local public authorities, non-teaching staff, other higher education institutes, local community, secondary level schools</td>
</tr>
<tr>
<td>Chapple &amp; Samms (2010) Case study and stakeholder analysis (ranked, top 10)</td>
<td>Students, staff, funders, commercial, government, community, governing and academic bodies, research councils and bodies, educational community, graduate recruiters</td>
</tr>
<tr>
<td>Sanderson (1997) Case studies and literature (net ranked)</td>
<td>Regulators, purchasers, suppliers (creates and providers: content providers, learning experts, designers, media providers, admin support, HR, technical providers, site coordinators), end users (teachers and learners)</td>
</tr>
<tr>
<td>Wagner et al (2018) Literature and stakeholder analysis (net ranked)</td>
<td>Students, instructors, educational institution, content providers, technologies providers, accreditation bodies, employers</td>
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</table>

In these studies, students and teachers were featured as the most dominant stakeholders. Bodies supplying accreditation or some form of governance also held top positions, and providers of media, technology and funders factored in significantly. Other key groups included local and educational communities.

Additional literature further developed a picture of stakeholder representation in higher education. In a paper about stakeholder priorities, Power & McGregor-Geddes (2011) identified stakeholders as students, faculty and administrators. Gross & Godwin (2005) recommended that higher education stakeholder analysis begin with the “obvious and well-known stakeholders: students, faculty, and administrators” (p. 1). Similarly, it was noted that in educational institutions, the most important stakeholders were “students, staff, administration and employers” (Singh & Weligamage, 2012, p. 5). Coleman et al (2013) identified higher education stakeholders as “students, employees, policy makers, faculty and administrators” (p. 3).

Tang & Husni (2011), in a study about stakeholder perspectives, identified higher education groups as university managers, academic staff, students, parents, graduates, industry employers and other representatives. Leisyte, Westerheijden, Epping, Faber, & De Weert (2013) similarly explained that higher education stakeholders could include academics, students, parents, administrators, managers, alumni, employers, media, and community representatives. The University of Wisconsin (2006) identified higher education stakeholders as students, faculty, staff, alumni, parents and visitors. Other research identified teachers, students, support staff, administrators, and managers as those whose roles in higher education had changed (Freeman, Patel, Routon, Scott, & Ryan, 2013).

These studies contributed useful perspectives. However, the contexts in which their stakeholder identifications occurred has since evolved. Over time, these environments have been transformed, and therefore re-contextualised through technological developments. This meant that stakeholder roles and activities were subjected to change; they too had shifted and evolved. These roles now had to be understood in a new, more relevant context.

While set in general higher education contexts, those existing studies had not made explicit mention of the blended element of the environment. This could have been due to differences in understandings about the meaning or scope of blended learning, or the presumption that its inclusion was a given component to the learning1. However, since “blended learning intersects nearly every sector of the university environment” (Moskal et al., 2013), is an integral part of modern-day tertiary strategies, and influences a panorama of activities in TELs, its significance should be acknowledged. It is a primary component of modern learning contexts, and its use has been made explicit in describing the context of this study (i.e. blended tertiary environments).

Although more recent research had been deemed necessary, existing studies provided insights that helped inform choices about methods of data collection and analysis in this study. These included the value of using literature to reveal gaps in

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1 These studies did not specifically focus on stakeholder identification.

2 The line between learning and blended learning is becoming increasingly blurred, with educationalists noting that “the trend toward blended learning systems will increase” to become “so ubiquitous that we will eventually drop the word blended and just call it learning” (Benk, & Graham, 2009, p. 7). Also, the definition and understanding of blended learning is subject to a level of interpretation and changeability. Ultimately, blended learning has become an evolving, responsive and dynamic process that in many respects is organic, defying all attempts at universal definition”, frustrating the search for specificity (Moskal, Dziuban, & Hartman, 2013).
stakeholder identification, the value of using purposeful sampling techniques to collect data from expert subjects, and the value of using their knowledge and expertise to help construct meaning and understanding about stakeholder identities, especially in light of the limited number of studies on the topic.

The shortage of studies on stakeholder identification in BTEs, and the need for updated relevant understandings signalled that an “examination of [the] stakeholder environment...[was]...pertinent” (Chaplee & Simms, 2010, p. 6). Researchers hope that stakeholder identification will in the future attract deserved attention from other researchers and practitioners in higher education (Avci et al., 2015). While “who the stakeholders are is a very complicated issue” (Avci et al., 2015, p. 53) and is considered “difficult to implement” (Marie, 2013, p. 217), since TEsIs have “a particularly complex stakeholder environment” (Chaplee & Simms, 2010, p. 6), new stakeholder research was necessary. Re-evaluations of the identity of key stakeholders and their roles needed to occur “when stakeholders’ requirements changed[d]” (Kettunen, 2015, p. 56). Especially since TEsIs were “under continuous pressure...to follow the global trends of technological innovations”, and adapt to the use of “modern technologies” and “new [educational] forms and structures” (Marie, 2013, p. 223).

This paper identifies and re-evaluates the key stakeholders in BTEs, and describes their contributions. Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia, and Canada, and a 5-step analysis of data, it verified and proposed a current list of key stakeholders in BTEIs. They included teachers, senior management staff, students, technical support staff, educational support staff, the institute, other staff, government bodies, technology infrastructure providers, communities, and the public. Some of these stakeholders were thought to be among those who contributed most significantly to BTE success. As learning spaces evolve and technology usage continues to accelerate, the outcomes from this research will provide a basis from which TEsIs can develop new understandings about their key stakeholders, at a level that enables the delivery of informed, relevant, and meaningful support. TEsIs that “can identify and understand their stakeholders...can greatly enrich their knowledge” (Avci et al., 2015, p. 53). Doing so will lead to better planning, initiatives and improved resource allocation, all of which promote organisational success and curb failure (Gress & Gedewin, 2005, p. 1).

Method

A qualitative system of methods was used to guide the collection and analysis of data (Marelli, 2016). Participants were selected using an expert sampling strategy to ensure that data came from those with specific expertise and experience in the field (Trockchin, 2000). This method was similar to the approaches used by Chaplee and Simms (2010), who obtained data from ‘opinion-formers’, and Wagner et al. (2008) who used experts’ feedback. Criteria were set to establish a basis for their selection for interviews. Participants had to fit the criteria of a ‘blended learning expert’. An expert is defined as “one whose special knowledge or skill causes him to be regarded as an authority” (Oxford University Press, 2014). Experts could be selected on relatively simple criteria, such as through certain qualifications or experience (Changmg Minds, 2013). Thus, the following criteria established a basis for their selection: 1) the individual must have occupied an academic role for not less than 10 yrs in a tertiary blended leaning context, 2) hold a post-graduate qualification, and 3) have conducted published research in the area of blended learning. Candidates without blended learning experience, or without post-graduate qualifications were excluded from this study.

A small group of 13 participants was chosen (Saldana, 2011), from TEsIs in New Zealand, Australia, and Canada. The rationale for this number was based on literature about qualitative research. Saldana (2011), for example, explained that there were varying opinions about the appropriate number of participants. While studying a single individual case in depth would make for a rich profile, an individual was not always representative of the population at large. Therefore, a small group of participants would provide sufficient data, with a minimum of 10-20 needed to ensure credible and trustworthy findings (Saldana, 2011). Accordingly, the use of 13 expert participants fitted within the required range. Obtaining data from a group of several individuals, rather than from one or two would likely deliver a holistic set of results that were applicable in more than one setting, and ensure that “no unidimensional conforming or non...easily anticipatable” (Yin, 2010, p. 47) could arise. Obtaining data from long-serving experts, from across several institutions and countries, was considered an appropriate way of “testing the evidence for consistency across sources” (Yin, 2010, p. 20). Due to their significant experience, they would render richer contextualised explanations than non-expert candidates. Notably, the credibility of findings were increased when they involved feedback from those with prolonged engagement in the field (Nicholls, 2009). The expectations were that “this particular group of people thought to share a common experience...[would] offer meaningful insights into the phenomenon” (Nicholls, 2005, p. 640).

Participants set aside at least 45 minutes of un-interrupted time to complete their interviews, which were conducted via online video-conferencing technology (Skype), and audio recorded using Pamela software. The interview contained 13 questions in total. Question three asked participants to identify the groups they considered ‘to be key stakeholders in BTEIs’.

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Question four asked them to identify which of these provided the most important contribution to the success of a BTE. The use of open-ended questions generated deep, meaningful answers, and gave participants an opportunity to state their own opinions (Ferrari & McClement, 2008). Probes helped to clarify meanings of responses, encourage in-depth explanations, and stimulate participants to expand their original comments (Yin, 2015). A large quantity of data was expected and received.

The data were recoded, and then transcribed in pre-formatted question-and-answer templates, which enabled the researcher to develop an intimate familiarity with the content (Danesi, 2016). It was analysed using Yin’s (2015) five phases of qualitative data analysis: 1) Compiling, 2) Disassembling, 3) Reassembling, 4) Interpreting, and 5) Concluding. Table 1 demonstrates the link between these five phases, and the research techniques used.

<table>
<thead>
<tr>
<th>Table 1: Qualitative phases vs research techniques</th>
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NVivo software (QSR International, 2015) was used to import, compile, and organise the transcribed documents into a logical filing structure (Yin, 2015). The data from these documents were disassembled into smaller pieces and coded. Using the Nodes coding function, the data was separated into categories that corresponded to the interview questions. These nodes were labelled using truncated versions of the questions, represented specific portions of the data. Their use enabled the data to be assigned logically, labelled, referenced, and contained within manageable groupings (Williams, 2003). Table 2 demonstrates the link between the node labels used for coding the data, and the interview questions.

<table>
<thead>
<tr>
<th>Table 2: Nodes linked to interview questions</th>
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<td>Node</td>
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The data was then reassembled, which required that it be transferred from its node position into analytic memos (Yin, 2015). These memos were used to record ideas and insights about specific stakeholders, and develop meaningful thoughts about their significance and contribution (QSR International, 2015). Interpretations of the memo data were made, and used to form the basis of the discussion, which focussed on the identification of key stakeholders in BTEs, and of those, the most significant contributors to BTE success. Comparisons to existing studies were made to provide a basis from which to correlate understandings about the meaning of the data. The conceptual diagram in Figure 1 uses a highlighted example to demonstrate the link between stages of the analysis process. This outcomes of the analysis provided a basis from which to identify and discuss the roles, contributions, and interests of the “key players in the environment” (Maric, 2013, p. 217).

Figure 1: Process of data analysis

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4 The remaining 11 questions, which related to BTEs and other key stakeholder matters were not discussed in this paper. Reporting on them here was outside its scope.
Table 4: Nodes for coding interview questions

Discussion of results

This section outlines the results of the analysis and discusses its findings in reference to the literature. It identifies the key stakeholders in BTEs, and those participants considered made the most significant contributions to BTE success, and finally proposes a draft list of key stakeholders in BTEs.

The expert participants identified a range of key stakeholders in BTEs. The most prominently and frequently identified were students, teachers, and technical and educational support staff. Students were identified as key stakeholders by 12 out of 13 experts, because of the need for them to ‘buy into’ blended learning, ‘participate fully, and be convinced of its value’. Their ability to support discussion, deliver feedback, and enhance ‘connectedness or community’ (Balaji & Chakrabarti, 2010, p. 17) contributed significantly to the success and value of learning experiences (Huatara, 2014b). Some participants categorised students into sub-groups, such as distance learners, local students versus international students, young students who ‘want[ed] the ticket’ versus mature students who ‘wish[ed] to formalise education’. Some also grouped students by their level of engagement with EOTs. These results aligned with the studies in Table 1, three of which had ranked students as key stakeholders (Chapleo & Simms, 2010; Maimardes et al., 2013; Wagner et al., 2008). These results were also consistent with a number of other studies that had listed students as key stakeholders (Coleman et al., 2013; Freeman et al., 2013; Gross & Godwin, 2005; Lestyte et al., 2013; Power & Morven-Gould, 2011; Singh & Weligamage, 2012; Stein & Graham, 2014; Tang & Hussin, 2011; University of Wisconsin, 2005).

Despite participants’ choice of students as key stakeholders, only 3 of the 13 experts identified them to be among those providing the most significant contribution to BTE success. They felt that student ‘buy-in [was] directed by teachers’, that ‘students [were] not the most influential, nor at the centre of learning at a BTE’. Instead ‘they [were] affected by the outcome’ generated by instructors, simply ‘follow[ed] what the teachers want[ed] them to do’, and were ‘impressed by how well [teachers] design[ed] and [taught]’. Their comments were reminiscent of descriptions about ‘instructor-centred teaching [where] the emphasis [was] on what instructors [did]’ (Blumberg & Weimer, 2012, p. 3). Participants said that while currently ‘teachers…made the most significant contribution…in the ideal online environment, [they] wouldn’t’.

Teachers were identified as key stakeholders by 11 out of the 13 experts, because of their immediate and direct involvement in the teaching and learning process, their day-to-day focus on and influence over blended learning experiences, their role in ‘develop[ing] the content’, and their role as a ‘conduit’ through which knowledge was passed onto students. These results compared with those from the studies in Table 1, all of which ranked teachers as key stakeholders (Chapleo & Simms, 2010; Maimardes et al., 2013; Sanderson, 1997; Wagner et al., 2006). These results were also consistent with other studies that identified teachers as key stakeholders (Coleman et al., 2013; Freeman et al., 2013; Gross & Godwin, 2005; Lestyte et al., 2013; Power & Morven-Gould, 2011; Singh & Weligamage, 2012; Stein & Graham, 2014; Tang & Hussin, 2011; University of Wisconsin, 2005).

3 The primary aim of these studies did not necessarily involve stakeholders identification or analysis
4 Whether explicitly or as part of a general staff category
Teachers were selected by 9 of the 13 experts as being among those who provided the most significant contribution to BTE success. Teachers guided the blended learning process, from design to delivery, and were ‘without doubt’ considered ‘more important than students’, because ‘if they [didn’t] drive it, it [wouldn’t] happen’. Factors including ‘how they designed the course’, their ‘use of resources, levels of interactivity’ contributed to reasons for why ‘teachers[were] key…in determining the success’ of BTEs. This was interesting, considering that in other studies, teachers’, although listed as key stakeholders, were ranked second behind students in the top 10 stakeholders (Mainardes, 2013, Chapleo & Simms, 2010). This difference could have been due to idealistic notions about student-centred learning, or it could relate to the greater role that teachers now assumed in these technologically demanding environments. Teachers ‘roles [were now] more critical in online learning environments’ (Moore, 2013, p. 307). More than ever, they were counted on to use EOTs effectively to communicate, encourage, and assist the learning process, “to master, design, and deliver strategies, techniques, and methods for teaching online courses” (Yang & Cornelious, 2005). Adding to this, ‘ generation Z…[were] coming through with ‘expectations…that [were] a challenge for [teachers] to keep up with’ (Tuapawa, 2016a). They were the corrected students from “the ‘bring-your-own-device era’” (Skiba, 2016, p. 1), who were “at great ease with the online culture” (Gupta, 2016, p. 1), and had “learned to expect immediate, continuous, all-round support” (Serdylakow, 2015, p. 60).

While most participants considered ‘academics [to be] the main contributors’, one participant admitted that some teachers were ‘terrible at engaging’. This was due to the growing pressure they faced to spend time undertaking research. The ‘publish or perish’ expectation reduced their focus on quality student engagement. Yet, “direct personal communication…between students and their teacher [was] an indispensable component of any learning” (Serdylakow, 2015, p. 67). Experts proposed an increase in the use of casual lecturers, who did not face the same level of pressure to pursue research, and therefore had more energy to help students. They also stated that there was pressure on teachers to ‘teach more, deliver more’ although being ‘given fewer resources to do so’. Although teachers might have been ‘lean and mean last year’, they had to ‘be leaner and meaner this year’ to ‘facilitate the interaction between the physical and digital learning spaces’. This was in spite of reports “that it [took] more time and effort…to teach an online course than to teach a corresponding face-to-face course” (Allen & Seaman, 2015, p. 26).

Technical and/or educational support staff were identified as key stakeholders by 9 out of the 12 experts, due to the critical nature of their role in providing EOT support to teachers and students. Participants regarded technical support as a key element to positive learning experiences on and off campus. Educational support staff were considered to be key stakeholders because of their role in providing professional development opportunities to staff who required pedagogical support to deliver blended learning experiences across a range of online tools. “Providing teachers with the appropriate support and professional development [was] crucial to ensuring that technology [was] being integrated” effectively (Moore, 2013, p. 302). “Teachers often [had] inadequate (or inappropriate) experience with using digital technologies for teaching and learning” (Koehler & Mishra, 2009, p. 92), due to a “lack of training” or ineffective or insubstantial training (Merfert, 2016, p. 1), which created difficulties for teachers who “struggled to keep up with the ever-increasing…tools available” (Ko & Rossen, 2010, p. 16). Their technical incompetencies were one of the major problems (Tufan, 2016). They “needed specific training, guidance and support…” to successfully use these new technologies, and incorporate them into course delivery…” (European Union, 2014, p. 17). Educational support staff sought “to build a consensus, to do it collaboratively” by supporting their colleagues through initiatives that helped them learn to use EOTs. In one TEL, for example, an academic services site had been developed to help users learn how to use forums. One expert considered the increased appropriation of institutional funds towards resources for this group as an indication of their rise in stakeholder importance.

In previous studies, technical and/or educational support staff had not been mentioned explicitly, or had been assigned under a larger general group, such as non-teaching staff (Mainardes, 2013) or suppliers (Sanderson, 1997). However, as the move towards digital delivery has become a priority for TELs, the significance of these groups is likely to grow, as evidenced by the results of this study. One report discussed the increasing importance of “the role and function of the IT department in enabling and supporting digital transformations” with indications that “the move to digital [was] disrupting this role, placing increasing emphasis on IT departments to innovate and adapt to deliver new learning outcomes” (Gibson, Palmer, Broderick & Tully, 2015, p. 3). These stakeholders played an important role for both students and teachers, in ‘ensuring the quality of the learning experience’, and in helping ‘to build comfortable and confident technology users’.

The academic institutions ‘shaping behind the academies’, were classed as key stakeholders because of their overarching role in championing, managing and sustaining TELs. Their responsibilities involved providing “affordable, sustainable approaches” (Beelham & Watkins, 2012, p. 61) to learning. Their investment in skilled expertise to facilitate digital transformations was considered important in light of technological developments. To support this, TELs had ‘to design an

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7 In the study by Chapleo & Simms (2010), teachers were assigned under the larger general group, staff.
eco-system of technologies and infrastructure that [was] responsive to changing landscapes, [and] robust enough to ensure stability and quality of learning experiences, and... meet strategic drivers.’ One expert stated that in addition, ‘a shared vision and strategy on how to achieve success in blended environments was necessary. It required the resource[s] and the desire to change’, the ability to clarify needs, and ‘generate high-level awareness...from the...coalition of delivery or interface with the learners...through to the managerial and leadership levels of the organisation’. It also required ‘a profound and deeply held sense of commitment to improving’.

Experts remarked that the survival of TEs depended on their ability to embrace, adopt and deliver online learning. ‘The playing field [was now] different’, and being ‘subject to a number of policy initiatives, government targets, regional and employment foci, and funding challenges’ they had to ‘future-proof [their] existence’. They needed to recognise that they ‘were playing a long game...didnt have the time or the money to keep re-doing it’, and ‘[didnt have] any other choice than to look to providing online components’. One participant remarked ‘we’re in a global competitive environment’, which meant that to survive, TEs ‘basically [had] to get smarter with doing more with less’. Another suggested that this was possible, with a clear institutional commitment to the nature and scale of the transformation, ‘diplomacy, and the ability to negotiate stakeholders through the transition. This suggested a “focus on changing individual attitudes”, and “using the power of personality and innovative thinking to bring...staff along the journey of digital transformation” (Gibson et al., 2015, p. 4).

Themes more common in this study than in existing studies related to the growing pressure institutes faced to incorporate EOLs into BTEs. Recognition of the demand for ‘consistent, reliable, and essential fundamental learning’ was significant, with a greater focus on technology as a force dictating delivery. One expert indicated that TEs that understood technological disruption would ensure appropriate management of change, and embrace opportunities afforded by blended transformations. The use of technology was ‘a paradigm shift for the institute’ and ‘critical to what we are about’. Success ‘always [comes] back to effective change and transformational leadership’ which required ‘due diligence around products we select and...roll out’.

**Senior management staff** were identified as key stakeholders. Some participants thought that the most significant contribution came ‘from senior executives of the institutions’, those in the ‘leadership and management tier of the organization’, including ‘personnel or direct line management’ staff who had ‘a big role to play’ especially in influencing change, and in securing extra resources. Without the institutional weight brought in by these stakeholders, ‘anything else you did [was] likely to be just around the edges, and wouldn’t have the staying power to embed that practice longer term and to transition to business as usual in a sustainable model.’ In fact, without the leadership function of the institute and their ability to release resource and champion a vision...help set strategy...and endorse...those hard decisions...any project [was] probably likely to fail.’ A recent report indicated that ‘significant engagement with all the senior leadership of the university [should involve] consulting, understanding, listening and amending [plans]...embracing the concept of change, in order to foster a culture of digital innovation’ (Gibson et al., 2015, p. 4). Educational leaders in the future would have to be proactive, anticipatory, and flexible (Peppers, 2016). In other studies, these stakeholders were not mentioned explicitly, or were assigned under a larger general group, such as non-teaching staff (Mainwaring, 2013) and staff (Chapleo & Sims, 2010).

**Marketers** were also identified as key stakeholders, because of their level of influence over the message promoted to communities about TEs. Family, friends or estimates of students were also considered to be key stakeholders, because of their provision of familial, personal or domestic support. Their interest in the learning content and interactions were cited as having an influence over learning experiences. For example, parents and siblings could join in watching onscreen lectures with the student from home. One expert remarked that comments concerning his lecture had been made to him in person by family members who had viewed the delivery via video conference.

Other key stakeholders were also identified. These included online learning leaders and champions, e-learning advisors, instructional designers, advisory committees, employers, industry, organisations facilitating student work placements, infrastructure providers including writers or proprietors of commercial software tools, the Government and statutory or accreditation bodies, online tool creators and hosts, the public and local communities, and non-academic staff. The stakeholders thought to have contributed most significantly to BTE success included e-learning champions, technical support staff, infrastructure providers, and course coordinators.

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8 Various terms including head of school, deans, management, executive team members, and administrators were used in reference to senior management staff.

9 Other terms used to describe staff in similar roles included technologists.

10 Various terms were used to identify non-academic staff who provided support to academic staff in BTEs. These included allied staff, administrative staff, support staff, and service staff.
Differences between these results and those of older studies could be attributed to the impact of technological change and development, as well as the expectations and demands of the newer digital era. In “contemporary, turbulent times”, universities had experienced a shift in social and technological values, and were being forced to reconsider their relationships with stakeholders in diverse and multi-dimensional environments (Marie, 2013, pp. 220, 221). Role changes would continue to occur. Due to various influences, especially technological and sociological change, “the role of...education...is not the same as it was...it has changed, and will continue to change in the years to come” (Marie, 2013, p. 218).

Proposed list of key stakeholders in BTEs

This section proposes a list of ten key stakeholders in BTEs, among whom are those thought to have made the most significant contributions to BTE success.

- Teachers
- Senior management staff
- Students
- Technical support staff
- Educational support staff
- Academic institute
- Other support staff
- Government bodies
- Infrastructure providers and technology hosts
- Public and communities

Conclusion

Although key stakeholders in blended tertiary environments (BTEs) fulfil an extraordinary role in advancing higher education, significant gaps in knowledge about their identities and contributions may impede the provision of appropriate support, limiting their ability to commit to effective learning and teaching. Establishing stakeholders’ identities, and determining the extent to which their needs and activities are understood and supported is therefore critical. As online growth intensifies and technological developments change contexts of learning, it is critical that TEIs address these gaps in knowledge by re-evaluating their understandings of key stakeholder identities.

The contexts in which previous studies’ stakeholder identifications had occurred have evolved. Over time, these environments have been impacted, transformed and therefore re-contextualised through technological developments. These roles now need to be understood in a current, more relevant context.

This paper re-evaluated the identity of key stakeholders in BTEs, and described their contributions. Through qualitatively designed semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, and a 5-step analysis of data, it verified and proposed a current list of key stakeholders in BTEs. They included teachers, senior management staff, students, technical support staff, educational support staff, the institute, other support staff, government bodies, technology infrastructure providers, communities, and the public. The most prominently and frequently identified stakeholders were students, teachers, senior managers, technical and educational support staff, and TEIs. Certain groups were considered important for various reasons. Students, for example, were considered as key stakeholders because of their need to ‘buy into’ blended learning, ‘participate fully, and be convinced’ of its value. Teachers were chosen because of their immediate and direct involvement in the teaching and learning process, and their day-to-day focus on and influence over blended learning experiences. Teachers were considered to be among those who contributed most significantly to BTE success. This was due to their having the most direct influence in guiding the blended learning process. The perceived level of significance that certain stakeholders held in BTEs had changed over time. For example, educational support and technical support stakeholders had grown in importance. This change in view may be attributed to the impact of technological change and development upon the roles of such groups, and the expectations and demands of the newer digital era.

The application and usefulness of this knowledge is significant for TEIs, who must be capable of daily transforming and reacting to change, and at the same time remaining true to their main mission (Marie, 2013). This involves identifying and analysing their key stakeholders, “to realise who [they] are, and what they want” (Marie, 2013, p. 223), and then “to improve its processes to meet their needs” (Kettunen, 2015, p. 56). The outcomes from this research have provided TEIs with a basis from which to develop and maintain new understandings about their key stakeholders, at a level that enables the delivery of
informed, relevant, and meaningful support. It will help TEIs to continue supporting their stakeholders, as they fulfil extraordinary roles in the advancement of higher education.

Some of the findings of this study were constrained. For example, some experts commented on the difficulty in identifying key stakeholders, with one stating that success of stakeholder identification depended on each TEI, and their vision of transformation. Digital transformations involved 'everybody in the institution', with the potential to 'grossly underestimate the ability for things to go wrong if you cut one of these out'. Also, a limitation in this research restricts its broad application. The small sample size characteristically used in qualitative studies makes it challenging to generalise results across large populations. However, the findings of qualitative studies provide deep insights into the predications of participants, and cannot be discounted. In this context, it is argued that the findings reported here provide an informed, robust expose of the current situation.

Future research could involve the development of stakeholder listings for different countries. This could assist TEIs worldwide "to tailor the [stakeholder identification] concept to maximise... potential, while being responsive to a new generation of students" (Moskal, et al., 2015). Future research could also attempt to identify and rank key stakeholders' needs, understanding that while rankings are fluid, by having "this list of stakeholders, duly classified by importance, [TEIs] are thereby positioned to ascertain their expectations" (Manardes et al., 2013, p. 2).
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8.6 Paper 6

Paper 6 is entitled “Challenges Faced by Key Stakeholders using Educational Online Technologies in Blended Tertiary Environments”. It was accepted for publication in the International Journal of Web-Based Learning and Teaching Technologies (IJWLTT).

Contribution to research

Paper 6 was the sixth in a series of seven publications that formed the output of preliminary research. It maps directly to research objectives 1 and 2, and outcomes 1 and 2 (see Figure 2). Through qualitative methods of data collection and analysis, this paper identified, described and verified a number of EOT challenges faced by key stakeholders in BTEs. Its insights about these obstacles, their impact and the extent to which they limited widespread adoption, would assist TEIs to keep abreast of the latest technological barriers, design relevant informed approaches to tackle these obstacles, and deliver relevant EOT support to key stakeholders.

While Paper 6 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. Its contribution to this research helped to build a strong foundation of current knowledge upon which to ground the phenomenological study, develop its context and potential for application, and triangulate the results.
Challenges Faced by Key Stakeholders Using Educational Online Technologies in Blended Tertiary Environments

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ABSTRACT

Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), providing a modern means through which tertiary education institutes (TEIs) can augment delivery to meet stakeholder needs. Despite the significant demand for web-enabled learning, there are obstacles concerning the use of EOTs, which challenge the continued success of blended implementations in higher education. As technology usage accelerates, it is important for TEIs to understand and address the current challenges faced by key stakeholders using EOTs in BTEs, and provide appropriate support. This paper identifies and discusses the challenges stakeholders experience in using EOTs in BTEs. Interviews with 13 blended learning experts from New Zealand, Australia and Canada identified the challenges in using EOTs, and the extent to which these prevent widespread adoption and effective use of EOTs in BTEs. The outcomes of this study will enable them to design relevant approaches to tackle current obstacles in EOT usage, and deliver meaningful support to key stakeholders in BTEs.

KEYWORDS

Blended Learning, Higher Education, Technology Problems, Teaching Technology, Web Technology

1. INTRODUCTION

Educational online technologies (EOTs) have revolutionised the delivery of online education, making a significant contribution towards the global increase in demand for higher learning. Across the globe “academic leaders at all types of institutions” have reported “increased demand for ... online courses” (Allen & Seaman, 2010, p. 5), in fact, the proportion of institutions stating that online learning is critical to their strategy is at an all-time high (Allen & Seaman, 2015). The rapid emergence, adoption and demand for these online tools has engendered significant advances across the higher education sector. Traditional learning spaces have evolved into dynamic blended tertiary environments.
environments (BTEs), providing a modern means through which tertiary education institutes (TEIs) can augment their delivery to meet stakeholders' needs. These digital transformations signal exciting prospects, especially for 'digitally native' students and 'vet on the net!' teachers.

Predictions about future online learning suggest that as the pace of change rapidly accelerates, “hybrid classes will proliferate” (Anderson, Boyles, & Rainie, 2012, p. 17). This is now happening, as “millions of students [take] online courses... [giving] evidence that this modality is meeting a clear demand” (Allen & Seaman, 2015, p. 21) for EOT use. Similar forecasts indicate that the digital delivery of course work via cheaper technologies will revolutionise higher education (Anderson et al., 2012), a prospect that aligns with results from a recent survey of students, which stated that 'since 2010, there has been an increase in the use of most technologies for learning.' (Gosper, McKenzie, Pizzica, Malfroy, & Ashford-Rose, 2014, p. 298).

Despite the significant growth and demand for web-enabled learning, there are considerable challenges concerning the use of EOTs, which during an era of immense growth, pose a clear risk to the future success and sustainability of BTEs (Moskal, Dziuban, & Hartman, 2013), and create difficulties for key stakeholders as they strive to deliver effective learning opportunities. These challenges include but are not limited to attitudinal pre-dispositions and institutional barriers (Panda & Mishra, 2007), insubstantial training and development, inadequacies in instructional design support, and technical support concerning reliability and connectivity (Panda & Mishra, 2007), time investment and learning curve complexities (Christie & Jurado, 2009), and high online course workloads (Bolliger & Wasilik, 2009).

Significant efforts have been made to achieve understandings about EOT challenges. This has resulted in considerable subject-specific research, with varied and noteworthy contributions to the literature. Some of these studies have focused on technology integration into blended environments (Moore, 2013), technology to support institutional roles (Huyih, Gibbons, & Fonda, 2009), barriers to adoption of online learning (Bacow, Bowen, Guthrie, Lack, & Long, 2012), and the needs of online students (Mapina, Nora, & Yaw, 2006).

However, while “our research foundation is rich” (Patsey, 2013, p. 209), not all problems have been adequately identified and addressed. The nature and extent of EOT challenges evidently changes over time, as technology advances and stakeholder needs evolve. Gaps therefore exist, and unfortunately “significant challenges are preventing widespread effective implementation” (Nagel, 2013, p. 1), which collectively concerns TEIs. Some feel that “it is the university leadership... it is the leaders at a university who must... see that... it happens... if widespread change is to occur” (Christie & Jurado, 2009, p. 278).

Thus, the literature abounds with efforts to identify the current challenges faced by stakeholders concerning EOT use, some of which occur due to the “lack of adequate, ongoing professional development” (Nagel, 2013, p. 1) creating difficulty for educationalists who “struggle to keep up with the ever-increasing... tools available” (Ko & Ressin, 2010, p. 16). Challenges also occur because students experience “difficulty with more sophisticated technologies” (Vaughan, 2007, p. 85), and also because faculties face obstacles “in acquiring new technology skills” (Vaughan, 2007, p. 87). There are also technical problems including Internet accessibility (Mullenburg & Berge, 2005), fear of online communication (Hartisch, Hughes, Carroll, Combes, & Millington, 2011), bandwidth constraints, high implementation costs, lack of technical and management support, and negative preconceptions towards the technology (Tuapawa & Skelton, 2012), all of which limit the adoption and effective use of EOTs. As the literature shows, challenges are not only technical, but also organisational, conceptual, and administrative (Bacow et al., 2012).

Responsively, higher education institutions, many of whom are “under significant pressure to provide affordable, sustainable approaches” (Beckem & Watkins, 2012, p. 61) using online tools, have collaborated to expand their knowledge base concerning “the specific EOTs being used in BTEs, and the ways in which these EOTs are being used” (Tuapawa, n. d.). Educationalists, administrators,
and other key stakeholders have also striven to develop and adapt their technological knowledge and skills (Gregory et al., 2010).

As technology advances and usage accelerates, it is important for TEIs to understand and address these challenges to meet key stakeholder needs. This paper identified and discussed the specific EOT challenges stakeholders experience. Interviews with 13 blended learning experts from New Zealand, Australia and Canada identified over 17 EOT challenges, including resistance to change, unrealistic expectations, and ineffective EOT usage. Recommendations for addressing some of these challenges were outlined. The outcomes assist TEIs to design approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful EOT support, and inform institutional strategies to strengthen the future of BTEs.

Section 2 describes the methods used to collect and analyse data for this research. Section 3 outlines the results obtained from the interviews, and discusses the findings.

2. METHODOLOGY

Thirteen blended learning experts from TEIs in New Zealand, Australia, and Canada were selected for semi-structured interviews using an expert sampling approach, similar to that used by Chapleo and Sinnas (2010) who obtained data from interviews with “opinion-formers”, and Wagner et al. (2008) who used experts to provide feedback. Obtaining data from experts across several institutions, contexts and countries was considered an appropriate way of “testing the evidence for consistency across sources” (Yin, 2010, p. 20) and enforcing a level of rigour to the literature review. Although qualitative research does not require several cases to render quality feedback, the realities experienced by a wider range of experts strengthens the findings by yielding results which are likely to “fall within acceptable and known parameters” (Yin, 2010, p. 20).

Theoretically, this would be achieved more effectively through the use of long-serving experts who, due to their significant experience, render richer contextualised explanations than what would be achieved through the use of non-expert candidates. Furthermore, literature indicates that an activity which increases the credibility of findings involves feedback from those with prolonged engagement in the field, with credibility included as a strategy used to test the rigour of qualitative research (Nicholls, 2009). The expectation was that “this particular group of people thought to share a common experience... would offer meaningful insights into the phenomenon” and “talk candidly about their experiences” (Nicholls, 2009, p. 640). Expert sampling was thus considered as an effective way to elicit the views of persons with specific expertise, demonstrable experience and insight into a specific field or topic to support the validity of the inquiry (Trochim, 2006). It supposed that a greater level of contextual richness would be captured, satisfying the need for this study to be informed by trustworthy data.

To be interviewed, the participants had to fit the criteria of a “blended learning expert.” An expert is defined as “one whose special knowledge or skill causes him to be regarded as an authority” (Oxford University Press, 2014). It is not uncommon for experts to be selected on relatively simple criteria, which can be defined through certain qualifications or experience (Changing Minds, 2013). Thus, the following criteria established a basis for the selection of experts: (1) the individual must have occupied an academic role for not less than 10 yrs. in a tertiary blended learning context, 2) hold a post-graduate qualification, and 3) have conducted published research in the area of blended learning.

Candidates without blended learning experience, or without post-graduate qualifications were excluded from this study. The rationale for using 13 participants for the interview was based on literature relating to qualitative research. Saldana (2011) explained that there are varying opinions concerning the appropriate number of participants. Studying a single individual case in depth makes for a rich profile, yet obviously the individual is not always representative of the population at large. It was believed therefore that a small group of participants would provide a broader spectrum of data for analysis, with a minimum of 10-20 participants needed to ensure credible and trustworthy findings.
(Saldana, 2011). The reasons for this range ensured that sufficient data would be obtained, whether from one person or 20 (Saldana, 2011). Accordingly, the use of 13 expert participants fitted within the required range. Obtaining data from several participants, rather than from one or two individuals was likely to provide a more rounded and holistic set of results that were applicable in more than one setting. This ensured that "no untoward consequences or none that can be easily anticipated" (Yin, 2010, p. 47) could arise. The use of open-ended questions generated deep, meaningful answers, giving participants an opportunity to state their own opinions (Penner & McClement, 2008). A large quantity of data was expected and received.

The data were obtained data via semi-structured interviews conducted via online videoconferencing technology (Skype). Participants set aside at least 45 minutes of un-interrupted time to complete the interview. The aim of the interviews was to explore, clarify, and verify issues from the literature. The interview contained 13 questions in total. Question five asked participants to explain 'what kind of challenges key stakeholders might experience concerning the use of EOTs in BTEs.' Question seven asked 'how these challenges could be overcome.' The remaining 11 questions related to EOT, BTE, and key stakeholder matters not discussed in this paper. Reporting on them here is outside the scope of this paper.

The analysis of interview data involved sorting and coding. Audio recordings were made and then transcribed into a pre-formatted question-answer template, which later enabled like data to be coded in a standardised manner. NVivo software was used to code and analyse the interview data (QSR International, 2015) using nodes. Nodes were used to assign and label the data into manageable groupings (Williams, 2003), and act as a container or reference to the assigned data. The node labels were created using short phrases that represented a portion of data. Assigning nodes to segments of text in the source documents helped assemble like-data into meaningful categories. Table 1 outlines how nodes were used to code the data relating to these interview questions.

These nodes were used as containers for relevant responses to questions five and seven. Data from node five were separated into 17 categories or memos, each of which contained data about a specific EOT challenge. The memos were used as the foundation from which the discussion was built and refined. The discussion was formatted to provide a section for each EOT challenge. Each section contains a description of an EOT challenge, and incorporates comments made by participants. Finally, a summary of recommendations for addressing some of these EOT challenges is outlined. Figure 1 outlines this process of data analysis.

### 3. RESULTS

Blended learning experts identified and described the EOT challenges experienced by key stakeholders in BTEs. These challenges included resistance to change, unrealistic expectations, ineffective EOT usage, lack of motivation, EOT constraints, management-related issues, EOT support-related issues, EOT overload, rapid EOT growth, accessibility to technology, financial constraints, time constraints, high workload commitments, lack of training and development, preventing boredom, and keeping abreast of technology. Recommendations for addressing these EOT challenges included implementing course "health-check" strategies where teachers' development and delivery of online course components are reviewed for effectiveness. Other recommendations involved developing

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<th>Node</th>
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<td>5</td>
<td>EOT challenges</td>
<td>What kind of challenges might key stakeholders experience concerning the use of EOTs in BTEs? Please explain why.</td>
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<td>7</td>
<td>EOT solutions</td>
<td>How do you think these challenges could be overcome?</td>
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strategies to deliver strong technical support for off-campus students, and strategies for designing and delivering simpler, more elegant courses and resources.

3.1. Resistance to Change

Blended learning experts indicated that resistance to change is a significant EOT challenge that key stakeholders experienced. Comments signaled that this can occur in those with whom there is ‘no actual desire to change in the first place’, and occurs also in those reluctant to expend additional effort to engage new methods. Resistance to change is often symptomatic of more explicit ‘root cause’ beliefs concerning using EOTs to deliver learning.

One ‘root cause’ reason for resistance to change involved the traditional and well-entrenched perspective concerning the superiority of face-to-face delivery. Concerns about online delivery and preferences were grounded firmly in long-standing experiences with didactic ‘sage on the stage’ techniques. For those having occupied a decades-long ‘sage’ role, the cultural capital implicit in “chalk and talk” techniques were considered more appropriate, and in certain practical-based disciplines were expected, while online methods were relegated to ‘supplementary’ status or touted as impractical. Statements like ‘you can’t teach this online’ expressed collective doubt from seasoned academics towards online delivery. One expert identified this as ‘the biggest issue,’ having regularly experienced teacher-led comments like ‘you’ve got to look at the whites of their eyes while they’re [learning].’

Another ‘root cause’ reason for resistance to change involved negative opinions concerning EOT usage. Attitudinal issues appeared more frequent among older academics who argued the merits of traditional methods with ‘we’ve always done it this way.’ Their familiarity and reliance on ‘old school’ methods where ‘everything was on paper’ made the switch to ‘online’ challenging. For forwardmoving innovators, ‘champions and pioneers’, the generational gap was considered as a great chasm, being made wider through the reluctance of older academics or students to bridge their learning and ‘traverse’ into newer online territories. Challenges intensified when recommendations for change emerged from a grass-roots level, rather than from ‘management decree.’

Negative opinions towards EOT usage impacted significantly ‘on the uptake.’ Teaching staff with ‘a barrow to push’ were described by one expert as ‘alienating’ others against EOT usage, holding sway over students, thereby causing ‘a serious problem’ which could ‘change the whole dynamic of the system and bring it down to its knees.’ Attitudinal issues were not limited to teaching staff. Experts remarked on the challenges that many ‘mature-aged’ students, described as ‘traditional’, and who ‘didn’t have time to engage’ online, experienced when ‘not so fluent in technology.’

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Another ‘root cause’ reason for resistance to change was simply a ‘fear of the new and the different,’ coupled with the intimidating prospect of having to rethink and relearn delivery through new channels.

3.2. Unrealistic Expectations

Unrealistic expectations about online learning also created challenges for key stakeholders. Experts remarked on the difficulty experienced by high school graduates entering University with misunderstandings about the type and level of learning support provided in BTEs. ‘They think that this is going to be like everything they’ve had before’ but once ‘they attend class, they start to build an understanding’ of the differences in support at secondary school versus University, and realise that a greater level of ‘self-direction’ and independent learning is now necessary. Difficulty arose if ‘the students weren’t mature enough in their education experience to understand what was required of them.’ Some say ‘this isn’t what we signed up for... [and are also] technically challenged’ and therefore ‘go all over the place.’ Others who expected face-to-face delivery argued against blended learning, stating to academics ‘I pay, you teach.’

Other expectations that presented challenges involved the level of learning support provided to mobile phone users. One expert explained how the accessibility to learning afforded by mobile technology has created an expectation amongst students that teacher engagement will continue after hours and during non-work periods. ‘Generation Z... are coming through’ with ‘expectations... that [are] a challenge for [teachers] to keep up with.’ One expert noted that the separation between ‘work and life... is not there anymore.’ Some expected ‘that if I ask a question now, [although it’s] the weekend, it doesn’t matter... [rules concerning ‘off-duty’ time] don’t apply to me.’ This challenge created a conflict with the institution’s intention to ‘attract... students who are not able to come onto campus every day.’ Following this scenario, ‘the institution is by default asking to provide support at all times’, and thus ‘students expect that... when [learning] is possible for me... I should have support.’

3.3. Ineffective EOT Usage

Ineffective EOT usage was also considered to be a challenge for key stakeholders. While LMS like Moodle are evolving into ‘relationship management systems’ to which institutes are ‘adding more products’ to address the need for a personalised student learning experience, some academics only use LMS ‘for content provision,’ ‘for the sake of it,’ or as a place to ‘shove stuff online’ without due consideration to ‘the pedagogical side.’ One expert termed this indifferent or haphazard content provision as ‘Shovelware.’ Another claimed that academics ‘are cluttering the screen with too much information’ instead of giving the students the essential information’ in the ‘right spot when they need it.’ Some in academia feel that student use of EOTs will diminish ‘the impact of the face to face environment.’

3.4. Lack of Motivation

Lack of motivation was another challenge key stakeholders experienced. One expert described some students as ‘lazy’ although not lacking the skills to engage, highlighting that ‘the challenge [for students] is to be independent learners and self-driven.’ Another expert stated regarding his students’ level of online engagement that ‘more than 60% will look at the learning content only once a week or less’, reviewing learning material very quickly before engaging in other activities. Does the flexible nature of online delivery foster laziness? Experts stated ‘[students] use it as an excuse to not arrive [for class].’ Their expectations in gaining ‘the ticket’ suggested a ‘give us what we want’ attitude which demands ‘the path of least resistance.’

3.5. EOT Constraints

Physical technology constraints also created challenges for key stakeholders. Most remarks centred on limitations found in specific EOTs. For example, one expert described the audio interaction using
a video technology setup as 'wooden and one way.' Other experts commented on the 'chunkiness' and 'unreliability' of Blackboard Collaborate, stating that 'each time [students] need to do something, Blackboard seems to be hiccuping.' Describing efforts to use Google Docs, one expert stated that 'it's diabolical on the tablet...a dogs breakfast.' Another expressed concern about the level of control EOT providers had over usage, stating 'you're at the whim of what they've provided for you...so going online has restrictions...’ An element of uncertainty over EOT usage suggested that 'technology will continue to disrupt education in ways that we cannot predict.' Concerns were thus expressed over the transient nature of EOTs that 'come and go' and change interface, causing a loss of control to users.

3.6. Management-Related Issues

Management-related issues also created challenges for key stakeholders. One expert commented on how the change in ‘corporate policy...blocked the ability to be able to’ use EOTs as before, ‘so you can get something working, then corporate step in and change’ the rules governing EOT usage. Another expert indicated that challenges arose when management ‘underestimated the nature and scale of the change...in using those...tools.’ This included ‘the emotional dimension...for staff, the cost, the organisational restructure, the supporting architecture...to make that transition.’

3.7. EOT Support-Related Issues

Technology support-related issues also created challenges for key stakeholders. One expert remarked on the challenge to provide ‘support infrastructure’ for in-class and online learners, and ‘tech support when students needed’ it, which in many cases ‘is not office hours.’ Another expert, while stating that ‘a good help system for staff’ was available, stated disapproval of certain technical support staff who ‘who reduced me to tears over the phone, but...do eventually sort the problem.’ ‘Financial constraints’ impacted on the provision of staff professional development, which in turn placed increased strain on the provision of technical support.

3.8. EOT Overload

Technology overload was also considered to be a challenge for key stakeholders. Experts collectively recognised the problem concerning ‘having too many technologies.’ There are ‘so many tools to choose from, you’ve got to nail it down to a realistic mix,’ but doing so can ‘be more challenging, more confusing’ in light of ‘mobile [and] pure e-learning.’ One expert asserted that institutes are ‘overloading the students’ with EOTs, describing ‘the integration of these systems’ as ‘an academic nightmare for workload allocations and balance.’ Others suggested that stakeholders were ‘under so much pressure’ and that there was ‘too much to learn,’ especially with ‘many tools...doing the same thing.’ Providing an example, one expert commented on the use of blogs such as ‘Blogger, WordPress and Google Sites...all of which have their advantages,’ but create too much choice. Regarding the proliferation of EOTs, another expert similarly remarked ‘today it’ll be Collaborate, tomorrow it’ll be something else, it’s just not realistic.’

3.9. Rapid EOT Growth

The pace at which technology advanced was another challenge key stakeholders experienced. Experts stated that ‘technology is moving too fast’ and stakeholders are ‘struggling to keep up.’ One expert remarked that ‘technology is accelerating away from the market’ because online tools were designed for industry and then picked up by institutions. The challenge, one expert stated ‘is understanding how to use them, [and] feeling comfortable’ with new EOTs. Teachers may lack ‘the skills or confidence or time to react quickly...to the changing demands’ of students EOT use. Commenting on the introduction of a newly acquired EOT, one expert stated that ‘up until last week, we didn’t have the technology to do this, and now we do.’ Pointing to the rate of EOT advancement, he admitted ‘I know that this one has already been superseded by a couple of other ones.’
3.10. Accessibility to Technology

The lack of accessibility to technology was also considered to be a challenge for key stakeholders. One expert noted that accessibility related not only to ‘physical disabilities’ that must be supported, but involved the ‘speed of connections, cognitive abilities’ and the ability to ‘understand technologies.’ Assumptions which overestimated student access to technology occurred. ‘We assume everybody has a laptop,’ ‘that they’re all running at the same speed’, and that the cost of hardware means that some ‘struggle to get access to the Internet.’ Others acknowledged that ‘technology’ in online environments, ‘will always have a gap.’

3.11. Financial Constraints

The costs associated to EOT use was another challenge key stakeholders experienced. While institutes ‘knock off millions’, experts stated that there is pressure on teachers to ‘teach more, deliver more’ although being ‘given fewer resources’ and ‘less money to do it.’ Although teachers might have been ‘lean and mean last year’, they ‘have to be leaner and meaner this year’ to operate in a ‘financially strapped’ environment, and still effectively ‘facilitate the interactions between the physical and digital learning spaces.’ This, in spite of reports that ‘it takes more time and effort... to teach an online course than to teach a corresponding face-to-face course’ (Allen & Seaman, 2015, p. 26). One expert described ‘double-dipping and double-sending’ scenarios, explaining that this occurred when funding has been used ‘for the classrooms and the labs’ but must then increase to accommodate ‘the blended channels.’ Financial pressure however was not limited to institutes. One expert noted that in using EOTs ‘students [also] need to spend more... money... than they used to.’

3.12. Time Constraints

Time constraints also created challenges for key stakeholders. Experts described the delivery of online learning as ‘very time... and resource consuming’, and a ‘huge time limited effort’ in an already hectic schedule which could quickly ‘become unmanageable.’ Teachers, although having ‘creative ideas’ on EOT usage, ‘didn’t always have the time... to implement and design... optimally.’ Delivering learning within an online environment ‘will take significantly longer’ if teachers were ‘new to blended learning’ and were ‘still coming to terms with... new tools.’ One participant remarked on the difficulty teachers had securing time to engage effectively with students. ‘Our time is limited... so we don’t have the time to do our best.’ This was often due to the growing pressure to spend time undertaking research, with the ‘publish or perish’ expectation, resulting in a reduced focus on effective student engagement. ‘There has to be a point in time where enough is enough.’ Time constraints created challenges that also affected students. One expert stated that ‘the overwhelming amount of information students’ receive limits the ‘time to train themselves... in these new technologies.’

3.13. High Workload Commitments

High workload commitments also created challenges for key stakeholders. One expert noted that ‘we’re putting more and more pressure on academics to do research, understand statistical methods, [and] understand research methods’ and the ‘expectation that the academics can pick up’ specialist areas such as ‘audio... video... [and] online interactive technologies’ which are ‘very big job[s]... is just unrealistic.’ Experts collectively agreed that for teachers and support staff ‘the workload is one major issue contributing to EOT challenges. ‘Academics... are really tired’ one expert noted, ‘they work so much’ and ‘don’t have enough time to do the training they need to do.’ In spite of this ‘academics are expected to be very broad in their skills set’, being ‘expected to research, design beautiful courses, be available 24 hours a day.’ Workload commitments created challenges that also affected students who ‘have a full workload, based on... classroom’ activity, ‘and then in addition they have to do online.’
3.14. Lack of Training and Development

A lack of training or professional development also created challenges for key stakeholders. ‘Not everyone is good at’ using EOTs to deliver learning, and ‘unless teachers understand how to use [these] effectively, there will be problems.’ Experts stated that despite ‘financial constraints [for] professional development’, staff ‘training needs to change to incorporate...emerging technologies’, otherwise teachers would not develop ‘the skills or confidence to react...to the...[online learning] demands of students.’ Lack of training also affected students who were assumed to be technologically ‘savvy, and they’re not savvy.’ The learning curve may be steeper for mature-aged stakeholders. ‘It’s not that they are stupid or unintelligent, but...both students and teachers...struggle with technology’ and required assistance. While in a heutagogical sense ‘it is easy to say that adults should take responsibility for their own learning’, experts noted that self-directed learning using EOTs is ‘still a big challenge.’

3.15. Preventing Boredom

Overcoming boredom was also considered to be a challenge for key stakeholders. Experts noted that ‘keeping the content interesting and engaging is really difficult’, and that while students ‘start using [an EOT] eventually ‘everyone gets bored with it.’ One expert quoted one of his students as saying that ‘at any point in time, there is something more interesting that your online sessions.’

3.16. Keeping Abreast of Technology

Keeping abreast of technology was also considered to be a challenge for key stakeholders. Although teaching staff may ‘feel obliged to be...on top of it’ some ‘get absolutely obsessed’ imagining ‘they have to know all the technologies’ which ‘is physically impossible.’ One expert expressed the difficulty in designing an eco-system of technologies and infrastructure that was responsive to that changing landscape, but also robust enough to ensure stability and the quality of the learning experience.

3.17. Other Challenges

Other challenges also impacted key stakeholders. These included the ethical control of content, the industries’ perception of the validity of qualifications gained through online learning, upgrades to LMS which changed the onscreen display, and in turn created ‘extraneous load for the student [and wasted]...an inordinate amount of time’ navigating and re-learning the interface.

4. SUMMARY

EOT challenges experienced by key stakeholders using EOTs in BTEs are varied, and affect both teachers and students in BTEs. Noticeably, the challenges most commonly identified were resistance to change, time constraints, and high workload commitments. 10 out of the 13 experts identified and described resistance to change as a challenge, 7 out of the 13 experts identified and described time constraints and workload commitments as challenges. Interestingly, many of the challenges identified were inter-related and impacted on other challenges. For example, financial constraints (challenge) limited funding available for training, therefore the provision of professional development could be reduced (challenge), which exacerbated problems like EOTs not being used effectively (challenge), and resistance to change (challenge).

5. RECOMMENDATIONS

Expert participants provided recommendations for addressing some EOT challenges. A summary of these recommendations is outlined below:
Teachers facilitate relationships between students and industry members. Have industry experts join in-class sessions, deliver guest lectures and engage students in discussions about current practice. Those from industry “are all over the new technologies, the newest things that are happening, [and] students enjoy that interaction a lot more, than listening to a dry old academic.”

Encourage communities of practice that share knowledge about EOTs, resources, and pedagogy. “Innovation that one department uses can be showcased to others.”

Change expectations about teachers “generating everything.” Have skilled support staff “work alongside academics to help them” develop engaging learning activities, and improve the look and feel of online resources.

Implement course “health-check” strategies, where teachers’ development and delivery of online course components are reviewed for effectiveness.

Managers urge and facilitate effective needs-based training for EOT use. “Ensure that whoever is involved has appropriate tools, training and support.” Allocate time for teachers to undertake training, value “iterative [skill] improvements.”

Rethink tertiary teacher education. Currently, “you get a PhD, and you are qualified to teach.” Implement “formal mechanisms for teaching qualifications at tertiary level”, because training is needed to help teachers “adapt”, understand pedagogy, and deliver effective “blended learning.” “Unless teachers understand how to use it effectively, there will be problems. Teacher training needs to change to incorporate [use of, and training in] emerging technologies.”

Increase use of enthusiastic casual lecturers who engage students effectively, and help ease teachers’ workload.

Rethink policies around support and training for blended learning, and create incentive for engagement online.

Encourage teachers to adopt a “happy to learn” approach, rather than “I have to know everything about EOTs.”

Create ‘how-to-study’ and ‘how-to-use’ technology guides that teachers’ and students’ may print in hardcopy.

Develop strategies to deliver strong technical support for off-campus students.

Implement strategies to develop and deliver simpler, more elegant courses and resources. “We’re cluttering the screen with too much information…we could do a lot better by simplifying” and providing “the essentials.”

Improve timeliness of teachers’ responses to students’ questions. Students feel “personal help is really important.”

Increase teachers’ awareness about benefits of EOT use across disciplines.

Review techniques in employing teaching staff, to ensure individuals’ abilities to engage effective pedagogy.

Adopt clear, flexible, and principle-based EOT policies that can adapt to technological advances. Avoid developing policies that are granular, overly defined, or too prescriptive.

Adopt strategies for reviewing teachers’ workloads and research commitments. Prioritise and adjust duties to alleviate burdens.

Consider how to achieve equivalent learning experiences across all delivery modes.

6. CONCLUSION

Despite the demand for web-enabled learning, considerable challenges impede EOT use, challenging the success of BTs. As technology advances and usage accelerates, it is important for TEIs to understand and address these challenges to meet key stakeholders’ needs. Interviews with 13 blended learning experts from New Zealand, Australia and Canada identified over 17 EOT challenges, including resistance to change, unrealistic expectations, and ineffective EOT usage. Recommendations for addressing some of these EOT challenges included implementing course “health-check” strategies...
where teachers' development and delivery of online course components are reviewed for effectiveness. Other recommendations involved developing strategies to deliver strong technical support for off-campus students, and strategies for designing and delivering simpler, more elegant courses and resources.

As TEIs strive to keep pace with EOT advances, this knowledge will help them keep abreast of current EOT challenges, and understand why and where EOT support for stakeholders is necessary. In addition, this research supplies individual teachers and students with valuable insights, a basis from which to share information and collaborate, and facilitates awareness of the issues fellow colleagues and learners experience using EOTs. These outcomes will assist TEIs to design approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful EOT support, and inform institutional strategies to strengthen the future of BTEs. Future research by the Author involves phenomenological examination of students' and teachers' experiences using EOTs in BTEs.
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ENDNOTES

1. “ Vet on the Net” phrase was coined by Ashtar, to describe the role that many seasoned educators now occupy, having transitioned over time from a traditional didactic ‘Sage on the Stage’ role, to a blended ‘Guide on the Side’ or ‘Vet on the Net’ role. The term ‘Vet on the Net’ describes an experienced academic delivering online learning using a range of EOTs.
8.7 Paper 7

Paper 7 is entitled “Resistance to Change Concerning Use of Educational Online Technologies in Blended Tertiary Environments”. It was presented at the 2015 International Conference on E-Learning and E-Technologies in Education (ICEEE2015), Tangerang, Indonesia, and was published in the conference proceedings.

Contribution to research

Paper 7 was the seventh in a series of seven publications that formed the output of preliminary research. It maps directly to research objectives 1 and 2, and outcomes 1 and 2 (see Figure 2). This paper elaborated on a key EOT challenge faced by key stakeholders in BTEs: resistance to change.

While Paper 7 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. Its contribution to this research helped to build a strong foundation of current knowledge upon which to ground the phenomenological study, develop its context and potential for application, and triangulate the results.
Resistance to Change Concerning Use of Educational Online Technologies in Blended Tertiary Environments

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ABSTRACT
The rapid emergence, adoption and demand for educational online technologies (EOTs) has engendered significant advances across the higher education sector. Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), providing a modern means through which tertiary education institutes (TEIs) can augment delivery to meet stakeholder needs. Despite the significant growth and demand for web-enabled learning, considerable obstacles face key stakeholders concerning the adoption and use of EOTs. These obstacles challenge the continued success and sustainability of blended implementations in higher education. Resistance to change was identified as one of these challenges during interviews with 13 blended learning experts from New Zealand, Australia and Canada. This paper discusses this issue as it relates to EOT usage, how it is demonstrated, and the extent to which it impacts on key stakeholders. As technology advances and usage accelerates, it is important for TEIs to understand and address this issue, and provide support for the effective use of EOTs. As TEIs keep pace with digital advancements, the outcomes of this study will enable them to design relevant approaches to tackle the issue of resistance to change as it relates to EOT usage, and deliver meaningful support to key stakeholders in BTEs.

KEYWORDS
Higher education, online technology, blended, tertiary, change

1 INTRODUCTION
Educational online technologies (EOTs) have revolutionised the delivery of online education, making a significant contribution towards the global increase in demand for higher learning. Across the globe “academic leaders at all types of institutions” are reporting “increased demand for online courses” [1], in fact, the proportion of institutions stating that online learning is critical to their strategy is at an all-time high [2]. The rapid emergence, adoption and demand for these online tools has resulted in significant advances across the higher education sector. Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), providing a modern means through which tertiary education institutes (TEIs) can augment delivery to meet stakeholders’ needs. These digital transformations signal exciting prospects, especially for ‘digitally native’ students and ‘vet on the net’ teachers.

Predictions about future online learning suggest that as "the pace of change" rapidly accelerates, "hybrid classes will proliferate" [3]. This is now happening, as "millions of students [take] online courses..." [giving] evidence that this

1 ‘Vet on the Net’ phrase was coined by Kimberley Tuapawa, to describe the role that many seasoned educators now occupy, having transitioned over time from a traditional didactic ‘face on the stage’ role, to a blended ‘foot on the side’ or ‘Vet on the Net’ role. The term ‘Vet on the Net’ describes an experienced academic delivering online learning using a range of EOTs.
modality is meeting a clear demand” [2] for the use of EOTs in BTEs. Similar forecasts indicate that the digital delivery of course work via cheaper technologies will revolutionise higher education [3], a prospect that aligns with results from a recent survey of students, which stated that “since 2010, there has been an increase in the use of most technologies for learning” [4].

However, while “the number of programs and courses online continue to grow” [5] and while “experimentation and innovation are proliferating” [3], the evidence indicates that the perception of acceptance of online learning by faculty has decreased. “Only 30.2 percent of chief academic officers believe their faculty accept the value and legitimacy of online education” [5].

Despite the significant growth and demand for web-enabled learning, there are considerable obstacles concerning the use of EOTs, which during an era of immense growth, pose a clear risk to the future success and sustainability of BTEs [5], and create difficulties for key stakeholders as they strive to deliver effective learning opportunities. These challenges include but are not limited to attitudinal pre-dispositions and institutional barriers [7], insubstantial training and development, inadequacies in instructional design support, and technical support concerning reliability and connectivity [7], time investment and learning curve complexities [8], and high online course workloads [9].

Significant efforts have been made to better understand the EOT-related challenges in BTEs. This has resulted in considerable subject-specific research, with varied and noteworthy contributions to the literature on EOTs in BTEs. Some of these studies have focused on technology integration into blended environments [10], technology to support institutional roles [11], barriers to adoption of online learning [12], and the needs of online students [13].

However, while “our research foundation is rich” [14], and a plethora of information surrounding EOT challenges pervades the atmosphere of current knowledge, not all problems have been adequately identified and addressed. The nature and extent of EOT related challenges change over time, as technology advances and stakeholder needs evolve. Gaps exist, and unfortunately “significant challenges are preventing widespread effective implementation” [15], which collectively concerns key stakeholders in BTEs. Some feel that “it is the university leadership...it is the leaders at a university who must...see that...it happens...if widespread change is to occur” [8].

Thus, the literature abounds with efforts to identify the current challenges faced by stakeholders, some of which occur due to the “lack of adequate, ongoing professional development” [15] creating difficulty for educationalists who “struggle to keep up with the ever-increasing...tools available” [16]. Challenges also occur because students experience “difficulty with more sophisticated technologies” [17], and because faculties face obstacles “in acquiring and new technology skills” [17]. There are also technical problems including Internet accessibility [18], fear of online communication [19], bandwidth constraints, high implementation costs, lack of technical and management support, and negative preconceptions towards the technology [20], all of which limit the adoption and effective use of EOTs. As the literature portrays, challenges are not only technical, but also organisational, conceptual, and administrative [12].

As technology advances and usage accelerates, it is important for TEIs to understand and address current EOT challenges faced by key stakeholders in BTEs, and provide support for
the effective use of EOTs. This paper identifies resistance to change as a challenge as it relates to EOT usage, discusses how it is demonstrated, and the extent to which it impacts on key stakeholders. Interviews with 13 blended learning experts provided compelling examples of how resistance to change is expressed by key stakeholders, revealing the existence of specific ‘root cause’ beliefs concerning the use of EOTs to deliver learning.

These interviews form part of a phenomenological study, which examines the lived experiences of key stakeholders engaged with EOTs in BLs, being undertaken by Kimberley Tsapawa in partial fulfillment of the requirements of her PhD at Newcastle University, Australia.

2 METHODOLOGY

This section explains the methods used to obtain data for this study. Thirteen blended learning experts from tertiary education institutes (TEIs) from New Zealand, Australia, and Canada were selected for semi-structured interviews using an expert sampling approach, similar to that used by Chapleau and Simms [21] who obtained data from interviews with ‘opinion-formers’, and Wagner et al. [22] who used experts to provide feedback. Obtaining data from experts across several institutions, contexts and countries was considered an appropriate way of “testing the evidence for consistency across sources” [23] and enforcing a level of plausibility to supplement the author’s literature review. It was considered that multiple realities, as experienced by a wider-ranging set of experts would strengthen the findings by yielding results which likely “fall within acceptable and known parameters” [23].

This may theoretically be achieved through experienced experts who are able to provide rich, mature and contextualised explanations compared to those of non-experts. Furthermore, literature indicates that an activity which increases the credibility of findings involves feedback from those with prolonged engagement in the field, with credibility included as a strategy used to test the rigor of qualitative research [24]. The expectation was that “this particular group of people thought to share a common experience… [would] offer meaningful insights into the phenomenon” and “talk candidly about their experiences” [24]. Expert sampling was thus considered as an effective way to elicit the views of persons with specific expertise, demonstrable experience and insight into a specific field or topic to support the validity of the inquiry [25]. It supposed that a greater level of contextual richness would be captured, satisfying the need for this research to be influenced by a distinct level of trustworthiness.

For inclusion in the interview, the participants had to fit the criteria of a ‘blended learning expert’. An expert is defined as ‘one whose special knowledge or skill causes him to be regarded as an authority’ [26]. It is not uncommon for experts to be selected on relatively simple criteria, which can be defined through certain qualifications or experience [27]. Thus, the following criteria established a basis for the selection of experts: 1) the individual must have occupied an academic role for not less than 10 years in a tertiary blended learning context, 2) hold a post-graduate qualification, and 3) have conducted and published research in the area of blended learning.

Candidates without blended learning experience and publications, or without post-graduate qualifications were excluded from this study. The rationale for interviewing 13 participants was based on literature relating to qualitative research. Saldana [28] explained that there are varying opinions concerning the appropriate number of participants. Studying a single individual case in depth makes for a rich
profile, yet obviously the individual is not always representative of the population at large. It was believed therefore that a small group of participants would provide a broader spectrum of data for analysis, with a minimum of 10-20 participants needed to ensure credible and trustworthy findings [28]. The reasons for this range ensured that sufficient data would be obtained, whether from one person or 20 [28]. Accordingly, the use of 13 expert participants fitted within the required range. Obtaining data from several participants, rather than from one or two individuals, was likely to provide a more rounded and holistic set of results that were applicable in more than one setting. This ensured that “no untoward consequences or none that can be easily anticipated” [23] concerning EOTs in BTEs would be received. The use of open-ended questions generated deep, meaningful answers. A large quantity of data was expected and received.

The data were obtained via a semi-structured interviews conducted via online video-conferencing technology (Skype). Participants set aside at least 45 minutes of un-interrupted time to be interviewed. The aim of the interviews was to explore, clarify, and verify issues from the relevant literature. The interview contained 13 questions in total. Question five asked participants to explain “what kind of challenges key stakeholders might experience concerning the use of EOTs in BTEs”. The remaining 12 questions related to EOT, BTE, and key stakeholder matters not discussed in this paper. Reporting on them here is outside the scope of this paper.

The analysis of interview data involved sorting and coding. Audio recordings were made and then transcribed into a pre-structured question-and-answer template, which later enabled like data to be coded in a standardised manner. NVivo software was used to code and analyse the interview data [29] using nodes. Table 1 outlines how a node was used to code the data relating to this interview question.

<table>
<thead>
<tr>
<th>Node</th>
<th>Node description</th>
<th>Related question</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>EOT challenges</td>
<td>What kind of challenges might key stakeholders experience concerning the use of EOTs in BTEs? Please explain why.</td>
</tr>
</tbody>
</table>

This node was used as a container for relevant responses. Data from this node was separated into 17 categories or memos, each of which contained data about a specific EOT challenge. One of these challenges was ‘resistance to change’. A memo was used as the foundation from which the discussion about this challenge was built and refined. The discussion contains a description of this EOT challenge, and incorporates comments made by participants. Figure 1 outlines this process.

3 RESULTS AND DISCUSSION

This section outlines some of the results obtained from the interviews, and discusses the findings. Blended learning experts were asked to identify challenges that stakeholders might encounter concerning the use of EOTs in BTEs, and explain why these situations presented a challenge. The participants identified a range of challenges. Noticeably, the challenges most commonly identified were resistance to change, time constraints, and high workload commitments. 10 out of the 13 experts identified and described resistance to change as a challenge. This challenge is described next, with the responses from blended learning experts incorporated into the description. Reporting on the other challenges here is outside the scope of this paper.
3.1 Resistance To Change

Comments during interviews with blended learning experts indicate that resistance to change is a significant challenge that key stakeholders experience. Comments from experts indicate that resistance to change can occur in those with whom there is ‘no actual desire to change in the first place’, and occurs also in those reluctant to expend additional effort to engage new methods. Resistance to change appears to be symptomatic of more explicit ‘root cause’ beliefs concerning the use of EOTs to deliver learning.

One ‘root cause’ involves the traditional and well-entrenched perspective concerning the superiority of face-to-face delivery. Concerns about online delivery and preferences are grounded firmly in long-standing experiences with didactic ‘sage-on-the-stage’ techniques. For those having occupied a decades-long ‘sage’ role, the cultural capital implicit in ‘chalk and talk’ techniques are considered more appropriate, and in certain practical-based disciplines are expected, while online methods are relegated to ‘supplementary’ status or touted as impractical. “Skeptics and critics abound. Not everyone is enthusiastic about the growth of technology-mediated teaching” [12]. Statements like ‘you can’t teach this online’ express collective doubt from seasoned academics towards online delivery. One expert identified this as ‘the biggest issue’, having regularly experienced teacher-led comments like ‘you’ve got to look at the white’s of their eyes while they’re [learning].’

Another ‘root cause’ reason for resistance to change involves negative opinions concerning the adoption of EOTs. Attitudinal issues appear more frequent among older academics who argue the merits of traditional methods with ‘we’ve always done it this way’. “Online instruction is alien to most faculty and calls into question the very reason that many pursued an academic career in the first place” [12]. Their familiarity and reliance on ‘old school’ methods ‘where everything was on paper’ has made the switch to...online’ challenging. For forward-moving innovators, ‘champions and pioneers’, the generational gap is considered as a great
chosen, being made wider through the reluctance of older academics or students to bridge their learning and ‘traverse’ into newer online territories. Challenges intensify when recommendations for change emerge from a grass-roots level, rather than from ‘management decree’.

Negative opinions towards EOT usage impacts significantly ‘on the uptake’. Resistance to change and adoption of EOT usage is also a result of a fear amongst faculty “that online instruction will be used to diminish... ranks” [12] or employment levels. Teaching staff with ‘a barrow to push’ were described by one expert as “alienating” others against EOT usage, holding ‘away over students’, thereby causing ‘a serious problem’ which could ‘change the whole dynamic of the system and bring it down to its knees’. Attitudinal issues were not limited to teaching staff. Experts remarked on the challenges faced by many ‘mature-aged’ students, who are described as ‘traditional’, and who don’t have time to engage online, experience when “not so fluent in technology”.

Explaining the basis for reluctance to use, Bacew et al. [12] indicates that faculty are “extremely reluctant to teach courses that they do not ‘own’” [12], and may be unwilling to embrace a course that does not allow for a high degree of customisation in how, what, and when relevant material is presented to their students [12]. However, preparing and customising a course online requires a much higher initial investment of time by a faculty member than teaching the same course in a traditional format [12]. Blended learning experts describe the delivery of online learning as ‘very time... and resource consuming’, and ‘a huge time limited effort’ in an already hectic schedule which can quickly become unmanageable’. Teachers, although having ‘creative ideas’ on EOT usage, “don’t always have the time... to implement and design... optimally’. Delivering learning within an online environment will take significantly longer’ if teachers are ‘new to blended learning’ and are ‘still coming to terms with... new tools’. Experts collectively agreed that for teachers and support staff ‘the workload is one major issue’ contributing to challenges concerning EOT usage. ‘Academics... are really tired’ one expert noted, ‘they work so much’ and ‘don’t have enough time to do the training they need to do’. In spite of this ‘academics are expected to be very broad in their skills set’, being ‘expected to research, design beautiful courses, be available 24 hours a day’.

Another ‘root cause’ reason for resistance to change identified by the experts is simply a ‘fear of the new and the different’, coupled with the intimidating prospect of having to rethink and realign delivery through new channels.

4 CONCLUSION

EOTs have revolutionised the delivery of online education, providing a modern means through which TEs can augment delivery to meet stakeholder needs. Despite the significant growth and demand for web-enabled learning, there are considerable obstacles being faced by key stakeholders concerning the adoption and use of EOTs. These obstacles challenge the continued success and sustainability of blended implementations in higher education. Resistance to change identified as one of these challenges, during interviews with 13 blended learning experts from New Zealand, Australia and Canada.

This paper discussed the issue of resistance to change, as it relates to EOT usage, how it is demonstrated, and the extent to which it impacts on key stakeholders. Resistance to change is a significant challenge that key stakeholders experience, and it occurs for a variety of reasons. Resistance to change appears to be symptomatic of more explicit ‘root cause’ beliefs concerning the use of EOTs to deliver learning. These beliefs include the
perception of the superiority of face-to-face delivery, attitudinal issues and negative opinions towards technology or change, familiarity and reliance on traditional methods, a fear that online delivery will be used to reduce employment levels, a dislike for online courses that are not ‘owned’ or that are perceived as not ‘customisable’, and the lack of time to learn and deliver online learning, and a fear of the new and the different.

As technology advances and usage accelerates, it is important for TEs to acknowledge, understand and address this issue of resistance to change, and provide support for the effective use of EOTs. As TEs keep pace with digital advancements, this paper can inform their efforts to design relevant approaches to tackle this issue, and deliver meaningful support to key stakeholders in BTEs.

This paper provides valuable insights to encourage collaboration, information sharing and a level of awareness to a range of key stakeholders across the tertiary sector concerning the issue of resistance to change. Future research by the author will address potential solutions to these challenges. This will be supported through phenomenological evidence that explores the experiences of key stakeholders using EOTs in BTEs.

REFERENCES


8.8 Paper 8

Paper 8 is entitled “Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Teachers in Blended Tertiary Environments: A Phenomenological Study”. It was accepted for publication in the Australian Journal of Educational Technology (AJET).

Contribution to research

Paper 8 was the first in a series of six publications that formed the output of phenomenological research. It maps directly to research objectives 3 and 4, and outcomes 3 and 4 (see Figure 2). Through qualitative analysis involving the abstraction of themes, this paper made an interpretation of students’ EOT experiences with teachers, in reference to their use of four types of EOTs. Its interpretations, which included descriptions of students’ EOT challenges, helped to inform a set of recommendations for effective EOT use that would assist TEIs in their efforts to address EOT challenges, meet stakeholders’ needs, and deliver relevant and meaningful EOT support.

While Paper 8 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. This research endeavour made a significant contribution to its overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a compelling first-hand insight into the phenomena of key stakeholders’ EOT experiences.
Interpreting experiences of students using educational online technologies to interact with teachers in blended tertiary environments: A phenomenological study

Kimberley Tuapawa
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Although educational online technologies (EOTs) have transformed the delivery of learning in higher education, significant EOT challenges have impeded their effectiveness, preventing widespread implementation. The persistence of these challenges suggests that tertiary education institutes (TEIs) have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. This research made a phenomenological interpretation of key stakeholders’ EOT experiences, to establish their current EOT needs and challenges and provide a basis from which to recommend methods for effective EOT support. It analyzed the EOT experiences of 10 students and 10 teachers from New Zealand and Australia and interpreted the meanings of the phenomena through an abstraction and articulation of local and global themes. This paper is the first in a series of six publications that presents the local themes. It documents the interpretations of students’ experiences with teachers, in reference to their use of four types of EOTs: online conference tools, learning management systems, blog sites and lecture capture tools. These interpretations, which include descriptions of stakeholders’ EOT challenges, helped to inform a set of recommendations for effective EOT use, to assist TEIs in their efforts to address EOT challenges and meet stakeholders’ needs.

Introduction

Educational online technologies (EOTs) have dynamically transformed the delivery of higher education, creating extraordinary opportunities for enhanced learning and teaching. In an era of unparalleled growth, their improved functionalities and affordances have revolutionised methods of knowledge access and engagement, engendering significant advances across the higher education sector. Traditional learning spaces have evolved into vibrant blended tertiary environments (BTEs), and channels of content dissemination have switched from didactically styled “traditional, face-to-face courses to … online courses” (Picciano, 2015, p. 149).

These digital transformations foreshadow thrilling prospects for teachers and students, the key stakeholders in BTEs. Predictions about online learning suggest that virtual universities and off-campus sites are the trends in the future of higher education (Peppers, 2016), and as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (Anderson, Boyle, & Rainie, 2012, p. 17). This is now happening, as “millions of students [take] online courses … [giving] evidence that this modality is meeting a clear demand” (Allen & Seaman, 2015, p. 21). Similar forecasts indicate that the digital delivery of coursework via online technologies will revolutionise higher education (Anderson et al., 2012). Results already show that “since 2010, there has been an increase in the use of most technologies for learning” (O’Cooper, McKenzie, Pizzica, Malfoy, & Ashcroft-Rowe, 2014, p. 256).

Despite the remarkable growth and demand for online learning, significant obstacles impede the use of EOTs. Some of these challenges include attitudinal inclinations and institutional barriers, inadequacies in instructional design support (Panda & Mishra, 2007) and a “lack of training” or ineffective or insubstantial training (Merlert, 2016, p. 1). Others include resistance to change, inefficient EOT usage, lack of motivation and technical limitations (Tuapawa, 2016). These challenges pose a clear risk to the future success of BTEs (Mostal, Dzuban, & Hartman, 2013) and create complications which limit stakeholders’ abilities to perform their roles effectively.

Significant efforts have been made to better understand EOT challenges. These have resulted in considerable research, with diverse contributions to the literature. Some studies have focused on the integration of technologies into learning environments (Moore, 2015), the affordances and effectiveness of learning technologies in higher education (Arenas, 2015; El-Khalili & El-Ghalayini, 2015), obstacles...
The persistence of these problems suggests that TEIs have experienced a gap in understanding the reality of key stakeholders’ EOT needs. Over time, these needs have shifted and evolved, and in an environment of rapid technological change have not been understood and addressed effectively. The dynamic nature of the environment in which TEIs operate means that their relevance is dependent on their ability to evolve and adapt to meet their stakeholders’ needs. However, doing this effectively requires that TEIs have current, in-depth understandings of their stakeholders’ EOT challenges, at a level that enables the delivery of informed, relevant and meaningful support.

Through a phenomenological approach, this research aimed to interpret key stakeholders’ EOT experiences, establish their current EOT needs and challenges and provide a basis from which to recommend methods for effective EOT support. Using a 5-step qualitative analysis of data, it examined the EOT experiences of ten students and ten teachers, categorised there to reflect the nature of their interactions with other key entities and then interpreted the meanings of the phenomena through an abstraction and articulation of local and global themes. The global themes delivered a broad set of interpretations about the meaning of stakeholders’ EOT experiences with other students, other teachers and content, and the local themes developed meanings that were specific to stakeholders’ use of individual EOTs.

This paper is the first in a series of six publications that present the local themes of this research, through written interpretations that articulate the meaning of the phenomena. It documents students’ EOT experiences with teachers, in reference to their use of four different EOTs: online conference tools (Adobe Connect), learning management systems (LMS) (Blackboard, Moodle), blogs and websites (Wordpress), and lecture capture/webcast tools (Echo). Included in the interpretations are descriptions of stakeholders’ EOT challenges, which deliver a realistic portrayal of the phenomena to strengthen understandings of stakeholders’ needs. The interpretations helped to inform a set of recommendations for the effective use of EOTs in student-to-teacher interactions. These were designed to assist TEIs in their efforts to adapt to meet stakeholders’ EOT needs by providing a basis from which to tackle EOT challenges and deliver relevant and meaningful EOT support.

To lay a foundation for this study, the author undertook preliminary research, which clarified and verified issues from literature, and created a basis for the selection of interview participants. This identified EOTs in BTEs (Tuapawa, 2017), produced a classification system for EOTs (Tuapawa, Sher, & Gu, 2014, 2016), identified key stakeholders in BTEs (Tuapawa, in review), identified the EOT challenges of key stakeholders (Tuapawa, 2016a) and discussed a key challenge (resistance to change) in using EOTs (Tuapawa, 2015).

Methodology

The collection and analysis of this data was guided by the methodology of interpretive phenomenology, which aimed to make an interpretation (rather than only a description) of the meanings of participants’ experiences (Padilla-Diaz, 2015; Sloan & Bowe, 2014; Yuksel & Yildirim, 2015). Aligned to the tenets of Heideggerian philosophy (Reiners, 2012), this study of experience (Frieden, Henrikson, & Saevi, 2012) abstracted and articulated emergent themes from key stakeholders’ experiences into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use. This methodological choice was influenced by i) the research aim, which sought to understand and interpret key stakeholders’ EOT experiences in BTEs; ii) the central research questions (Marelli, 2016), which were: What were the EOT experiences of key stakeholders in BTEs? and What interpretations could be drawn from their meanings? and iii) the researcher’s “interest in the meaning of a phenomenon as it [was] lived by other subjects” (Englander, 2012, p. 14).

A group of ten students and ten teachers from institutes in New Zealand and Australia were selected as participants using a purposive sampling strategy (Yuksel & Yildirim, 2015). This method ensured that data would be obtained from individuals with first-hand experiences of the phenomena (Waters, 2016), in support of the aim of phenomenology, to understand a particular phenomenon “from the point of view of
the lived experience” (Englander, 2012, p. 16). The rationale for this number was based on literature about phenomenological research. Englander (2012), for example, indicated that a large sample size, especially when it concerned qualitative research, was not a prerequisite for generalisable results. Nicholls (2009b) explained that “phenomenological studies . . . commonly use[d] as few as five . . . participants” (p. 639). Rawat (2014) similarly stated that normally “four or five respondents” were selected for in-depth interviews. It was on this basis that 20 participants were chosen (Englander, 2012; Nicholls, 2009b; Padilla-Díaz, 2015).

Further criteria were set to refine the selection of participants. To be interviewed, they had to be teachers on full-time tenure with an accredited tertiary institute, delivering an academic course in a blended learning mode. If they were students, they had to be aged 18 years or older, enrolled full time with an accredited tertiary institute and in an academic course delivered in a blended learning mode. Teachers were identified from university website profiles of academic staff teaching in New Zealand or Australia. Students were identified with the assistance of a staff member at each institute. Invitations sent to participants indicated that participation was voluntary. Attempted were made to recruit both male and female participants.

The rationale for the selection of only teachers and students was based on a study by the author (Tuapa, in review), which identified key stakeholders in BTEs and described their contributions. Through a review of literature about key stakeholder identification (Chapleo & Simma, 2010, Coleman et al., 2013, Gross & Godwin, 2005, Lehty, Westerheijden, Epping, Faber, & De Weerdt, 2013, Mannar, Alves, & Kaporos, 2013, Power & Morven-Gould, 2011, Sanderson, 1997, Singh & Welgans, 2012, Tang & Husin, 2011, Wagner, Hassanein, & Head, 2008) and qualitative interviews with 13 blended learning experts from New Zealand, Australia and Canada, teachers and students were shown to be among those identified most prominently and frequently as key stakeholders in BTEs. Students were identified as key stakeholders by 12 of 13 experts because of the need for them to “buy into” blended learning, “participate fully, and be convinced” of its value (p. 5). Their ability to support discussion, deliver feedback, and enhance “connectedness or community” (Galaj & Chakrabarti, 2010, p. 17) contributed significantly to the success and value of learning experiences (Tuapa, 2016b). Teachers also were identified as key stakeholders by 11 of the 13 experts, and considered by nine of them to be among those contributing most significantly to BTE success, due to their immediate and direct involvement in the teaching and learning process and their day-to-day focus on and influence over blended learning experiences.

Phenomenological interviews, known for being “exceedingly common in qualitative research studies” (Nicholls, 2009b, p. 640) were considered appropriate for gathering idiographic data. These interviews followed a semi-structured format and were conducted via online video-conferencing technology (Skype) and audio recorded using Panamax software. Participants set aside at least 45 minutes of uninterrupted time to engage (Simon & Gove, 2012) and were asked a series of 27 questions. They responded with first-hand narratives (Dowling & Brown, 2012; Moustakas, 1994; Waters, 2016) of their EOT experiences, which included descriptions about their use of different types of EOTs to interact with different sets of key entities (students, teachers and content). Specifically, participants were asked for a “description of a situation in which [they had] experienced the phenomenon” (Englander, 2012, p. 25) of using an EOT in a BTE. The situational aspects of their descriptions were vital to the research, since understandings of a phenomenon [i.e. using an EOT] had to be “connected to a specific context in which the phenomenon [was] experienced” (i.e., a BTE) (Englander, 2012, p. 25).

To encourage a frank portrayal of the phenomena, the interview questions were carefully constructed to elicit descriptions of experiences that included EOT challenges. Probes were used to clarify the meanings of responses and encourage participants’ in-depth explanations (Lester, 1999; Penner & McClement, 2006; Waters, 2016) and rich descriptions of their “conscious experience” (Martin, 2010, p. 1). As a result, participants detailed “the phenomenon in their consciousness” (Whimsical, 2013, p. 1), rendering valuable idiomatic narratives that supported understandings of the phenomena.

The questions were also framed to stimulate participants’ recollections of their EOT experiences or encounters with different key entities. These types of encounters were based on the classification by interaction taxonomy augmented by Culatta (2011) and the original classification proposed by Moore (1989). This taxonomy categorised technologies by the relationship between learners and other parties.
The first three interaction types of the original taxonomy were learner to expert, learner to learner, and learner to content. Culatta (2011) presented a fourth category: learner to content. Tuapawa, Sher, and Gu (2014, 2016), proposed a fifth category: learner to media. These categories were adopted to facilitate and structure interviews with teachers, as follows: (1) teacher to student; (2) teacher to teacher; (3) teacher to content; (4) teacher to content, and (5) teacher to media. The use of the relationship-based classification for structuring the questions helped refine participants’ experiences into relevant and recognizable EOT interactions. It revealed distinctions between phenomena occurring in different key relationships, and set in place a structure through which to organise the themes, or essential meanings, about the phenomena (Waters, 2016). Table 1 outlines the questions asked of students about their EOT experiences with teachers.

<table>
<thead>
<tr>
<th>Interaction type</th>
<th>Questions</th>
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<tbody>
<tr>
<td>Learner to teacher</td>
<td>Question 1: (a) Describe an experience in which you used an EOT in a learner-to-teacher interaction while studying in a BTE? (b) Did you face issues or challenges using the EOT in this case? Explain. (c) What do you think would be a solution to this issue? (d) What do you think would have helped you make more meaningful use of this EOT? (e) Did you experience benefits in using this EOT? Explain.</td>
</tr>
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</table>

To encourage conversation and promote a connected, comfortable atmosphere, the researcher adopted a personable, inquisitive and mindful disposition (Yin, 2015). Thoughtful engagement with participants, a sensitivity towards their challenging issues and conversational qualities in “talking to people” (Nicholls, 2009a, p. 533), helped to solicit their perspectives (Saldana, 2011, p. 75). It also ensured that “sufficient interview data” (Saldana, 2011, p. 34) was obtained, until the point of saturation was met and repetition occurred.

Recordings of the interviews were transcribed using pre-formatted question-and-answer templates. This process, although time-consuming, enabled and compelled the researcher to develop an intimate level of familiarity with the content (Damasio, 2016) and prepare it for examination. Yin’s (2015) five phases of qualitative data analysis; compiling, disassembling, reassembling, interpreting, and concluding, were used to frame and structure the analysis. Table 2 demonstrates the link between these five phases, and the phenomenological techniques used.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage description</th>
<th>Phenomenological research technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compiling</td>
<td>Data transcriptions imported and arranged</td>
</tr>
<tr>
<td>2</td>
<td>Disassembling</td>
<td>Data descriptions coded using nodes</td>
</tr>
<tr>
<td>3</td>
<td>Reassembling</td>
<td>Memos used to develop understandings of phenomena</td>
</tr>
<tr>
<td>4</td>
<td>Interpreting (thematic analysis and interpretation of data)</td>
<td>Local and global themes abstracted, meanings of experiences articulated through written interpretations</td>
</tr>
<tr>
<td>5</td>
<td>Concluding (conclusions and recommendations)</td>
<td>Interpretations used to inform recommendations for effective EOT use that supports stakeholders’ needs</td>
</tr>
</tbody>
</table>

NVivo software (QSR International, 2015) was used to import, compile, and organise the transcripts into a logical structure (Yin, 2015). Data from these documents were disassembled into smaller pieces and coded. Using the Nodes coding function, the data was separated into categories that corresponded to the interview questions. These nodal categories, which were labelled using truncated versions of the questions, represented the data clearly and enabled it to be logically assigned, labelled, referenced and contained in manageable groupings (Williams, 2003). Table 3 demonstrates the link between the node labels used for coding the data, and the interview questions.

Table 3
Nodes linked to student interview questions

<table>
<thead>
<tr>
<th>Node</th>
<th>Node description</th>
<th>Related question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Learner-to-teacher Q1a</td>
<td>Describe an experience in which you used an EOT in a learner-to-teacher interaction while studying in a BTE.</td>
</tr>
<tr>
<td>2</td>
<td>Learner-to-teacher Q1b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>3</td>
<td>Learner-to-teacher Q1c</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>4</td>
<td>Learner-to-teacher Q1d</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>5</td>
<td>Learner-to-teacher Q1e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

The data were then reassembled, which required that they be transferred from the nodal position into analytic memos (Yin, 2015), where they could be used to elaborate ideas and insights (QRS International, 2015) and help develop understandings about the phenomena (Saldaña, 2011). Finally, the data were subjected to an interpretation, through thematic analysis, which involved an abstraction and synthesis of local and global themes (Padilla-Diaz, 2015) using a reflective perspective (Sloan & Bower, 2014). In this process, themes, the essential meanings or aspects associated with the phenomena, were discovered through thoughtful engagement with the descriptions of the stakeholders’ experiences (Waters, 2016), into a series of written interpretations, to bring to light the phenomena (Sloan & Bower, 2014) of EOT use. The global themes, which were broad in significance, generated high-level interpretations of the phenomena. The local themes, developed through a deep but narrow scope, derived meanings from the use of individual EOTs.

The highlighted example in Figure 1 conceptualises how the data were gathered, transcribed, sorted and coded and stored using nodes, refined into a student-to-teacher based memo and interpreted through an analysis of local themes. These provided the basis for the discussion of results in this paper.

![Diagram of data analysis process](image_url)

**Figure 1.** Process of data analysis

### Results and discussion

This section articulates the local themes that were abstracted from students’ EOT experiences with teachers. These are delivered as a series of written interpretations of students’ lived experiences (Sloan & Bower, 2014; Waters, 2016) and organised into five sections according to the EOT types students had identified: online conference tool (Adobe Connect), learning management system (LMS) (Blackboard), LMS (Moodle) blog site (Wordpress) and lecture capture/webcast tool (Echo360). Each of these sections includes a description of the EOT brand exemplar, a series of local themes related to its use and an interpretation of students’ experiences, which include their comments on EOT issues and challenges, potential usage, solutions and benefits. The labels used to describe the EOT types are based on the pedagogy (Tuapawa et al., 2014, 2016), a robust, contextualised and multi-dimensional framework for categorising EOTs.
EOT: Online conference tool
Example: Adobe Connect

Description
Adobe Connect is a conferencing platform that offers real-time collaborative online meeting experiences, from small-group collaboration to large-scale webinars (Adobe Systems Software Ireland Ltd, 2015). It is being used in institutes "as an online virtual classroom, but also in quite flexible ways to enable conversations often out of time" (Tuapawa, 2017, p. 4, Tuapawa et al., 2014, 2016).

Themes
Easy to use, accessible across devices, affords flexible learning, technical and hardware issues, bandwidth problem, teachers' ineffective use

Experiences
Students' descriptions of their experiences using Adobe Connect to interact with their teachers revealed this tool to be simple to use, easily accessible, in some ways flexible, in other ways limiting and fraught with technical problems. Distance learners with online access to its real-time class sessions generally viewed their interactions with teachers as useful and beneficial. The tool's flexible nature enabled them to engage with "inside class, but at home, whereas learning could occur without distraction. Describing the value added to his learning through Adobe Connect, one student acknowledged that he "[got] more, doing it from home" than in class. The students who missed live sessions appreciated being able to view a recording of the lecture. Others, however, experienced problems using Adobe Connect to interact with their teachers. While real-time sessions were described as "useful for distance learners" and "beneficial", one student was averse to engaging with others in class, citing reluctance to interrupt lectures with a question, because "you [didn't] want to put someone who [was] speaking off, you'[d be stopping the whole class from learning." Others expressed their annoyance with various technical issues, which included "problems with positioning of microphone, sound quality, bandwidth". Some experienced negative impacts on their learning due to "rustiness on the lecturer's part ... not clicking on the right things at the right time." Problems arose as the teacher "tried to manage Adobe Connect while teaching ... [often] stopping the class to type [or] shrink windows, [which] ... interrupted class time, [costing] a good 10-15 seconds in limbo".

EOT: LMS
Example: Blackboard

Description
Blackboard is a complete e-learning software platform that delivers a comprehensive course management support (Blackboard Inc., 2015). It can serve as a repository for learning resources or be used as "an e-learning portal around a particular programme of work, course or sets of activities" (Tuapawa, 2017, p. 4).

Themes
Enables engagement for distance learners, more practical than face-to-face, frustration at lack of access to learning resources, broken links, restricted access levels, design inconsistencies, non-standard page customisations, navigation issues, expectations not communicated clearly

Experiences (messaging and discussion forums)
Students' experiences using Blackboard to interact with their teachers via messaging and discussion forums were described as "really difficult", "really hard", "frustrating" and "notorious". Students were frustrated with teachers who did not use Blackboard to respond in a timely manner, or at all, to questions they had raised. One asserted that his lecturer failed to "respond to anyone. It's frustrating." The lack of communication from their teachers left students feeling confused, neglected, and abandoned. "You post a question, but don't know when you're going to get a response." As to the severity of this problem, another student bemoaned having a "lecturer who [hadn't] responded in 3 weeks", the result of which was "driving me insane". Another described her lecturer's lack of responsiveness as "notorious". Considering [that] this was the only way of interacting with the lecturer, you feel let down that they were not answering your questions. "The situation worsened after students had waited, only to receive a late response that "[da]'t give you what you need(ed)." Clarifying with a follow-up question seemed
pointless, because "asking again [was] harder." "Although you'd clearly stated what you wanted... it [got] lost in translation."

Another issue causing frustration for students involved the occurrence of broken links, or links for which access was denied. For one student, "video links didn't work, or the link was locked." While trying to access online resources, he noted that "a lot of the links were bad," making it difficult to "move around without pressing back, back." Although the teachers "put up good stuff you, you [couldn't] get into it."

Students then had to "spend hours and hours trying to find answers to questions," which was "very frustrating." They also expressed frustration over design inconsistencies that occurred across course pages, which resulted from non-standard customisations applied to page layouts by teachers. Non-generic page designs created navigational issues, confusion, and a situation whereby students wasted time searching for familiar elements. Explaining the issue, one student asserted that "every page... set up in Blackboard was slightly different to the others," and so effort was expended on identifying the location of required texts. "It's a minefield," because to find what is needed, "you really had to trawl through it." They requested that teachers simply "put the same things in the same spots," work at "displaying it better... [using] the right titles... [and making] it easier to get around."

Students also expressed frustration at the lack of clear statements about course and assignment expectations. These should be communicated through Blackboard, otherwise "interpreting what your lecturer wanted was really difficult." One student was frustrated at a lecturer who said "absolutely nothing in response to a question, and when they finally got around to answering, their answer had nothing to do with the question." Another student held that instead of delivering a helpful explanation, teachers simply "fobbed it off" with a recommendation to engage "problem-based learning, and discover [the answer] for yourself." Despite negative experiences, students recognized the role Blackboard played in enabling engagement from distance learners, many of whom "worke[d] full-time" and [could] use the tool "more practical than standard face-to-face." Confirming its value, one student acknowledged that "without Blackboard, I couldn't be a distance student at all." Another remarked that "unlike in an offline environment," the use of Blackboard helped her understand "very broadly where the whole class [was] up to."

EOT: LMS

Example: Moodle

Description
Moodle is a platform which provides a robust, secure and integrated system for creating personalized learning spaces. It provides a set of learner-centric tools and collaborative learning environments that support education (Moodle, 2015). Its various features include "the chat mode, online forums, online quizzes," links to "pre-recorded videos" and additional activity-based tools (Tunapua, 2017, p. 8).

Themes
Potential for extended features and use, affords flexible out-of-class learning, easy to use, unrestricted access to learning, teachers' ineffective use, teachers' maturity and response times, dated layout and design, lack of training for tool, platform for shoreware.

Experiences
Students' descriptions of their experiences using Moodle to interact with their teachers revealed positive views of this tool's functionality and potential for extended features and use, but negative views about teachers' inactivity and ineffective use of it. They were frustrated with teachers who "were not tech savvy... [or] very active in Moodle." Teachers who failed to use Moodle effectively needed "more... in the instruction and training" to accommodate "different age groups," such as "someone in their seventies [who would] absolutely struggle." Interacting with teachers in Moodle was "frustrating," it was "easier to flick an email." Some students complained about the layout, design and general appearance of Moodle. "It looks dated. None of the 18-19-year olds use it... it looks terrible, like something from the nineties."

Some were annoyed at the lack of Moodle-based training. One student wanted "dedicated sessions, an idiot's guide to Moodle," since he had found "lots of things... on Moodle that [had not been] explained." Another voiced frustration about not having received "good orientation" to the system. "To be uninitiated, it was a minefield." For other students, the use of Moodle lay bare the failure of teachers
“who [were] really good at their subject [but] really suck[ed] at lecturing, [those who were] not good at conveying it … in an online situation.” Disappointed, one student criticised his teacher’s habit of shovelling “everything away online” by uploading notes which were simply read out during the lecture. “If I wanted[ed] that, I [could have] just sat at home and read what he’s written. I wanted[ed] the lecture to add value to those notes, not be the notes.”

Despite these unfortunate experiences, students acknowledged the role Moodle played in enabling engagement as “anytime, [without] having to be there”. Having experienced the benefits of its unrestricted access to online learning activities, one student described enjoying the “freedom to [post a comment] anytime … You [could] post it up, and not worry about it.” Moodle enabled users “to put a [problem] up there, and free [their] mind.” They even imagined “more creative ways of using [Moodle]”, and stated that the “potential [for its use was] endless.” Others stated that for this to happen “more encouragement from tutors to actually use it” was needed. They suggested an incentivised approach.

**EOT:** Blog site  
**Example:** WordPress

**Description**

WordPress is an online, open source website creation tool that provides an easy-to-use, powerful blogging and website content management system (Themes Media, 2015). It is a “broadcasting and user construction tool, and media repository” with “low levels of fidelity” (Tuapawa et al., 2014, p. 47; 2016, p. 233)

**Themes**

Useful authoring capabilities, enables expression, valuable tool for communicating feedback and developing e-portfolios, anonymity valued, strict rules needed to guide conduct

**Experiences**

Students’ descriptions of their experiences using WordPress to interact with their teachers revealed positive views of its authoring capabilities and as a platform for liberatory expression. The opportunities it provided for communication and creative writing strengthened its perceived value for students. One student enjoyed using WordPress to “express a viewpoint”, believing it to be a valuable tool with which to “dis[a]re our experience”. Another used it to develop and maintain an e-portfolio. WordPress enabled open and honest written feedback on particular issues in an unencumbered, safe and non-confrontational manner where students could enjoy “privacy … and intimacy”. One student valued “the relative anonymity … to make honest judgements” on specific topics. He appreciated being able to communicate “when I wanted to, say what I wanted to, [without] having to make an appointment to get feedback”. When on one occasion, he realised that although part of a group of students, he had done most of the work, he used the platform to “make an indirect grumble” to his teacher, being “emboldened” by the “relative anonymity” afforded by WordPress “to say what [he] wanted”. Although the use of WordPress allowed him to experience a level of freedom, he felt that “stiffer guidelines?” around written conduct should be established.

**EOT:** Lecture capture/webcast tool  
**Example:** Echo360

**Description**

The Echo360 Active Learning Platform provides lecture capture and webcast capabilities, enabling instructors to record, edit and assign instructional videos, create media-rich course content for live or on-demand viewing, record classroom action and interaction and then turn these into lessons that students can replay on a device (Echo360, 2015).

**Themes**

Affords flexible out-of-class learning, repeatable recordings are valued, teachers’ ineffective use of tool and attitude towards use, ineffective hardware use affects sound quality
Experiences

Students' descriptions of their experiences using Echo360 to view their teachers revealed both positive and negative views about its perceived value. Those who missed live sessions appreciated being able to view a recording of the lecture. Stating why interacting with teachers using Echo360 was effective, one student explained that "a lot of guys [would]... go home and watch it." Viewing pre-recorded lectures enabled students to "listen over and over again and try to understand the points" without ever having to "miss a lecture." Others, however, experienced problems in using Echo360. One student simply commented that "the lectures were not good at [using] it." Some teachers "walk[ed] around the room and you loo[ed] at a lot of what they sa[id]". Others "point[ed] to... the slides [using laser pointers for those in class], but should [have] used a mouse" to enable those viewing at a distance to follow along. Microphones and appropriate sound equipment needed to be used effectively so that online learners could hear the questions and answers.

Disappointed, one student described his teacher's apathetic attitude in using this tool, admitting how "they'd put YouTube videos into their lectures, and then the links or sound [wouldn't] work, and they'd be like "Oh well, just listen to it when you get home."" Disheartened at the apparent lack of concern, another student asked that teachers "care a little bit more".

Students' experiences using EOTs to interact with teachers were varied and informative. Their descriptions indicated that effective EOT use contributed to enriched student-to-teacher interactions, whereas inefficient use created barriers that negatively impacted on learning. Students' vivid descriptions of EOT challenges delivered a realistic portrayal of the phenomena and demonstrated the extent to which these obstacles limited their engagement in learning. Some expressed concern, annoyance, and impatience when confronted with technical or accessibility issues; others were perplexed, irritated, sceptical, and voiced their discomfort or confusion. Despite negative experiences, their recognition of the function EOTs had in facilitating engagement was evident. Students indicated that improvements to EOT functionality, accessibility, and design would lessen certain obstacles, and improve their interactions with teachers. Their recommendations for solutions to challenges signalled that they wanted change and relevant support, to ensure their commitment to EOT use.

Teachers' impacted students' experiences through attitudinal characteristics and their methods of EOT engagement with them. Experiences indicated students' strong expectations of support for learning from teachers. Teachers were counted on to use EOTs effectively to communicate, encourage and assist the learning process; "to master, design, and deliver strategies, techniques, and methods for teaching online courses." (Yang & Cornelius, 2005, p. 1). Their "roles [were now] more critical in online learning environments." (Moore, 2013, p. 307) and their direct involvement with students, or with material intended for student use, contributed significantly to the success of learning experiences.

Conclusion, recommendations and limitations

This research made a phenomenological interpretation of key stakeholders' EOT experiences to strengthen understandings about their EOT needs and challenges and provide a basis from which to recommend methods for effective EOT support. It analysed the EOT experiences of ten students and ten teachers from TEs in New Zealand and Australia and interpreted the meanings of the phenomena through an abstraction and articulation of local and global themes. This paper was the first in a series of six publications that presented the local themes of this research. It documented the interpretations of students' EOT experiences with teachers, in reference to their use of four different types of EOTs: online conference tools (Adobe Connect), LMS (Blackboard, Moodle), blog sites (WordPress) and lecture capture/webcast tools (Echo360). These interpretations, which delivered insights into the reality of students' EOT challenges and needs, helped to inform a set of recommendations for effective EOT use, to assist TEs in their efforts to address EOT challenges and needs through relevant, meaningful EOT support.

The small sample size characteristically used in phenomenological studies makes it challenging to generalise results across large populations (Waters, 2016). However, the descriptions of key stakeholders' experiences provide a rich and authentic means from which to extract deep levels of knowledge about the phenomena. Although individual experiences were unique, their interpretations established themes that were common across homogeneous participants. It is important to note that the views expressed by participants reflected the state of development of software at a particular point in time, the ways in which
it was implemented and maintained, and the manner in which it was used. Notwithstanding these realities, much can be gained from the comments of participants. Although an interpretive phenomenological approach supported the researcher’s ‘interest in the meaning of a phenomenon as it [was] lived by other subjects’, it also permitted their personal preconceptions to affect the analysis of data (Reiners, 2012).

The interpretations in this research could be used to support understandings about other similar EOTs. For example, the themes drawn from students’ experiences with Adobe Connect could in some cases be applied to Skype. This research has the potential to be replicated and applied to other TEI stakeholders, such as administrators or educational support staff, to strengthen understandings of their EOT challenges and needs. A summary of recommendations for addressing some of the EOT challenges described in students’ experiences is outlined below:

- Teachers to establish ground rules with the class before beginning sessions using Adobe Connect. Remind students to offer the respect and active listening skills to virtual speakers as they would for live speakers. Decide ahead of time how students will interact with other virtual participants (Adobe Systems Inc, 2010).
- Managers urge and facilitate teachers’ ongoing needs-based training for LMS use, to ensure they have relevant skills to construct and deliver online courses effectively.
- Managers encourage teachers to engage best practices in course page design, employ effective design principles such as clarity, cohesion, familiarity, consistency with layout, positioning, size, and colour (Garton, 2012).
- Teachers to employ good usability principles to make content learnable, efficient, memorable (Voyton, 2014). Organise content so it appears and operates in predictable ways through lists, menu items and clear structure.
- Teachers engage common rules of email and messaging etiquette, demonstrating professionalism and efficiency. Be concise and to the point, answer all questions and pre-empt further questions, and use proper spelling, grammar and punctuation.
- Implement strategies to improve timeliness of teachers’ responses to students’ questions. Students feel “personal help is really important” (Tuapawa, 2015a, p. 10). Teachers log in daily to read new discussions and participate where appropriate. Respond where necessary within 24 hours to demonstrate faculty presence in course (Northern Illinois University, 2016).
- Teachers consider providing or facilitating access to student training in using key LMS features and functions. Ensure guidelines to effective LMS use are provided.
- Teachers consider how live sessions are organised and recorded to ensure that in-class learning activities are delivered effectively to learners at a distance, for example, positioning of camera and microphone to record session clearly.
- Teachers ensure that all required online learning content is accessible to students at all times.

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Tao, K. (In review). Identifying key stakeholders in blended tertiary environments. 15


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8.9 Paper 9

Paper 9 is entitled “Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments: A Phenomenological Study”. It was accepted for publication in the International Journal of Online Pedagogy and Course Design (IJOPCD).

Contribution to research

Paper 9 was the second in a series of six publications that formed the output of phenomenological research. It maps directly to research objectives 3 and 4, and outcomes 3 and 4 (see Figure 2). Through qualitative analysis involving the abstraction of themes, this paper made an interpretation of students’ EOT experiences with other students, in reference to their use of four types of EOTs. Its interpretations, which included descriptions of students’ EOT challenges, helped to inform a set of recommendations for effective EOT use that would assist TEIs in their efforts to address EOT challenges, meet stakeholders’ needs, and deliver relevant and meaningful EOT support.

While Paper 9 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. This research endeavour made a significant contribution to its overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a compelling first-hand insight into the phenomena of key stakeholders’ EOT experiences.
Interpreting Experiences of Students Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments: A Phenomenological Study

Kimberley Tsupawa, University of Newcastle, Callaghan, Australia

ABSTRACT

This paper is part of a phenomenological study that examined teachers’ and students’ experiences using educational online technologies (EOTs) in blended tertiary environments (BTEs). Its aim was to understand how EOT engagement was experienced, to inform insights on EOT interactions, challenges, functionality and benefits. Phenomenological interviews were conducted with 10 teachers and 10 students from New Zealand and Australia, and their EOT experiences explored, under a range of different interactions. This paper reports on students’ EOT interactions with other students, in reference to four types of EOTs: Online conference tools (Adobe Connect), learning management systems (LMS) (Blackboard, Moodle), online social networks (Facebook), and online collaboration tools (Google Docs). This research helps tertiary education institutes (TEIs) understand how, why and where EOT support for stakeholders is necessary. The outcomes assist TEIs to design approaches to tackle EOT challenges, deliver meaningful EOT support, and inform institutional strategies to strengthen the future of BTEs.

KEYWORDS
Blended Learning, Online Technology, Phenomenology, Student Experiences, Tertiary Education

INTRODUCTION

Educational online technologies (EOTs) have revolutionised the delivery of online education, making a significant contribution to the global increase in demand for higher learning. In an era of unparalleled online growth, their rapid emergence, adoption and demand has engendered significant advances across the higher education sector. Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), providing tertiary education institutes (TEIs) with a modern means through which to augment course delivery. These digital transformations signal exciting prospects for teachers and students, the key stakeholders in BTEs. Predictions about future online learning, and the extent of recent growth, along with forecasts for EOT use are discussed in the first of these six papers’ (Tsupawa, in press).

Despite the significant growth and demand for online learning, considerable obstacles impede the use of EOTs. Such challenges include, but are not limited to attitudinal pre-dispositions and...
institutional barriers, insubstantial training, and inadequacies in instructional design support (Panda & Mishra, 2007). Other challenges include resistance to change, ineffective EOT usage, lack of motivation, technical constraints, and accessibility (Tuapawa, 2016). These challenges pose a clear risk to the future success of BTEs (Moskal, Dziuban, & Hartman, 2013), and create difficulties for stakeholders as they deliver and engage in learning.

Significant efforts have been made to better understand EOT challenges. This has resulted in considerable subject-specific research, with varied and noteworthy contributions to the literature. Some of these studies have focussed on technology integration into blended environments (Moore, 2013), affordances and effectiveness of learning technologies in higher education (Arenas, 2015; El-Khalili & El-Ghaly, 2015), barriers to adoption of online learning (Bacow, Bowen, Guthrie, Lack, & Long, 2012), and e-learning challenges faced by academics (Islam, Beer, & Slack, 2015).

However, while “our research foundation is rich” (Passey, 2013, p. 209), not all problems have been adequately identified and addressed. The nature and extent of EOT challenges change over time, as technology advances and stakeholder needs evolve. Gaps therefore exist, and unfortunately “significant challenges are preventing widespread effective implementation” (Nagel, 2013, p. 1), which collectively concerns TEIs. Some feel that “it is the university leadership... that is the leaders at a university who must... see that... it happens... if widespread change is to occur” (Christie & Jurada, 2009, p. 278). Responsively, TEIs, many of whom are “under significant pressure to provide affordable, sustainable approaches” have collaborated to expand their knowledge-base of the value of online technologies (Beckson & Watkins, 2012, p. 61). Educationalists, administrators, and other key stakeholders have also striven to develop and adapt their technological knowledge and skills (Gregory et al., 2010).

However, the persistence of EOT challenges suggests that some stakeholder needs remain unmet, and that further action is required. Stakeholder needs in modern BTEs have shifted and are evolving, and in an environment of rapid change, are not being understood and addressed effectively. Adding to this, Moskal et al., acknowledge the environments under which these problems arise. They observe that TEIs accept the status quo, and that “ultimately, blended learning has become an evolving, responsive and dynamic process” (2013).

While this transience may cast doubt on the on the longevity of new research, it provides strong reasons to obtain up-to-date solutions to real-time problems. The dynamic nature of TEI environments means that their relevance is dependent on their ability to evolve and adapt to the needs of key stakeholders. It is therefore imperative that they have a clear and current understanding of the EOT challenges facing teachers and students in BTEs, to deliver relevant, meaningful support. This support can be reinforced through rigorous replicable research using an approach that is attuned to stakeholder EOT challenges, and geared towards adding immediate value to decisions on EOT use.

An appropriate research method should answer the following questions effectively: 1) What are the current EOT challenges facing key stakeholders? 2) How can these challenges be understood and addressed effectively? A well-established approach to obtaining in-depth stakeholder insights in particular is phenomenological examination. It is a qualitative method that closely analyses the first-hand experiences of individuals to gain a clear and effective understanding of how a phenomenon is being experienced. Compared to other approaches, it enables a set of real-life experiences to inform the reality of a situation, providing a first-hand basis from which insightful and responsive solutions can emerge.

This paper is part of a phenomenological study that examined teachers’ and students’ experiences using EOTs in BTEs. Its aim was to understand how EOT engagement was experienced, to inform insights on EOT interactions, challenges, functionality and benefits. Semi-structured interviews were conducted with 10 teachers and 10 students from New Zealand and Australia, and their EOT
experiences explored, under a range of different interactions. A series of six papers, each based on a specific interaction type, detailed their experiences. This paper reports on students’ EOT interactions with other students, in reference to four types of EOTs: Online conference tools (Adobe Connect), learning management systems (LMS) (Blackboard, Moodle), online social networks (Facebook), and online collaboration tools (Google Docs).

The rationale for using 10 teachers and 10 students was based on literature relating to phenomenological research. Englender (2012) indicated that a large sample size, especially when it concerns qualitative research, is not a prerequisite for generalisable results. Nicholls (2009b) explained that “phenomenological studies … commonly use as few as five … participants” (p. 639). Rawat (2015) similarly stated that normally “four or five respondents” are selected for in-depth interviews. On this basis, it was believed that 20 participants would provide “sufficient interview data” (Saldana, 2011, p. 34). Data was gathered until the point of saturation was met and repetition occurred. As expected, a large quantity of data was collected.

This research addresses a gap in knowledge about EOT challenges, using a phenomenological approach to generate explanations about how EOT engagement is currently experienced by teachers and students. It creates a compelling and informative basis from which TEIs can understand how, why and where EOT support for stakeholders is necessary. Close analysis of the experiences also informs insights on EOT interactions, functionality and benefits. The outcomes assist TEIs to design approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful support to key stakeholders, and inform institutional strategies, to strengthen the future of BTEs.

The meanings of these experiences may be applied across TEIs to enhance future EOT experiences, and provide informed stakeholder support. However, their application to developing nations without the infrastructure to support mainstream EOT usage is limited. Future studies could address this gap by examining and applying the findings of key stakeholder EOT experiences in developing nations.

**METHODOLOGY**

Ten lecturers and ten students from TEIs in New Zealand and Australia were chosen for interviews using a purposive sampling strategy. This approach sought participants with first-hand experiences of the phenomena, in support of the aim of phenomenology, to understand, a particular phenomenon “from the point of view of the lived experience” (Englender, 2012, p. 16). The aim of these interviews was to gather first-hand descriptions of teachers’ and students’ experiences using EOTs in BTEs. Their close proximity to the phenomena would result in genuine data that would add a distinct level of authenticity to the research.

Phenomenological interviews are “exceedingly common in qualitative research studies” (Nicholls, 2009b, p. 640), and were appropriate for gathering data “due to [the researcher’s] interest in the meaning of a phenomenon as it is lived by other subjects” (Englender, 2012, p. 14). This study of experience (Friesen, Henriksson, & Saevi, 2012), involved finding the meaning in a phenomenon, using “text” generated “by talking to people” (Nicholls, 2009a, p. 533), and directly soliciting participants’ perspectives (Saldana, 2011, p. 75).

To be interviewed, participants had to be 1) teachers on fulltime tenure with an accredited tertiary institute, delivering an academic course in a blended learning mode, or 2) students aged 18 years or older, enrolled fulltime with an accredited tertiary institute, and in an academic course delivered in a blended learning mode. Candidates who were not full time teachers or students at an accredited tertiary institute were excluded from this study. Teachers were identified from university website profiles of academic staff living and teaching in New Zealand or Australia. Students were identified with the assistance of a staff member at each TEI. Invitations sent to participants indicated that participation was voluntary. Attempts were made to recruit both male and female participants.

The rationale for using only teachers and students as participants was based on the results from a study by Taapawa (in press.). This study identified key stakeholders in BTEs, using methods which
involved 1) an in-depth review of four existing studies (Chapleo & Simms, 2010; Mainardes, Alves, & Raposo, 2013; Sanderson, 1997; Wagner, Hassanein, & Head, 2008) and other literature about key stakeholder identification, and 2) verification of stakeholder identification from interviews with blended learning experts. The results showed teachers and students as those most frequently and prominently identified as key stakeholders in BTEs. Students were explicitly identified as key stakeholders by 12 out of the 13 experts, being considered as such because of the need for them to ‘buy into’ blended learning, ‘participate fully, and be convinced’ of its value. Teachers were considered to be key stakeholders, and were identified by 9 of the 13 experts as being among those who provided the most significant contribution because of their immediate and direct involvement in the teaching and learning process, and among other reasons, their day-to-day focus on and influence over blended learning experiences.

The semi-structured interviews were conducted via online video-conferencing technology (Skype). Participants set aside at least 45 minutes of un-interrupted time to complete the interview. A number of broad, open, data-generating questions were asked to initiate the interview process, and thus generate “a more open interview” (Dowling & Brown, 2012, p. 79). Specifically, participants were asked for a “description of a situation in which [they had] experienced the phenomenon” (Englander, 2012, p. 25) of using an EOT in a BTE. This was vital since an understanding of the phenomenon (i.e., using an EOT) had to be “connected to a specific context in which the phenomenon [was] experienced” (i.e., a BTE) (Englander, 2012, p. 25). The participants were expected to provide rich descriptions of their “conscious experience” (Martin, 2010, p. 1). Probes were used to clarify the meanings of responses and encourage in-depth descriptions (Penner & McClement, 2008), and as anticipated, participants detailed their experiences of “the phenomenon in their consciousness” (Wikispaces, 2015, p. 1).

The interviews for teachers and students each contained 27 questions. These questions explored the experiences under a range of different relationships, based on different interaction types, as represented in the ‘Classification by Interaction’ taxonomy augmented by Culatta (2011), and the original classification proposed by Moore (1989). The ‘Classification by Interaction’ taxonomy categorised technologies by the relationship between learners and other parties. The first three interaction types of the original taxonomy were: 1) Learner to expert, 2) Learner to learner, and 3) Learner to content. Culatta (2011) presented a fourth category: 4) Learner to context. Tuapawa, Sher and Gu (Tuapawa et al., 2014, 2016), proposed a fifth category: 5) Learner to media. These categories were adapted to facilitate and structure interviews with teachers: 1) Teacher to student, 2) Teacher to teacher, 3) Teacher to content, 4) Teacher to context, and 5) Teacher to media. The use of a relationship-based classification system for structuring questions helped refine participants’ experiences into relevant and recognisable EOT interactions.

Table 1 outlines the questions asked of students in ‘learner to learner’ interactions. Questions about other interactions were discussed in other papers in this study.

Interview data was sorted and coded from audio recordings transcribed into pre-formatted question-and-answer templates. NVivo software was used to code and analyse the data (QSR International, 2015). Nodes were used to assign, label, reference and contain data (Williams, 2003).

Table 1. Structure of student interview questions based on learner-to-learner interaction

<table>
<thead>
<tr>
<th>Interaction Type</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner to learner</td>
<td>a) Describe an experience in which you used an EOT in a ‘learner to learner’ interaction while studying in a BTE? b) Did you face issues or challenges using the EOT in this case? Explain. c) What do you think would have helped you make more meaningful use of this EOT? d) What do you think would be a solution to this issue? e) Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>
The assignment of nodes to text segments helped to assemble like-data into meaningful categories. The nodal data was separated into analytic memos to help enhance understandings about various segments (Saldana, 2011). Themes emerging from the memo data were analysed, refined, and used to build the discussion. Figure 1 outlines this analysis process. Using a highlighted example, it conceptualises how the data was gathered, transcribed, stored in nodes, refined into memos, and built into the discussion.

**DISCUSSION OF RESULTS**

This discussion is based on data from interviews with students about their experiences using EOTs to interact with other students. It is organised in sections specific to the types of EOTs students identified. The EOTs and brand exemplars are: Online conference tools (Adobe Connect), learning management systems (LMS)(Blackboard, Moodle), online social networks (Facebook), and online collaboration tools (Google Docs)³. The sections include descriptions of EOT brand exemplars identified by students, and descriptions of their experiences. Included in these experiences are students’ comments on EOT issues and challenges, potential usage, solutions, and benefits.

**EOT:** Online conference tool
**Example:** Adobe Connect

**Description**

Adobe Connect is a type of web conferencing software which offers immersive online meeting experiences from small group collaboration to large scale webinars (Adobe Systems Software Ireland Ltd, 2015). It is a ‘real time learning and collaborative tool’ with ‘high levels of physicality’ that is being used to facilitate interactions (Tuapawa et al., 2014, 2016). Adobe Connect is being widely used in TEIs, ‘as an online virtual classroom, but also…in quite flexible ways to capture and enable other conversations’, as it provides ‘the ability to capture what occurs in a physical space, and share and…manage that within a digital sense’ (Tuapawa, n.d, p. 4).

**Experiences**

The experiences of students using Adobe Connect to interact with other students revealed the use of this EOT to be free, easy, accessible across devices, and flexible, but also restrictive, limiting and fraught with technical issues. Distance students with online access to real-time class sessions, generally viewed their interactions with other students as valuable. ‘It’s free, it’s easy, just follow the link, you don’t have to install it’. Similarly, another student said ‘there’s no login [required], you can

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**Figure 1. Process of data analysis**

[Diagram showing data analysis process]

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access it as a guest. It’s accessible learning." The ability to access learning through Adobe Connect on multiple devices added value to the experiences of students. You can even download Adobe Connect on your Smartphone and stream it on the subway train." Headphones and microphones were used to link distant students to the live class sessions. Distance students liked using Adobe Connect to message in-class students who were 'logged in and you could talk to them'.

Others however, experienced problems in using Adobe Connect to interact with other students. The use of poor quality microphones 'made it difficult to say 'hello' to other students. The positioning of the camera also created tunnel-vision issues. Students 'can't see everything at once' which 'presents difficulties with the dissemination of information.' One student discussed the difficulty in identifying in-class students who spoke, because the webcam and microphone is not directed at these individuals. 'It's bizarre. because if your camera is not good enough you can't even see the person asking the question or giving the presentation.' Stressing his disappointment at missing out, he suggested that microphone and headphone equipment be 'part of course costs' or allow students to get 'a discounted rate', alternatively 'lower the fees if you're not getting the direct one on one experience', which arranging the equipment more equitably might provide. Another student insisted that 'the technology has got to improve' to ensure that 'the experience is not diminished by the technology involved.'

Otherwise, students dislike having 'to pay the same amount of money as the guy who gets to be in the classroom the whole time.' Indicating that teachers should ensure the use of quality tools for improved learning, one student stated 'if I was giving a lecture, I would like to have confidence that the quality of the experience wasn’t being changed because I was in a different location to the lecture taking place.' One student recommended that students be afforded the opportunity to 'set up their own Adobe Connect sessions, student to student, like a study group online' to enable richer collaborative experiences between learners.

EOT: Learning management system
Example: Blackboard

Description
Blackboard is a comprehensive and flexible e-Learning software platform that delivers a complete course management system (Blackboard Inc, 2015). It is currently being ‘used for a huge range of activities’, and can serve simply as a ‘repository’ for learning resources, or be used in more innovative ways such as ‘an e-learning portal around a particular programme of work, course or set of activities’ (Ilaupawa, n.d, p. 4).

Experiences
The experiences of students using Blackboard to interact with other students via discussion forums revealed the use of this EOT to be acceptable and widespread, but also signalled that certain improvements to its notification functionality would significantly enhance its effectiveness. Students used Blackboard to collaborate with their peers in shared assignments or group work, often ‘posting [or] responding to comments’. The asynchronous communication methods of the discussions boards, and lack of a notification system resulted in slower communications between students, taking 'a day, rather than a couple of minutes', in comparison to Facebook, where 'a conversation [gets] started on one of the assignments' where 'multiple people [are] talking', 'post[ing] and share[ing] links to useful info', and 'you're getting notifications all the time.' Most students wished that Blackboard incorporated notification and instant messaging functionality similar to that of Facebook, enabling them to 'chat to them directly, because once you realise who is on track with what you’re doing, you could... get a lot further very quickly'.

Instead with Blackboard, conversations were 'less instant', 'on the forum you don’t know who’s online', but 'not with Facebook'. Students asserted that 'it's easier to use Facebook', 'Facebook
is good', 'it's handy', 'that's why we use Facebook, instead of Blackboard for student-to-student interactions'. While students recognised that the use of Blackboard discussion boards helped determine 'whether you're on track or not', and that 'you still need the discussion boards... [and that Facebook-like functionality] would only be supplementary', the affordances generated by the addition of such improvements would definitely be helpful'. Students said 'take functions from Facebook... take those good things from Facebook', incorporate these into Blackboard, and 'all of a sudden, you've got a much more efficient system'. The logic in doing so is that 'we're using Facebook to do it anyway, that it's easy and instant, a socially acceptable form of engaging in discussion with classmates, you get feedback straight away', and that clearly 'students are mostly using Facebook groups because 'hands down... in terms of getting hold of classmates... and for group work... it is really [the] best, [and] people use this more'. 'Facebook is a perfect one to compare [the need for this functionality] with', because 'getting notifications on this would definitely be helpful'.

Unlike Facebook however where 'we don't have access to everyone', Blackboard provides students with a link to every other student on the course. Another useful addition to Blackboard would be the addition of 'a little picture up next to [other students'] name, because currently you don't know who people are.' Because via Facebook, 'you don't actually know [other students], you're not going to add them, [because you don't] have any idea of who they are'. However, via Blackboard students were already joined together with a common purpose, and this pre-existing commonality had already removed the 'stranger-based' barriers common in platforms like Facebook. ‘You realise who is on track with what you’re doing’, and therefore immediate engagement is possible.

Yet, another useful recommendation to emerge from student experiences concerning the use of Blackboard related to establishing a rewards system that recognised students ‘who share [with] or help other students'. Otherwise, 'there's really no reason for you to help anyone else, other than goodwill'. Students who had delivered assistance to their peers, and who had received help, believed that using such an approach could greatly enrich the student learning experience. Confident of its workability, one student admitted that 'people do a lot for literally nothing', but they should be recognised and encouraged to actively lend a hand. Contemplating the visual aspect of a rewards system, and whether the display of a series of stars attached to students' profiles would work, one student observed 'I don't know what reward there could be', but perhaps 'they have a little trusted or VIP thing' which rewards a student with a credibility rating, and essentially indicates to other students that ‘this guy, he’s good, he's helped a lot of people'.

**EOT:** Learning management system

**Example:** Moodle

**Description**

Moodle is a learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system for creating personalised learning environments. It delivers a set of learner-centric tools and collaborative learning environments that support both teaching and learning (Moodle, 2015). Learning management systems (LMS) like Moodle are evolving into ‘relationship management systems’ to which institutes are ‘adding more products and custom-made plug-ins’ to address the need for a personalised student learning experience (Tsouw, n.d., p. 7). Various features within Moodle are being used, including ‘the chat mode, the online forums, the online quizzes’, links to ‘pre-recorded videos’, and additional activity-based tools (Tsouw, n.d., p. 7).

**Experiences**

The experiences of students using Moodle to interact with other students revealed positive views of its functionality, potential for extended features and use, but negative views about slow response rates with asynchronous communication methods, lack of system orientation, lack of instructions for
forum usage, and overuse of text. Students used Moodle to collaborate with their peers in discussion forums, often posting comments that “everyone in the class can see.” Discussion forums on Moodle provided an “opportunity for people to post links, or items of interest.” Students signalled that certain improvements to its functionality would significantly enhance its effectiveness. “Delays in reply,” although characteristic of an asynchronous tool, created “communication barriers.” For students, “it’s a pain having to wait for responses, it’s not instant.” Some students complained about the layout, design and general appearance of Moodle. “It looks dated. None of the 18-19 year olds use it...it looks terrible, like something from the nineties.”

One student bemoaned the lack of Moodle-based training, “dedicated 19-19 year olds to Moodle,” asserting he had found “lots of things...on Moodle that weren’t explained.” Another was similarly frustrated at the lack of “a good orientation” to the system. “To the uninitiated, it was a minefield.” Students also voiced negative experiences about the lack of instructions for forum use. “There are no guidelines on what could be posted.” This resulted in an overload of distracting posts from a “socially awkward” individual. According to a student, “one guy posted a lot, [and] sometimes it was totally irrelevant.” Quality over quantity was required. One student explained that discussion posts “needed to be well written,” because while Moodle provides a “good way of communicating and sharing info, it is purely text.”

Despite negative experiences, students recognised the role Moodle played in enabling engagement at “anytime, [without] having to be there.” Concerning the ease of use, and unrestricted access to online learning activities, one student commented on “the freedom to [post a comment] anytime...You can post it up, and not worry about it.” Another appreciated “be[ing] able to put a [problem] up there, and free your mind.” Students envisioned “more creative ways of using [Moodle],” stating that the “potential is endless.” The ease of obtaining knowledge “for one-off information gain” was valued. Moodle “is an archive,” which allowed new students to “go back and see what people were saying last year about the exam topic.” Doing this proved useful for one student, who could “cross reference and [develop insights on the content of] exams.”

Students appreciated how forums provided a method to “articulate...to the entire class, [where]...everyone gets the same message...rather than verbalise complex issues” in class. Forums provided a valuable space to place information that students “could refer back to...something that needed to be elaborated on in class.” While the accessibility of Moodle across devices rated highly amongst students who could use “an app on your phone for Moodle...[to] reply to forum posts,” not everyone was aware of it. “If they were, they would contribute more often, because it’s more convenient.” Accessibility also extended to other areas, including language. “Students need to consider the English levels of other students.” One student admitted that “some might not understand [certain] words.” The recommendation for supporting these barriers was for native English-speaking students to write in a way that demonstrated “consideration to those who are reading.”

EOT: Online social network
Example: Facebook

Description
Facebook is a globally popular “social networking tool” that is being used to facilitate “learner to learner” interactions (Tupawa et al., 2014, 2016). EOTs such as Facebook provide highly accessible, inexpensive and scalable publishing techniques and allow the generation and exchange of user content with capability to reach small or large audiences (The Social Media Guys, 2010). It is a platform whose “significance and potential...in educational terms” cannot be underestimated, (Moore, 2013, p. 358). “Facebook is...used regularly by...students to communicate with each other but to a far lesser extent for communicating with staff. The success of Facebook...may be due, in part, to its
high rate of use in everyday life where it is used regularly by 80% of participants. Other applications have far less penetration...” (Gosper, McKenzie, Pizzica, Mallrey, & Ashford-Rowe, 2014, p. 299).

Experiences

The experiences of students using Facebook and Messenger to interact with other students via group and instant messaging were described as ‘working well’, ‘easy and instant’, ‘handy’, a ‘more efficient system [than Blackboard]’, ‘superior’, and ‘the best’. Student experiences revealed that this EOT facilitated more immediate notification, provided efficient, trusted, and responsive channels for discussions between students, delivered effective messaging and notification options which delivered significantly more value than Blackboard, provided a socially acceptable form of peer engagement, and enabled collaborative efforts which added considerable value to learning.

Students explained how group discussions on Facebook occurred when ‘conversation[s] [get] started on one of the assignments’ and involve ‘multiple people [who are] talking’, ‘posting and sharing’ links to useful info’. Facebook incorporates a notification and instant messaging functionality which enabled students to ‘chat [their peers] directly’ and ‘get feedback straight away’. If [students] had a question that needed answering...it was’ responded to quickly. ‘You’d know that [other students were] online and they could start typing’ to provide assistance. One student described her experience using Facebook to communicate with others as ‘easy and instant’, because ‘you’re getting notifications all the time’, which is useful ‘hands down...in terms of getting hold of classmates...and for group work...’ it ‘is really [the] best’. Another student ‘shared examples over Messenger’.

These Facebook-facilitated activities extended beyond group work, since ‘with exams due at the same time, everyone keeps in touch, [which is] handy...’. With Facebook accessible across devices, and ‘Messenger app on your phone’ students said that fellow learners ‘are a lot more responsive’. Facebook is accepted amongst students as a socially appropriate channel for ‘chatting’, unlike voice chat or texting via mobile phone, against which one student states ‘I wouldn’t necessarily ask for the cell phone number to text...the people I chat with’ on Facebook.

Regarding how Facebook compares with other platforms for group work, students observed that their peers ‘are mostly using Facebook groups’, and although other platforms exist to support learning, ‘people use this more’. In reality ‘we only use discussion boards these days to talk to the teacher, not to get stuff off other students.’ Others however, experienced problems in using Facebook to interact with other students. ‘It’s not moderated, and [its presence] can be a distraction.’ To overcome this issue, one student recommended using Facebook for learning activities only. ‘You get in, do your thing, and get out.’ Another student felt that Facebook could be used to ‘add students, not just from a specific campus group, but [those] studying’ similar courses at other institutes. She felt that extending the pool of knowledge beyond one institute would enrich learning.

EOT: Online collaboration tool

Example: Google Docs

Description

Google Docs is an online word processor that enables users to create and format text documents, and to collaborate with other users in real time, storing the documents in Google Drive (Google, 2015). It is a ‘collaborative tool’ with ‘low levels of fidelity’ that enables document preparation, and is being used to facilitate ‘learner to learner’ and ‘learner to content’ interactions (Tafawa et al., 2014, 2016). Technologies that support communication, interaction and collaboration continue to be in demand with greater use being made of... web tools such as Google Docs” (Gosper et al., 2014, pp. 298,299).
Experiences

The experiences of students using Google Docs to interact with other students revealed positive views of its usefulness as a collaborative tool for document preparation, but negative views about format incompatibility, overly automated setup, access issues, and potential for imbalance of work amongst group users. Google Docs enabled students to 'pool together information', and coordinate work efforts by 'putting notes in...writing cut sections...[and] sharing it with each other'. Students enjoyed being able to 'edit stuff simultaneously' without having to wait five minutes to synchronise'. In response to prompts about what enhanced their experience with Google Docs, students answered 'definitely the collaboration.' Describing functions which enabled students to update simultaneously, one student explained how 'you could be working on one part of it, [while another student] is working on the other side', the result being a collaborative activity that 'works seamlessly' and is contributed to by users who can update anything on there at the same time'. One student valued using the 'little chat section', which enabled group users to 'chat to each other while they're [collaborating] online.'

Others however, experienced problems using Google Docs to interact with other students. In particular, the incompatibility with Microsoft Office products created formatting issues. One student suggested using One Drive to overcome this challenge 'because you can store and share that'. Some students 'weren't familiar with [One Drive]' so other workarounds to accommodate formatting requirements were established. Another student complained at the overuse of the comment functionality. 'There are too many places for commenting.' Overcoming this issue required 'turning off the comments on [subpages] and just having the main comments page.'

One student signalled dislike of the overly basic way in which Google Docs operated. He described the setup as 'being nanny-ish', explaining how 'Google do a lot of stuff for you, because they know you're stupid'. However, for the generation familiar with older word processing programs, the expectation is for a manual process. 'People are used to doing stuff, like clicking save'. Not having to do this manually in Google Docs 'throws people'. Students also experienced problems when documents had not been 'shared with the group'. Others criticised the imbalance of work responsibility amongst group members using Google Docs. 'Some students do lots, others leave the work to a few.' Discussion about the ubiquity of this problem is outside the scope of this paper.

Other students' experiences involved the use of WikiEducator, Google Sites, Viber, and Echo360.

RECOMMENDATIONS

A summary of recommendations for addressing some of the FOT challenges described in students' experiences is outlined below:

- Ensure that in-class sound and audio equipment works effectively to support learning experiences of distance learners;
- Consider mindfully how live sessions are organised and recorded to ensure that in-class learning activities are delivered effectively to distance learners: e.g., positioning of camera to record session clearly;
- Consider potential for integration of Facebook-like notification and messaging functionalities into LMS;
- Explore strategies for more frequent or extended student use of Facebook to support student-to-student interactions, and group work;
- Consider development of rewards or acknowledgement system that encourages students to deliver online support to each other;
- Consider providing or facilitating access to student training in using key LMS features and functions. Ensure guidelines to effective LMS use are provided;
Encourage native English-speaking students to make written online communications easy to understand and read for students of other cultures;
- Establish workaround solutions to address format incompatibilities in cloud-based office applications.

CONCLUSION

Despite the significant growth and demand for online learning, considerable challenges impede the use of EOTs. The persistence of these challenges suggests that some stakeholder needs remain unmet, and that further action is required. It is imperative that TEIs have a clear and current understanding of the EOT challenges facing teachers and students in BTEs, to deliver relevant, meaningful support. This paper is part of a phenomenological study that examined teachers' and students' experiences using EOTs in BTEs. Its aim was to understand how EOT engagement was experienced, to inform insights on EOT interactions, challenges, functionality and benefits. Phenomenological interviews were conducted with 10 teachers and 10 students from New Zealand and Australia, and their EOT experiences explored under a range of different interactions. This paper reported on students' EOT interactions with other students, and provided a summary of recommendations for addressing some of the EOT challenges.

Students' experiences using EOTs to interact with other students were varied and informative. Their descriptions indicated that effective EOT use contributed to enriched student-to-student interactions, whereas ineffective use created challenges that negatively impacted on learning. Vivid descriptions of EOT challenges revealed the severity of students' experiences, and the extent to which these obstacles limited their engagement in learning. Some expressed frustration, disappointment, and anxiety when faced with technical or accessibility issues, others voiced indifference or confusion. Despite negative experiences, general recognition of the role EOTs played in enabling engagement was evident. Students indicated that improvements to EOT functionality, accessibility and design would reduce certain challenges, and enhance their interactions with other students. Recommendations given by students for solutions to challenges signalled that they wanted change and relevant support, to ensure their commitment to EOT use.

The following integrated summary of students' experiences presents an outline of some key EOT issues:

- **Online conference tool (Adobe Connect):**
  - Easy to use, easily accessible across devices, affords flexible out-of-class discussions, potential to set up online study groups;
  - Hardware issues reduce quality of learning, ineffective use of tool creates 'tunnel-vision' during class;
- **LMS (Blackboard messaging and discussion forums):**
  - Enables immediate engagement with fellow learners, provides a common link to every other student, joined together with a common purpose, potential for student profile images to be used, and rewards system that recognises helpful students;
  - Asynchronous nature means slower communications than Facebook, no notification or instant messaging functionality like Facebook, potential to improve Blackboard by incorporating Facebook-like functions;
- **LMS (Moodle):**
  - Potential for extended features and use, affords flexible out-of-class communication, easy to use, unrestricted access to learning activities, access to archived material useful;
  - Slow response rate with asynchronous methods, lack of system orientation, lack of instructions for forum usage, and overuse of text, dated layout and design, lack of training for tool, difficulties understanding students with poor writing skills;
Online social network (Facebook):
- Facilitates immediate notification, efficient trusted and responsive channels for student discussions, socially acceptable form of peer engagement, enables collaborative efforts, discussions can involve multiple people at once, enables immediate feedback, potential to extend student groups into other institutes;
- Not moderated, can be a distraction;

Online collaboration tool (Google Docs):
- Useful for document preparation and collaboration, useful for editing work simultaneously, enables group chat while updating documents;
- Format incompatibility, overly automated setup, access issues, and potential for imbalance of work amongst group users, document 'sharing' issues.

This research used a phenomenological approach to address a gap in knowledge about EOT challenges. By delivering clear, current explanations about how EOT engagement is experienced, it assists TEIs to understand how, why and where EOT support for stakeholders is necessary. Close analysis of the experiences in this paper can help broaden TEIs' insights on EOT interactions, functionality and benefits. Application of this knowledge will enable TEIs to design relevant approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful support to key stakeholders, and inform institutional strategies, to strengthen the future of BTEs.

While individual experiences of the phenomena are unique and specific to the EOTs identified, the findings may be used to support understandings of other similar EOTs. The meanings of these experiences may be applied across TEIs to provide a basis from which to enhance future EOT experiences and provide informed stakeholder support.

ACKNOWLEDGMENT

Thanks is extended to Associate Professor Willy Sher, who reviewed and made comments on draft copies of this work.
REFERENCES


This is one in a series of six papers that form part of a phenomenological study, which examined teachers' and students' experiences using EOTs in BTEs.

While individual experiences of the phenomenons are unique and specific to the EOTs identified, the findings may be used to support understandings of other similar EOTs.

The author has a background in tertiary education, and substantial teaching experience with extensive EOT use. The author has delivered training to both teachers and students on the effective use of EOTs, developed applications and materials to aid EOT use, and conducted and presented research in the areas of EOTs in BTEs. The author holds a Master's Degree in Digital Media, Bachelor's Degree in Computing Systems, Diploma in Multimedia and Web Development, Diploma in E-Business, and Diploma in Information and Communication Technology. The lens through which key stakeholder EOT experiences have been interpreted is applied by an individual with comprehensive and credible insights into this subject.

To lay a foundation for this study, the author undertook preliminary research to clarify and verify issues from the literature, and create a basis for the selection of stakeholders for the interviews. This research identified EOTs in BTEs (Tuapawa, in press.), produced a classification system for EOTs (Tuapawa, Sher, & Gu, 2014, 2016), identified stakeholders in BTEs (Tuapawa, in press.), identified EOT challenges of key stakeholders in BTEs (Tuapawa, 2016), and discussed a key challenge (resistance to change) in using EOTs (Tuapawa, 2015).

Two out of the four studies ranked students as the most important stakeholder, with teachers and instructors occupying a key position, secondary to students in some cases.

These EOT categories are based on the multi-dimensional taxonomy, called the Pentaonomy (Tuapawa et al., 2014), a robust, contextualised, and multi-dimensional framework for categorising EOTs.

Notwithstanding these caveats, the views expressed by participants reflect the state of development of software at a particular point in time, the ways in which it was implemented and maintained, and the manner in which it was used. Notwithstanding these realities, much can be gained from the comments of participants.

This word limit of this paper does not permit discussion on students' experiences using these EOTs.

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8.10 Paper 10

Paper 10 is entitled “Interpreting the Experiences of Students Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments: A Phenomenological Study”. It was accepted for publication in the International Journal of Distance Education Technologies (IJDET).

Contribution to research

Paper 10 was the third in a series of six publications that formed the output of phenomenological research. It maps directly to research objectives 3 and 4, and outcomes 3 and 4 (see Figure 2). Through qualitative analysis involving the abstraction of themes, this paper made an interpretation of students’ EOT experiences with content, in reference to their use of seven types of EOTs. Its interpretations, which included descriptions of students’ EOT challenges, helped to inform a set of recommendations for effective EOT use that would assist TEIs in their efforts to address EOT challenges, meet stakeholders’ needs, and deliver relevant and meaningful EOT support. While Paper 10 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. This research endeavour made a significant contribution to its overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a compelling first-hand insight into the phenomena of key stakeholders’ EOT experiences.

Abstract

This paper is part of a phenomenological study undertaken to examine and understand how EOT engagement is experienced, to inform knowledge about EOT challenges, functionality and benefits. Interviews were conducted with ten teachers and ten students from New Zealand and Australia, and their experiences explored under a range of different interactions. This paper examined students’ EOT interactions with content, in reference to seven types of EOTs: Learning management systems, online library catalogue, lecture capture/web cast tools, wikis, online collaboration tools, online video platforms, and online web-building tools. These experiences revealed compelling insights. For example, students valued using YouTube to re-watch videos, filter useful content, and subscribe to channels that supported learning. Through a phenomenological approach to understanding how EOT engagement is experienced, this research helps TEIs understand how, why and where EOT support for stakeholders is necessary. The outcomes assist TEIs to design approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful EOT support, and inform institutional strategies to strengthen the future of BTEs.
Interpreting Experiences of Students Using Online Technologies to Interact with Content in Blended Tertiary Environments: A Phenomenological Study

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ABSTRACT

Through a phenomenological approach, this research aimed to make an interpretation of key stakeholders’ EOT experiences, to establish their current EOT needs and challenges, and provide a basis from which to recommend methods for effective EOT support. It analysed a range of students’ and teachers’ EOT experiences, and then interpreted the meanings of these phenomena through an abstraction of local and global themes. The local themes developed a set of meanings that were specific to stakeholders’ use of individual EOTs. This paper is the third in a series of six publications that presented the local themes. It documents the interpretations of students’ EOT experiences with content, in reference to their use of six different EOTs: Learning management systems (LMS), an online library catalogue, lecture capture/web cast tools, wikis, online collaboration tools, and online video platforms. The interpretations also informed recommendations for the effective use of EOTs in student-to-content interactions to assist TEIs in their efforts to adapt to meet stakeholders’ EOT needs.

KEYWORDS
Blended Learning, Online Technology, Phenomenology, Student Experiences, Tertiary Education

INTRODUCTION

Educational online technologies (EOTs) have dynamically transformed the delivery of higher education, creating extraordinary opportunities for effective learning and teaching. In an era of unprecedented growth, their enhanced functionalities and affordances have revolutionised methods of knowledge access and participation, engendering significant advances across the tertiary education sector. Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), and “technological innovations...and integration[s]” have opened opportunities to “real world experiences and gateways to more interactions” (Gapa, 2016, p. 1).

These digital transformations signal exciting prospects for teachers and students, the key stakeholders in BTEs. Predictions about future web-based learning suggest that virtual universities and off-campus sites are the trends in the future of higher education (Peppers, 2016), and as “the pace of change” rapidly accelerates, “hybrid classes will proliferate” (Anderson, Boyles, & Rainie, 2012).

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p. 17). This is now happening, as “millions of students [take] online courses … [giving] evidence that this modality is meeting a clear demand” (Allen & Seaman, 2015, p. 21). Similar forecasts suggest that the digital delivery of coursework via online technologies will revolutionise higher education (Anderson et al., 2012). Results already show that “since 2010, there has been an increase in the use of most technologies for learning” (Gosper, McKenzie, Pizzica, Malfroy, & Ashford-Rowe, 2014, p. 298). This growth has intensified with the proliferation of mobile technologies and emergence of mLearning (Asseo, Johnson, Chalapathy, & Cosello, 2016; Davison & Lazarus, 2015).

Despite the significant growth and demand for online education, considerable obstacles impede the use of EOTs. Some of these barriers are attitudinal predispositions and institutional barriers, inadequacies in instructional design support (Panda & Mishra, 2007) and a “lack of training” or ineffective or insubstantial training (Merfert, 2016, p. 1). Others include resistance to change, ineffective EOT usage, lack of enthusiasm, technical constraints and accessibility (Teapawa, 2016). These challenges pose a clear risk to the future success of EOTs (Moskal, Dziuban, & Hartman, 2013) and create difficulties for key stakeholders as they struggle to deliver and engage in learning.

Understanding challenges of EOTs has improved, through research that has focused on technology integration into blended environments (Moore, 2013), affordances and effectiveness of learning technologies in higher education (Arenas, 2015; El-Khalili & El-Ghalya, 2015), barriers to adoption of online learning (Bascow, Bowen, Guthrie, Lack, & Long, 2012) and e-learning challenges faced by academics (Islam, Beer, & Slack, 2015). However, while “our research foundation is rich” (Passey, 2013, p. 209), not all problems have been adequately identified and addressed.

The persistence of these challenges suggests that tertiary education institutes (TEIs) have experienced a gap in understandings about the reality of key stakeholders’ EOT needs. Over time, these needs have shifted and evolved, and in an environment of rapid technological change have not been understood and addressed effectively. The dynamic nature of the environment in which TEIs operate means that their relevance is dependent on their ability to evolve and adapt to meet their stakeholders’ needs, but doing this effectively requires that TEIs have current, in-depth understandings of their stakeholders’ EOT challenges, at a level that enables the delivery of informed, relevant, and meaningful support.

Through a phenomenological approach, this research aimed to interpret key stakeholders’ EOT experiences, establish their current EOT needs and challenges and provide a basis from which to recommend methods for effective EOT support. Using a 5-step qualitative analysis of data, it examined the EOT experiences of ten students and ten teachers, categorised these to reflect the nature of their interactions with other key entities, and then interpreted the meanings of the phenomena through an abstraction and articulation of local and global themes. The global themes delivered a broad set of interpretations about the meaning of stakeholders’ EOT experiences with other students, other teachers and content, and the local themes developed meanings that were specific to stakeholders’ use of individual EOTs.

This paper is the third in a series of six publications that presents the local themes of this research, through written interpretations articulating the meaning of the phenomena. It documents students’ EOT experiences with content in reference to their use of six different EOTs: Learning management systems (LMS) (Blackboard, Moodle), an online library catalogue (NEWCAT+), lecture capture/web cast tools (Echo 360), wikis (WikiEducator), online collaboration tools (Blackboard Collaborate), and online video platforms (YouTube). Included in its interpretations are descriptions of stakeholders’ EOT challenges, which deliver a realistic portrayal of the phenomena to strengthen understandings about stakeholders’ needs. The interpretations helped to inform a set of recommendations for the effective use of EOTs in student-to-content interactions. These were designed to assist TEIs in their
efforts to adapt to meet stakeholders’ EOT needs by providing a basis from which to tackle EOT challenges and deliver relevant and meaningful EOT support.

To provide a foundation for this study, the author undertook preliminary research, which clarified and verified issues from the literature, and created a basis for the selection of interview participants. This research identified EOTs in BTEs (Tuapawa, 2017), produced a classification system for EOTs (Tuapawa, Sher, & Gu, 2014, 2016), identified key stakeholders in BTEs (Tuapawa, in review), identified the EOT challenges of key stakeholders (Tuapawa, 2016a), and discussed a key challenge (resistance to change) in using EOTs (Tuapawa, 2015).

METHODS

The collection and analysis of this data was guided by the methodology of interpretive phenomenology, which aimed to make an interpretation (rather than description only) of the meanings of participants’ experiences (Padilla-Diaz, 2015; Sloan & Bowe, 2014; Yuksel & Yildirim, 2015). Aligned to the tenets of Heideggerian philosophy (Reiners, 2012), this study of experience (Friesen, Henriksson, & Saevi, 2012) abstracted and articulated emergent themes from key stakeholders’ experiences into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use. This methodological choice was influenced by 1) the research aim, which sought to understand and interpret key stakeholders’ EOT experiences in BTEs, 2) the central research questions (Marelli, 2016), which were: What were the EOT experiences of key stakeholders in BTEs? and What interpretations could be drawn from their meanings? and 3) the researcher’s “interest in the meaning of a phenomenon as it [was] lived by other subjects” (Englander, 2012, p. 14).

A group of ten students and ten teachers from institutes in New Zealand and Australia were selected as participants using a purposive sampling strategy (Yuksel & Yildirim, 2015). This method ensured that data would be obtained from individuals with first-hand experiences of the phenomena (Waters, 2016), in support of the aim of phenomenology, to understand a particular phenomenon “from the point of view of the lived experience” (Englander, 2012, p. 16). The rationale for this number was based on literature about phenomenological research. Englander (2012), for example, indicated that a large sample size, especially when it concerned qualitative research, was not a prerequisite for generalisable results. Nicholls (2009b) explained that “phenomenological studies … commonly use[d] as few as five … participants” (p. 639). Rawat (2014) similarly stated that normally “four or five respondents” were selected for in-depth interviews. It was on this basis that 20 participants were chosen (Englander, 2012; Nicholls, 2009b; Padilla-Diaz, 2015).

Further criteria was set to refine the selection of participants. To be interviewed, they had to be teachers on full-time tenure with an accredited tertiary institute, delivering an academic course in a blended learning mode or students aged 18 years or older, enrolled fulltime with an accredited tertiary institute and in an academic course delivered in a blended learning mode. Teachers were identified from university website profiles of academic staff teaching in New Zealand or Australia. Students were identified with the assistance of a staff member at each institute. Invitations sent to participants indicated that participation was voluntary. Attempts were made to recruit both male and female participants.

The rationale for the selection of only teachers and students was based on a study by the author (In review), which identified key stakeholders in BTEs, and described their contributions. Through a review of literature about key stakeholder identification (Chapleo & Simms, 2010; Coleman et al., 2013; Gross & Godwin, 2005; Leiszyte, Westerheijden, Epping, Faber, & De Weert, 2013; Mainardes, Alves, & Raposo, 2013; Power & Morven-Gould, 2011; Sanderson, 1997; Singh & Weligamage, 2012; Tang & Hussain, 2011; Wagner, Hattie, & Head, 2008), and qualitative interviews with 13 blended learning experts from New Zealand, Australia and Canada, students and teachers were shown to be among those identified most prominently and frequently as key stakeholders in BTEs. Students were identified as key stakeholders by 12 out of 13 experts, because of the need for them
to “buy into” blended learning, “participate fully, and be convinced” of its value (p. 5). Their ability to support discussion, deliver feedback, and enhance “connectedness or community” (Balaji & Chakrabarti, 2010, p. 17) contributed significantly to the success and value of learning experiences (Tuapawa, 2016b). Teachers also were identified as key stakeholders by 11 out of the 13 experts, and considered by nine of them to be among those contributing most significantly to BTE success, due to their immediate and direct involvement in the teaching and learning process, and their day-to-day focus on and influence over blended learning experiences.

Phenomenological interviews, known for being “exceedingly common in qualitative research studies” (Nicholls, 2009b, p. 640) were appropriate for gathering idiomatic data. These interviews followed a semi-structured format, and were conducted via online video-conferencing technology (Skype) and audio recorded using Pamela software. Participants sat aside at least 45 minutes of uninterrupted time to engage (Sinon & Goes, 2012), and were asked a series of twenty-seven questions. They responded with first-hand narratives (Dowling & Brown, 2012; Moustakas, 1994; Waters, 2016) of their EOT experiences, which included descriptions about their use of different types of EOTs to interact with different sets of key entities (students, teachers, and content). Specifically, participants were asked for a “description of a situation in which [they had] experienced the phenomenon” (Englander, 2012, p. 25) of using an EOT in a BTE. The situational aspects of their descriptions were vital to the research, since understandings of a phenomenon [i.e., using an EOT] had to be “connected to a specific context in which the phenomenon [was] experienced” [i.e., a BTE] (Englander, 2012, p. 25).

To encourage a frank portrayal of the phenomena, the interview questions were carefully constructed to elicit descriptions of experiences that included EOT challenges. Probes were used to clarify the meanings of responses and encourage participants’ in-depth explanations (Lester, 1999; Penner & McClement, 2008; Waters, 2016) and rich descriptions of their “conscious experience” (Martin, 2010, p. 1). As a result, participants detailed ‘the phenomenon in their consciousness’ (Wikispace, 2015, p. 1), rendering valuable idiomatic narratives that supported understandings of the phenomena.

The questions were also framed to stimulate participants’ recollections of their EOT experiences or encounters with different key entities. These types of encounters were based on the Classification by Interaction taxonomy augmented by Culatta (2011), and the original classification proposed by Moore (1989). This taxonomy categorised technologies by the relationship between learners and other parties. The first three interaction types of the original taxonomy were: 1) Learner to expert, 2) Learner to learner, and 3) Learner to content. Culatta (2011) presented a fourth category: 4) Learner to context. Tuapawa, Sher and Gu (2014, 2016), proposed a fifth category: 5) Learner to media. These categories were adapted to facilitate and structure interviews with teachers, as follows: 1) Teacher to student, 2) Teacher to teacher, 3) Teacher to content, 4) Teacher to context, and 5) Teacher to media. The use of the relationship-based classification system for structuring the questions helped refine participants’ experiences into relevant and recognisable EOT interactions. It revealed distinctions between phenomena occurring in different key relationships, and set in place a structure through which to organise the themes, or essential meanings about the phenomena (Waters, 2016). Table 1 outlines the questions asked of students about their EOT experiences with content.

<table>
<thead>
<tr>
<th>Interaction Type</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learner to content</td>
<td>Question 3: a) Describe an experience in which you used an EOT in a ‘learner to content’ interaction while studying in a BTE? b) Did you face issues or challenges using the EOT in this case? Explain. c) What do you think would be a solution to this issue? d) What do you think would have helped you make more meaningful use of this EOT? e) Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>
To encourage conversation and promote a connected, comfortable atmosphere, the researcher adopted a personable, inquisitive and mindful disposition (Yin, 2015). Thoughtful engagement with participants, a sensitivity towards their challenging issues, and conversational qualities in “talking to people” (Nicholls, 2009a, p. 533), helped to solicit their perspectives (Saldana, 2011, p. 75). It also ensured that “sufficient interview data” (Saldana, 2011, p. 34) was drawn until the point of saturation was met and repetition occurred.

Recordings of the interviews were transcribed using pre-formatted question-and-answer templates. This process, although time-consuming, enabled and propelled the researcher to develop an intimate level of familiarity with the content (Daniela, 2016), and prepare it for examination. Yin's (2015) five phases of qualitative data analysis, 1) compiling, 2) disassembling, 3) reassembling, 4) interpreting, and 5) concluding were used to frame and structure the analysis. Table 2 demonstrates the link between these five phases, and the phenomenological techniques used.

NVivo software (QSR International, 2015) was used to import, compile, and organise the transcripts into a logical filing structure (Yin, 2015). Data from these documents were disassembled into smaller pieces and coded. Using the Nodes coding function, the data was separated into categories that corresponded to the interview questions. These nodal categories, which were labelled using truncated versions of the questions, represented the data clearly, and enabled it to be logically assigned, labelled, referenced, and contained in manageable groupings (Williams, 2003). Table 3 demonstrates the link between the node labels used for coding the data, and the interview questions.

The data were then reassembled, which required that they be transferred from the nodal position into analytic memos (Yin, 2015), where they could be used to elaborate ideas and insights (QSR International, 2015) and help develop understandings about the phenomena (Saldana, 2011). Finally, the data were subjected to an interpretation, through a thematic analysis, which involved an abstraction and synthesis of local and global themes (Padilla-Diaz, 2015) using a reflexive perspective (Sloan & Bowe, 2014). In this process, themes, the essential meanings of or aspects associated to the

**Table 2. Phases of qualitative analysis vs interpretive phenomenological research techniques**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage Description</th>
<th>Phenomenological Research Technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compiling</td>
<td>Data transcripts imported and arranged</td>
</tr>
<tr>
<td>2</td>
<td>Disassembling</td>
<td>Data descriptions coded using nodes</td>
</tr>
<tr>
<td>3</td>
<td>Reassembling</td>
<td>Memos used to develop understandings of phenomena</td>
</tr>
<tr>
<td>4</td>
<td>Interpreting (thematic analysis and interpretation of data)</td>
<td>Local and global themes abstracted, meanings of experiences articulated through written interpretations</td>
</tr>
<tr>
<td>5</td>
<td>Concluding (conclusions and recommendations)</td>
<td>Interpretations used to inform recommendations for effective EOT use that supports stakeholders' needs</td>
</tr>
</tbody>
</table>

**Table 3. Nodes linked to student interview questions**

<table>
<thead>
<tr>
<th>Node</th>
<th>Node Description</th>
<th>Related Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Learner-to-content Q1a</td>
<td>Describe an experience in which you used an EOT in a learner-to-content interaction while studying in a DTE?</td>
</tr>
<tr>
<td>12</td>
<td>Learner-to-content Q3b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain</td>
</tr>
<tr>
<td>13</td>
<td>Learner-to-content Q3c</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>14</td>
<td>Learner-to-content Q3d</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>15</td>
<td>Learner-to-content Q3e</td>
<td>Did you experience benefits in using this EOT? Explain</td>
</tr>
</tbody>
</table>
phenomena, were discovered through thoughtful engagement with the descriptions of stakeholders’ experiences (Waters, 2016), into a series of written interpretations, to bring to light the phenomena (Sloan & Bowe, 2014) of EOT use. The global themes, which were broad in significance, generated high-level interpretations of the phenomena. The local themes, developed through a deep but narrow scope, derived meanings from the use of individual EOTs.

The highlighted example in Figure 1 conceptualises how the data were gathered, transcribed, sorted and coded and stored using nodes, refined into a student-to-content based memo, and interpreted through an analysis of local themes, which provided the basis for the discussion of results in this paper.

**DISCUSSION OF RESULTS**

This section articulates the local themes that were abstracted from students EOT experiences with content. These are delivered as a series of written interpretations of students’ lived experiences (Sloan & Bowe, 2014; Waters, 2016), and organised into seven sections according to the EOT types students had identified: Learning management systems (LMS) (Blackboard, Moodle), online library catalogue (NEWCAT+) and e-portfolio tools, lecture capture/web cast tools (Echo 360, Blackboard Collaborate), and online video platforms (YouTube). Each of these sections includes a description of the EOT brand exemplar, a series of local themes related to its use, and an interpretation of students’ experiences, which include their comments on EOT issues and challenges, potential usage, solutions and benefits. The labels used to describe the EOT types are based on the Pentagon model (Tuapawa et al., 2014, 2016), a robust, contextualised, and multi-dimensional framework for categorising EOTs.

**EOT: Learning Management System**

Example: Blackboard

- **Description:** Blackboard is a comprehensive and flexible e-learning software platform that delivers a complete course management system (Blackboard Inc., 2013b). It can be used as a repository for learning resources or as “an e-learning portal around a particular programme of work, course or set of activities” (Tuapawa, 2017, p. 4).
- **Themes:** Enhances engagement with content, more practical than face-to-face, frustration at access issues and broken links, inconsistent policies concerning access to academic texts, and inconsistent page design;

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**Figure 1. Process of data analysis**

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TRANSCRIPTS</th>
<th>NODES</th>
<th>MEMO</th>
<th>THEMATIC ANALYSIS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student 1</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 2</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 3</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 4</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 5</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 6</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 7</td>
<td>Q3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student 8</td>
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<tr>
<td>Student 9</td>
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<td></td>
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<tr>
<td>Student 10</td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

Q3c: Participant 1 response to Question 3c.
Q3c: Participant 2 response to Question 3c.
Q3c: Participant 3 response to Question 3c.

Analytical tools relevant to participants responses for Question 3c.

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Experiences: The experiences of students using Blackboard to interact with content revealed the use of this EOT to be widespread, but also signalled that certain improvements to its content functionality would significantly enhance its effectiveness. Negative views emerged from experiences involving the lack of access to learning resources, due to broken links and restricted access levels, inconsistent policies concerning access to academic texts, and inconsistent page design. Students were frustrated at the occurrence of broken links, or links for which access was denied. For one student, ‘video links [didn’t] work, or the link [was] locked’. While trying to access online resources, he noted that ‘a lot of the links were bad’, making it difficult to ‘move around without pressing back, back’. Although the teachers ‘put up good stuff for you, you [couldn’t] get into it’. Frustrated at the extent to which this problem occurred, one student complained ‘this happens over and over.’ Students then had to ‘spend hours and hours trying to find answers to questions’, which ‘was very frustrating’.

Students also expressed frustration over design inconsistencies that occurred across course pages, resulting from non-standard customisations applied to page layouts. Non-generic page designs created navigational issues, confusion, and a situation wherein students wasted time searching for familiar elements. Explaining the issue, one student asserted that ‘every page...set up [in Blackboard was] slightly different to the others’, and so effort was expended on identifying the location of required texts. ‘It’s a minefield’, because to find what was needed, ‘you really had to trawl through it.’ Students requested that those uploading content simply ‘put the same things in the same spots’, work at ‘displaying it better...[using] the right titles...[to make it] easier to get around.’

The inconsistency around posting academic content also raised issues for students. Regarding the provision of direct online access to excerpts ‘some lecturers [said] no, there’s copyright issues, [and] we can’t post it up’, so ‘you’ll have to go and look for it yourself.’ Conversely ‘some lecturers just put it up there’. Unsure of which rules applied, one student responded apathetically, ‘I don’t know who’s right, or if they’re just lazy, or what the policy really is.’ But the effect of the experience was ‘very frustrating.’ ‘You search[ed] for it yourself...[asking] have I got the right article? Because the link didn’t work.’ Regarding support for accessing content, one student said of his teacher ‘he’s hopeless.’ Others advised that ‘only having part of the journal article up’ was due to ‘licensing restrictions’. This challenge created negative experiences. Students felt the solution was to ‘have the license’, ‘put the whole book or chapter up’ and ‘crush these problems getting into things’. Others suggested transferring and reformatting the content from the original academic texts, and uploading these as plain text documents ‘because you [didn’t] have any issues with a text document, it always work[ed]’; and prevented the likelihood that content was ‘not going to work along the way’.

Despite unfortunate experiences, students acknowledged the function that Blackboard played in enhancing engagement with content from distance learners, many of whom ‘work[ed] full-time’ and found using this tool ‘more practical than standard face-to-face’. One student remarked that ‘without Blackboard, [they] couldn’t be a distance student at all.’ Another stated that ‘unlike in an offline environment’, the use of Blackboard helped her to understand ‘very broadly where the whole class [was] up to’.

EOT: Learning Management System

Example: Moodle

Description: Moodle is a learning platform designed to provide education stakeholders with a secure and integrated system for creating personalised learning environments. It delivers a set of education-based tools and learning environments that support teaching and learning (Moodle, 2015). Various features include “the chat mode, online forums, online quizzes”, links to “pre-recorded videos” and additional activity-based tools (Tuapawa, 2017, p. 8);
**Themes:** Potential for expanded features and use, affords flexible out-of-class communication, simple to use, unrestricted access to learning activities, access to archived material useful, denial of access to content, lack of system orientation, lack of instructions for forum usage, and overdose of text, dated layout and design, lack of training for tool, difficulties understanding students with poor writing skills;

**Experiences:** Students' descriptions of their experiences using Moodle to interact with content revealed their positive views of its functionality and potential for expanded features and use, but negative views about format and layout, lack of system orientation, lack of instructions for forum usage, and overdose of text. They used Moodle to read learning material and access online texts and link to other resources. At times however, access to relevant content failed. Although teachers 'put YouTube videos into their lectures... the links didn't always work or the sound wouldn't work.' Content for which access was denied only frustrated student's efforts to engage with online materials. About the quality of content provision, one stated 'they need to be more professional about the whole system', 'it needs to work all the time'.

Discussion forums on Moodle provided an 'opportunity for people to post links, or items of interest' and interact with this content. Students signalled that certain improvements to its functionality would significantly enhance its effectiveness. 'It's not easy to move around in, without pressing 'back, back'. Some students complained about the layout, design and general appearance of the content in Moodle. 'It looks dated. None of the 18-19 year olds use it... it looks terrible, like something from the nineties'. One student was irritated at the lack of Moodle-based training, or 'dedicated sessions, an idiot's guide to Moodle'. Although being 'taught how to login, and [shown] basic features... there were lots of [other] things [they] discovered... [that] weren't explained.' 'A good orientation' to the system would have helped, because 'to the uninitiated, it was a minefield'.

Students also voiced their concern about the lack of instructions for forum use. 'There are no guidelines on what could be posted'. This resulted in an overload of distracting content posts from a 'socially awkward' individual. 'One guy posted a lot,' said one student, and 'sometimes [the content] was totally irrelevant'. Quality over quantity was required. One student explained that discussion posts 'need[ed] to be well written', because while Moodle provided a 'good way of communicating and sharing info, it is purely text.' Ineffective use of content by teachers created difficulty for students during exam preparation periods. One student explained 'there were times when I was in exams... in panic, because the questions being asked were not actually [the] course content' or 'lecture notes' that had been placed on Moodle for revision purposes.

Despite these negative experiences, students recognised the function Moodle had in enabling engagement with content, including being able to access lecture material at 'anytime, [without] having to be there'. They also found the presentation of content in a range of formats including 'video, text, audio... lots of different kinds of information', 'extremely helpful in doing assignments', particularly when these resources contained 'content specific to the assessment you're doing'. The ease of obtaining knowledge 'for one-off information gain' was valued. Moodle 'is an archive', which allowed new students to 'go back and see what people were saying last year about the exam topic.' Doing this proved useful for one student, who could 'cross reference and [develop insights on the content of exams].'

Students appreciated how forums provided a method to read, and 'articulate... to the entire class, [where]... everyone [got] the same message... rather than verbalise complex issues' in class. Forums provided a valuable space to place information that students 'could refer back to...something that needed to be elaborated on in class'. While the accessibility of Moodle across devices rated highly amongst students who could use 'an app on [their] phone for Moodle... [to] reply to forum posts' and engage with content, not everyone was aware of it. 'If they were, they would contribute more often, because it's more convenient.' The need for accessibility also extended to other areas, including language. 'Students need[ed] to consider the English levels of other students when producing content, because "some might not understand [certain] words." The recommendation for overcoming this
barrier was for native English-speaking students to write in a way that demonstrated ‘consideration to those who [were] reading.’

**EOT: Online Library Catalogue**

Example: NEWCAT+

- **Description:** NEWCAT allows students at the University of Newcastle, Australia to search the majority of the Library’s resources using a single search box, and view the results in one list. It includes both the library catalogue and more than 360 journal databases, enabling access to books, journal articles, conference papers, and more (University of Newcastle, 2015).

- **Themes:** Inefficiencies in sourcing literature, unwieldy access and technical issues with login access, timing out issues, broken links, valuable for accessing vast amounts of material.

- **Experiences:** The experiences of students using the online University library to interact with content revealed negative views of its use as a tool for sourcing academic literature. Describing the unwieldy access and technical issues they experienced, one student admitted that ‘the library website...log[ged] you out in a haphazard manner’, which meant ‘you ha[d] to re-login to see everything’. Unfortunately however, the ‘e-books you’[d] opened ha[d] timed out, [so] then you’[d] have to re-login and find the book and reopen the book’, which caused frustration and wasted time. Other students expressed their annoyance over finding a link to an article that ‘[didn’t] actually exist in the database’. One said that although ‘a link to a book or a journal’ would exist, ‘you [had] to click on it about three times to finally view the article’, only to receive a message which stated ‘it [was] unavailable’. Concerning access to learning resources, students vented their irritation, demanding ‘do they have it or not? Has anyone got this journal article? Has anyone got access?’ Broken or outdated links created difficulty and frustration for students who were prevented from sourcing necessary information in a timely manner. ‘It just waste[d] your time...you lost[ed] track of where you were’. Concerning a solution, students explicitly stated that their institutions should ‘just make sure you ha[d] the right article.’

Concerns were also expressed about the difficulty in locating articles using the search facility. ‘Although you’[d] search for exactly the topic, the journal article...[would] not come up as number one.’ Also, the need to access multiple University systems using separate login details created hassle. ‘You’re already logged into Blackboard, so they knew you’re a student,’ but then ‘you ha[d] to log in with email’, and then ‘you ha[d] to login to the Library’. Students stated that institutes needed ‘to bring all this stuff together into one platform’ to enable ‘access to everything’ and prevent students from having ‘to keep going around in circles.’ Despite experiences that were overwhelmingly negative, one student admitted that ‘there [were] more journal articles [accessible via this tool] than in a physical library’.

**EOT: Lecture Capture/Web Cast Tool**

Example: Echo 360

- **Description:** The Echo 360 Active Learning Platform provides lecture capture and webcast functionalities that enable instructors to record, edit and assign instructional videos, create media-rich course content for live or on-demand viewing, record classroom action and interaction, and turn these into lessons that students can replay (Echo360, 2015);

- **Themes:** Affords flexible access to content, value in repeatable recordings, ineffective hardware use means poor content quality;

- **Experiences:** The experiences of students using Echo 360 to interact with content revealed both positive and negative views about its perceived value. Those who missed live sessions, and who
need[ed] to re-listen, or who work[ed] and [couldn’t] attend lectures’ appreciated being able to
watch lecture recordings. One student explained that since ‘a lot of guys work[ed]’, watching
the lectures meant that ‘[you didn’t] have to work your job around your lecture times’, instead
‘[you could]... just go home and watch it’. This system also enabled students to ‘listen over and
over again and try to understand the points’ without ever having to ‘miss a lecture’. Stressing the
benefit of this, one student remarked that with Echo 360 ‘you [could] really listen to the things
that you [didn’t] get.’ Others however, experienced challenges in using Echo to interact with
content. ‘The links [didn’t] work or the sound [wouldn’t] work’. One student admitted having to
‘reload it a few times’. Another criticised having to view a ‘video [which had been taken] from
the back of the room’, making it difficult to view the content. ‘You [couldn’t] read what’s on the
slides’, and ‘unfortunately, they [couldn’t] release the slides for copyright reasons.’

EOT: Wiki

Example: WikiEducator, WikiSpaces Classroom

- **Description:** A wiki is a website which allows collaborative modification of its content
directly from a web browser, by anyone who has access to it (Boulos, Mammana, & Wheeler,
2006; Malauned, 2012). WikiSpaces, for example, is a social writing platform for education,
which enables users to create a classroom workspace for teachers and students to communicate
(Wikispaces, 2015);
- **Themes:** Enables quick content updates, content is easy to add, valued as a channel for accessing
content to support learning outside of institute, and facility to practise HTML-coding skills;
- **Experiences:** The experiences of students using a wiki like WikiEducator or WikiSpaces
Classroom to interact with content revealed positive views of its synchronous nature and immediate
ability to update and organise content, the freedom and ease with which content could be added
and revised, as a channel for learning materials outside of the institute, and as a facility for
practising coding skills. Students appreciated the opportunity to access ‘more content outside of
the Moodle environment, and outside of class’, and enjoyed having control over content to ‘make
changes’. Editing content using a wiki provided students with ‘HTML practice’, enabling those
whose ‘HTML skills’ needed work to ‘do all the tags, [and] insert the media the old school way.’
Negative views involved the ‘challenge of ever-changing content’ from a lecturer who would
update ‘on the fly’. Other challenges included the onslaught of spam from other public users. One
student explained that outside ‘users could create a persona for anyone and make comments’ on
the wiki, and since ‘this tool was not with [the institute’s] boundary of authority, it [became] a
problem for the teacher involved... because it’s the teacher’s initiative.’ While the use of a wiki
was ‘a lot of responsibility for the tutor’, the student experiences of using this tool for interacting
with content was overall positive.

EOT: Online Collaboration Tool

Example: Blackboard Collaborate

- **Description:** Blackboard Collaborate provides a comprehensive online learning and collaboration
platform and enables users to create virtual classrooms that offer an approach to learning while
involving students on an individual level (Blackboard Inc., 2015a). EOTs like Blackboard
Collaborate “facilitate the production of group work” (Anderson, 2007, p. 8) and “provide a wide
variety of capabilities and perspectives” (Zigurs & Munckvold, 2006, p. 144);
- **Themes:** Technical issues, lag time, functionality issues;
- **Experiences:** Descriptions of students’ experiences using Blackboard Collaborate to interact with
content indicated low levels of confidence in its value due to problems with video functionality.
One student stated ‘it [did] not work at all…you [couldn’t] hear the video, or the audio cut out, or [lagged] a long time.’ Frustrated with this tool, another student remarked ‘Collaborate [was] so bad, it’s just not holding up to what it’s supposed to do.’ Technical issues impacted on other learning experiences. Disappointed, one student revealed how one of our assignments got the can because [Blackboard Collaborate was] not good enough. ‘It just wouldn’t work.’ To overcome this issue, video content was uploaded ‘to YouTube instead of Blackboard’ for lecture viewing, because the content was ‘certainly a lot easier to view’ and did not ‘drop in or cut out.’ Students’ preference for YouTube versus Blackboard to view video lectures also existed because ‘everyone knew it.’ To address video-related problems, one student suggested ‘uploading videos in one format [which] worked’ across programs and devices. ‘Even if they had to change [or reformat] it before…upload’ this would ensure compatibility and prevent technical issues. Giving an example, he indicated that ‘nearly every computer [could] see a Windows media file’.

**EOT: Online Video Platform**

**Example:** YouTube

- **Description:** YouTube is a popular website platform designed to enable users to upload and share videos that can be viewed by anyone (Digital Unite, 2015). It is an ‘social, broadcasting and asynchronous learning tool’ that supports the application of learning (Author et al., 2014, 2016) and utilises repositories to enable users to manage their profiles, share content and collaborate (Churchill, Wong, Law, Sulter, & Tai, 2009).

- **Themes:** Useful as a platform for sharing video content to enhance learning, preferable to Echo 360 for viewing media, easy to change quality of content, demonstration of tasks easy to understand, close up videos near to task rather than recorded from back of room, easy to filter between useful and irrelevant or distracting material, value in repeating recordings.

- **Experiences:** The experiences of students using YouTube to interact with content revealed positive views of its usefulness as a platform for sharing video clips to enhance learning. It’s power to facilitate learner to content interactions and support learning was particularly noticeable, to the extent that students preferred viewing media from YouTube rather than the institute-preferred program, Echo 360. ‘You could change the quality really easily,’ whereas ‘the Echo centre…would drop in and out.’ The demonstration of tasks was more easily viewable and understandable via YouTube, than on other platforms. YouTube’s videos were used to illustrate complex concepts or processes by visually demonstrating the steps or ideas involved. One student explained how his lecturer used [YouTube] ‘[to] explain…[a task using] spreadsheets’, and although able to facilitate this task himself, the lecturer ‘liked the way [the presenter] did it, so he sent us the video’, which resulted in an enhanced student learning experience. ‘I found that really helpful, because the [presenter]…knew what he was doing…you could see the computer screen…it was visual [and]…a really good thing.’ Students preferred a learning experience in close proximity to the task, rather than ‘a camera at the back of the room’, and recommended that lecture demonstrations delivered in a YouTube-style manner ‘would be easier to use’.

Students also enjoyed using YouTube’s subscription service to access streams of content. ‘Once you’ve found a good video, [subscribe] to that, and find out what others are looking at.’ Concerning the delivery of a video in a presentation, students recommended that clips be ‘embedded’ in the PowerPoint rather than linked, to prevent getting ‘distracted with all the other topics’ displayed in YouTube. They found it easy to filter between useful and irrelevant or distracting material. With YouTube, ‘you find out who’s talking crap’, try and ‘get to the good stuff quickly’, and to support
learning ‘keep the content good and solid, rather than the waffly stuff.’ Students enjoyed the inherent media player benefits of being able to re-watch video content. ‘If you’ve zoned out...you can just...watch it again, as opposed to when you’re at school’. Students felt that YouTube enabled them to ‘concentrate on the learning’.

Students’ EOT experiences with content were varied and informative. Their descriptions indicated that effective EOT use contributed to enriched student-to-content interactions, whereas ineffective use created challenges that negatively impacted on learning. Students’ vivid descriptions of EOT challenges delivered a realistic portrayal of the phenomena, and demonstrated the extent to which these obstacles limited their participation in learning. Some expressed frustration, disappointment, and anxiety when faced with technical or accessibility issues, and others voiced their complaints.

Despite negative experiences, their recognition of the role EOTs played in enabling engagement was evident. Students valued EOT experiences in which content, displayed “in a variety of modalities, such as text, audio, visuals, videos, and multimedia” (Serdish, 2015, p. 66), was well laid out and designed, freely accessible from a distance, could be updated quickly, was repeatable, and easy to understand. It was counted on to help present, transmit, build and enhance subject knowledge. Its ability to support learning in an efficient, flexible, “intellectually stimulating” (Origin Learning, 2015), and practical way contributed significantly to the success of learning experiences. These content characteristics promoted positive experiences and reinforced to students the value of using EOTs for learning.

Students indicated that improvements to EOT functionality, accessibility and design would lessen certain challenges, and enhance their interactions with content. Their recommendations for solutions to these obstacles signalled that they wanted change and relevant support, to ensure their commitment to EOT use.

RECOMMENDATIONS

A summary of recommendations for addressing some of the EOT challenges described in students’ experiences is outlined below:

- Teachers consider the use of YouTube videos to visually illustrate a complex concept, and add annotations and links to provide additional resources (Pappas, 2014);
- Determine who the users are and ensure there is a moderator to ensure contributions fit the goal and format (Malamed, 2012);
- Teachers consider providing or facilitating access to student training in using key LMS features and functions. Ensure guidelines to effective LMS use are provided. Consider developing demonstrations of how to use LMS, using ready-made visual demonstrations such as slide casts or screen casts;
- Encourage native English-speaking students to make written online communications easy to understand and read for students of other cultures
- Teachers ensure all required online learning content is accessible to students at all times;
- TEIs investigate the potential for modernising LMS design features to improve general style and appearance;
- TEIs investigate access issues with online library catalogue, and increase awareness of policies about access to academic literature. Ensure library links are updated and material is easily accessible, and make students aware of training available for system use;
- TEIs consider potential for centralising various systems with central access point;
- Consider mindful how live sessions are organised and recorded to ensure that in-class learning activities are delivered effectively to distance learners: e.g. positioning of camera to record session clearly;
• Managers encourage teachers to engage best practices in course page design, employed effective design principles such as clarity, concision, familiarity, consistency with layout, positioning, size, and colour (Garton, 2012);
• Teachers encouraged to employ good usability principles to make content learnable, efficient, memorable (Voyton, 2014). Organise content so it appears and operates in predictable ways through lists, menu items, and clear structure.

CONCLUSION

This research made a phenomenological interpretation of key stakeholders’ EOT experiences to strengthen understandings about their EOT needs and challenges and provide a basis from which to recommend methods for effective EOT support. It analysed the EOT experiences of ten students and ten teachers from TEIs in New Zealand and Australia and interpreted the meanings of the phenomena through an abstraction and articulation of local and global themes. This paper was the third in a series of six publications that presented the local themes of this research. It documented the interpretations of students’ EOT experiences with content, in reference to their use of six different EOTs: Learning management systems (LMSs) (Blackboard, Moodle), an online library catalogue (NEWCAT+), lecture capture/web cast tools (Echo 360), wikis (WikiEducator), online collaboration tools (Blackboard Collaborate), and online video platforms (YouTube).

Students’ EOT experiences with content were varied and informative. Their descriptions indicated that effective EOT use contributed to enriched student-to-content interactions, whereas ineffective use created challenges that negatively impacted on learning. Content impacted experiences through its format and structure, quality of delivery, and level of accessibility. The interpretations, which delivered insights into the reality of students’ EOT challenges and needs, helped to form a set of recommendations for effective EOT use, to assist TEIs in their efforts to address EOT challenges and needs through relevant, meaningful EOT support.

Limitations were noted. For example, the small sample size characteristically used in phenomenological studies made it challenging to generalise results across large populations (Waters, 2016). However, the descriptions of key stakeholders’ experiences provided a rich and authentic means from which to extract deep levels of knowledge about the phenomena. Although individual experiences were unique, their interpretations established themes that were common across homogenous participants. Also, while an interpretive phenomenological approach supported the researcher’s “interest in the meaning of a phenomenon as it [was] lived by other subjects”, it also permitted their personal preconceptions to affect the analysis of data (Reiners, 2012).

The interpretations in this research could be used to support understandings about other similar EOTs. For example, the themes drawn from students’ experiences with Blackboard could be applied to Moodle. This research has the potential to be replicated and applied to other TEI stakeholders, such as managers or technical support staff. to strengthen understandings about their EOT obstacles and needs.
REFERENCES


Tuapawa, K. (in review). Identifying key stakeholders in blended tertiary environments. 15.


ENDNOTES

1 The term ‘content’ refers to educational materials, including sound, text, graphics, and video (Moore, 2013). Student to content interactions “can take many forms and serve a variety of functions” (Moore, 2013, p. 258).

2 The views expressed by participants reflect the stage of development of software at a particular point in time, the ways in which it was implemented and maintained, and the manner in which it was used. Notwithstanding these realities, much can be gained from the comments of participants.
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8.11 Paper 11

Paper 11 is entitled “Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Students in Blended Tertiary Environments: A Phenomenological Study.” It was accepted for publication in the International Journal of Information and Communication Technology Education (IJICTE).

Contribution to research

Paper 11 was the fourth in a series of six publications that formed the output of phenomenological research. It maps directly to research objectives 3 and 4, and outcomes 3 and 4 (see Figure 2). Through qualitative analysis involving the abstraction of themes, this paper made an interpretation of teachers’ EOT experiences with students, in reference to their use of three types of EOTs. Its interpretations, which included descriptions of teachers’ EOT challenges, would assist TEIs in their efforts to address EOT challenges, meet stakeholders’ needs, and deliver relevant and meaningful EOT support.

While Paper 11 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. This research endeavour made a significant contribution to its overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a compelling first-hand insight into the phenomena of key stakeholders’ EOT experiences.
Interpreting Experiences of Teachers Using Online Technologies to Interact with Students in Blended Tertiary Environments

Kimberley Tuapawa, University of Newcastle, Callaghan, Australia

ABSTRACT

This paper is part of a phenomenological study that examined teachers' and students' experiences using Educational Online Technologies (EOTs) in Blended Tertiary Environments (BTEs). Its aim was to understand how EOT engagement was experienced, to inform insights on EOT interactions, challenges, functionality and benefits. Semi-structured interviews were conducted with 10 teachers and 10 students from New Zealand and Australia, and their EOT experiences explored, under a range of different interactions. A series of six papers, each based on a specific interaction type, detailed their experiences. This paper reports on teachers' EOT interactions with their students, in reference to three types of EOTs: Learning management systems, online video platforms, and online networking tools. Key aspects of the research approach adopted were detailed in the first of these six papers, and included the research questions, research significance, and research methodology. The strategies and rationales for participant selection, participant numbers, inclusion and exclusion criteria, data collection, and data analysis were also explained (Tuapawa, n.d.-a).

KEYWORDS
Blended Learning, Online Technology, Phenomenology, Tertiary Education, Teacher Experiences

INTRODUCTION

Educational online technologies (EOTs) have revolutionised the delivery of online education, making a significant contribution to the global increase in demand for higher learning. In an era of unparalleled online growth, their rapid emergence, adoption and demand has engendered significant advances across the higher education sector. Traditional learning spaces have evolved into dynamic blended tertiary environments (BTEs), providing tertiary education institutes (TEIs) with a modern means through which to augment course delivery. These digital transformations signal exciting prospects for teachers and students, the key stakeholders in BTEs. Predictions about future online learning, and the extent of recent growth, along with forecasts for EOT use are discussed in the first of these six papers (Tuapawa, n.d.-a).

Despite the significant growth and demand for online learning, considerable obstacles impede the use of EOTs. Such challenges include, but are not limited to, attitudinal pre-dispositions and institutional barriers, insubstantial training, and inadequacies in instructional design support (Panda & Mishra, 2007). Other challenges include resistance to change, ineffective EOT usage, lack of motivation, technical constraints, and accessibility (Tuapawa, 2016). These challenges pose a clear risk to the future success of BTEs (Moskal, Dzibon, & Hartman, 2013), and create difficulties for stakeholders as they deliver and engage in learning.

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Significant efforts have been made to better understand EOT challenges. This has resulted in considerable subject-specific research, with varied and noteworthy contributions to the literature. Some of these studies have focussed on technology integration into blended environments (Moore, 2013), technology to support institutional roles (Hynd, Gibbons, & Fonda, 2009), barriers to adoption of online learning (Bacow, Bowen, Guthrie, Lack, & Long, 2012), and the needs of online students (Mupinga, Nora, & Yau, 2006).

However, while “our research foundation is rich” (Paasen, 2013, p. 299), not all problems have been adequately identified and addressed. The nature and extent of EOT challenges change over time, as technology advances and stakeholder needs evolve. Gaps therefore exist, and unfortunately “significant challenges are preventing widespread effective implementation” (Nagel, 2013, p. 1), which collectively concerns TEIs. Some feel that “it is the university leadership... it is the leader of a university who must... see that... it happens... if widespread change is to occur” (Christie & Jurado, 2009, p. 278). Responsively, TEIs, many of whom are “under significant pressure to provide affordable, sustainable approaches” have collaborated to expand their knowledge-base of the value of online technologies (Beckem & Watkins, 2012, p. 61). Educationalists, administrators, and other key stakeholders have also striven to develop and adapt their technological knowledge and skills (Gregory et al., 2010).

However, the persistence of EOT challenges suggests that some stakeholder needs remain unmet, and that further action is required. Stakeholder needs in modern BTEs have shifted and are evolving; and in an environment of rapid change, are not being understood and addressed effectively. Adding to this, Mostal et al. acknowledge the environments under which these problems arise. They observe that TEIs accept the status quo, and that “ultimately, blended learning has become an evolving, responsive and dynamic process” (2013). While this transience may cast doubt on the on the longevity of new research, it provides strong reasons to obtain up-to-date solutions to real-time problems. The dynamic nature of TEI environments means that their relevance is dependent on their ability to evolve and adapt to the needs of key stakeholders. It is therefore imperative that they have a clear and current understanding of the EOT challenges facing teachers and students in BTEs, to deliver relevant, meaningful support.

This research addresses a gap in knowledge about EOT challenges, using a phenomenological approach to generate explanations about how EOT engagement is currently experienced by teachers and students. It creates a compelling and informative basis from which TEIs can understand how, why and where EOT support for stakeholders is necessary. Close analysis of the experiences also informs insights on EOT interactions, functionality and benefits. The outcomes assist TEIs to design approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful support to key stakeholders, and inform institutional strategies, to strengthen the future of BTEs. The meanings of these experiences may be applied across TEIs to enhance future EOT experiences, and provide informed stakeholder support. However, their application to developing nations without the infrastructure to support mainstream EOT usage is limited. Future studies could address this gap by examining and applying the findings of key stakeholder EOT experiences in developing nations.

METHODOLOGY

Phenomenological interviews were conducted with ten students and ten students from TEIs in New Zealand and Australia. The aim was to gather descriptions of their experiences using EOTs in BTEs. Key aspects of this research methodology were detailed in the first paper (Trapp, undated). The interviews were semi-structured, and contained 27 questions. These questions explored the experiences under a range of different relationships, based on different interaction types as represented in the ‘Classification by Interaction’ taxonomy augmented by Culatta (2011), and the original classification proposed by Moore (1989). The ‘Classification by Interaction’ taxonomy categorised technologies by the relationship between learners and other parties. The first three interaction types of the original
taxonomy were: 1) Learner to expert, 2) Learner to learner, and 3) Learner to content. Culatta (2011) presented a fourth category: 4) Learner to context. Tuapawa, Sher and Gu (Tuapawa et al., 2014, 2016) proposed a fifth category: 5) Learner to media. These categories were adapted to facilitate and structure interviews with teachers: 1) Teacher to student, 2) Teacher to teacher, 3) Teacher to content, 4) Teacher to context, and 5) Teacher to media. The use of a relationship-based classification system for structuring questions helped refine participants’ experiences into relevant and recognisable EOT interactions. Table 1 outlines the questions asked of teachers in ‘teacher to learner’ interactions. Questions about other interactions were discussed in other papers in this study.

Interview data was sorted and coded from audio recordings transcribed into pre-formatted question-and-answer templates. NVivo software was used to code and analyse the data (QSR International, 2015). Nodes were used to assign, label, reference and contain data in groupings (Williams, 2003). The assignment of nodes to text segments helped to assemble like-data into meaningful categories. The nodal data was separated into analytic menus to help enhance understandings about various segments (Saldana, 2011). Themes emerging from the memo data were analysed, refined, and used to build the discussion. Figure 1 outlines this analysis process. Using a highlighted example, it conceptualises how the data was gathered, transcribed, stored in nodes, refined into memos, and built into the discussion.

DISCUSSION OF RESULTS

This discussion is based on data from interviews with teachers about their experiences using EOTs to interact with students. It is organised in sections specific to the types of EOTs teachers identified. The EOTs and brand exemplars are: Learning management systems (LMS)(Blackboard), online video platforms (YouTube), and online networking tools (Twitter, LinkedIn). The sections include

Table 1. Structure of teacher interview questions based on teacher-to-student interaction.

<table>
<thead>
<tr>
<th>Interaction type</th>
<th>Questions</th>
</tr>
</thead>
</table>
| Teacher to student | Describe an experience in which you used an EOT in a 'teacher to student' interaction while studying in a BTE?  
Did you face issues or challenges using the EOT in this case? Explain.  
What do you think would have helped you make more meaningful use of this EOT?  
What do you think would be a solution to this issue?  
Did you experience benefits in using this EOT? Explain. |

Figure 1. Process of data analysis

PARTICIPANTS  
TRANSCRIPTS  
NODES  
EOT MEMOS  
DISCUSSION
descriptions of EOT brand exemplars identified by teachers, and descriptions of their experiences. Included in these experiences are teachers' comments on EOT issues and challenges, potential usage, solutions, and benefits.

**EOT: Learning Management System**

*Example: Blackboard*

**Description:** Blackboard is a comprehensive and flexible e-Learning software platform that delivers a complete course management system (Blackboard Inc, 2013). It is currently being 'used for a huge range of activities', and can serve simply as a 'repository' for learning resources, or be used in more innovative ways such as ‘an e-learning portal around a particular programme of work, course or sets of activities’ (Tuagawa, n.d, p. 4).

**Experiences:** The experiences of teachers using Blackboard to interact with students involved extensive use of its various functions, and revealed positive and negative opinions about its ability to support the delivery of learning. Themes emerging from teachers' experiences signalled frustration with usability issues, slow operation, poor design and lack of customisability. The lack of cross-platform compatibility also created negative views, as did a lack of training and development to improve teachers' abilities to provide student support. Teachers valued using discussion forums to engage students, and other features which supported content storage and dissemination. Blackboard's ability to support flexible learning for distance students was highly valued.

Among other activities, teachers used Blackboard for storing and uploading resources, establishing links to content, providing course updates, and creating discussion boards. One teacher described Blackboard as the ‘central [means] to formalising content’, and commented on its value for content dissemination. ‘I like being able to take content from my hard drive and upload to Blackboard,’ he said, ‘because then it has left me, and [exists] in a virtual area that everyone can access.’ Another teacher used Blackboard as an upload point for his lecture recordings, and as a repository for slides that students later used for course revision. Teachers also used Blackboard for creating discussion boards to enable feedback on specific topics. One used discussion forums ‘to facilitate students’ selection of topics...setting it up in such a way that they end up talking to each other’ to establish their topic choice, which is taken on a first-come-first-serve basis. Because student’s ‘see that those topics are already picked...it’s a time saver for me’. Other teachers valued Blackboard’s ability to facilitate discussion between students on ‘what they’d learned’. One teacher used the ‘test feature in Blackboard’ to enable ‘instant feedback’ to students ‘in lower stakes assessments’, valuing its ability to ‘test their knowledge on practise questions’. Others initiated the use of blogs to help students ‘record their learning progressively’, and form ‘the habit of keeping a professional diary’ to support professional development. Despite the advantages in using Blackboard, various challenges impacted teachers’ experiences. ‘Blackboard has quirks’, said one teacher, ‘it suddenly freezess...it is slow, not as quick as students would like, [and] it does not allow for many people to interact at once’. Expressing her frustration, she added ‘I find Blackboard very annoying’ because ‘the screen layout is messy’ and requires that I ‘constantly change tabs’. Blackboard was described by others as ‘clunky’.

Teachers also expressed frustration over the lack of ‘intuitive design’, describing its ‘html style’ as ‘outdated’. One teacher stated that ‘the design of the environment should be more customisable’. A balanced approach using video and text could help get ‘interaction out of [student’s] in a more human way’. Another suggested that an improvement to the asynchronous discussion boards which are ‘too static’, could be made by incorporating a ‘Skype feature’ to enable real-time text or video chat. Teachers emphasised the need for Blackboard to operate effectively ‘across multiple devices’. Although ‘students have iPads, Smartphones, old and new laptops, Mac and windows... the tools just won’t work’. Additionally, ‘[TEIs] don’t seem to keep them updated for the new browsers.’ creating usage difficulties. ‘These days [institutes] should have responsive technologies that work across
devices, especially as we’re relying on students bringing their own [devices]. Teachers stressed the need for cross-platform compatibility to accommodate the needs and expectations of modern-day students, whose ‘attention spans are getting shorter’, and who ‘want access to’ training while waiting for a bus or train. Teachers appreciate that students use their ‘down time to get in and learn’, and therefore ‘the systems must be set up...for a new way of learning and working’.

One teacher felt annoyed that her TEL had ‘upgraded the systems without actually checking with the people who are using them’. In one instance, ‘they’d actually removed some of [Blackboard’s] useful features’. The lack of ‘adequate training’ after system updates created difficulties that ‘hindered uptake’ and caused teachers to ‘think, oh this is just a waste of time’. Others complained of ‘teething issues’ made worse through ‘very poor staff training’. Teachers who ‘get dropped in on Day 1’ are not able to ‘use it as an interactive tool’, or create ‘a comfortable user experience’ for students, rather ‘they just upload stuff and leave it there’. While ‘there are some courses you can do...it’s very centralised’, and teachers are ‘putting barriers up’, and alienating students. One teacher recommended a process of ‘conceptual thinking’ about how to develop ‘Blackboard skills’. He advocated taking time to consider ‘all the things [you] need to deliver’, and ways in which to ‘make...engagement as little hassle as possible’, remove the ‘preciousness’ of course construction, and the ‘locked-in’ mindset of ‘this is my course’. Instead, ‘let people in so they can learn from you and suggest things...let people in to share the information’. This could mean: ‘problems [become] self-sorting’, ‘Rather than coming to me and complaining, [students]...can make the decision themselves.’ Aware that self-managed students helped reduce teachers’ workloads, one teacher stated the ‘key is in helping [students] find the answer [using Blackboard] without relying on me’, thereby ‘minimising the interactions’. Being ‘methodical and organised’ helped. Indicating that this was a gradual process requiring evaluation, he continued ‘each year, I’ve...been able to reduce the number of posts, [but] it’s important to evaluate the learning and content interactions’, so that although processes are streamlined, ‘learning can become better’. The successful management of student correspondence involved having ‘rules of engagement’ to handle ‘communication processes’.

Despite negative experiences, teachers valued ‘the flexible learning process’ afforded by Blackboard, and recognised the role it played in enabling engagement from distance learners. One stated that the Blackboard ‘environment [provided] the only point of contact...for distance learners’. Another teacher who had ‘100 students who learn online’ said that ‘all of these [students] live remotely’. Another used ‘Blackboard to teach courses [to students based] in Vietnam.’

**EOT: Online Video Platform**

*Example: YouTube*

**Description:** YouTube is designed to enable users to upload and share videos that can be viewed by anyone (Digital Unite, 2015). It also utilises repositories to enable users to manage their profiles, share content and collaborate (Churchill, Wong, Law, Salter, & Tai, 2009). YouTube is being used extensively to showcase video clips that support learning. ‘One of the trends’ is to ‘put the media clips on Youtube...instead of using local storage or LMS’ (Turagawa, n.d., p. 9).

**Experiences:** Themes from teachers experiences about the use of YouTube to interact with students showed they valued it as a means to share useful video files, its capacity to showcase hands-on tasks, and deliver practical learning experiences for students. Teachers commonly used YouTube to demonstrate practical tasks to students during class. Explaining its value, one teacher expressed satisfaction in finding ‘an absolutely brilliant 7-minute clip’ to support her students’ learning. Another viewed YouTube as an additional ‘way of sharing information with students’. Alternatively, teachers provided links via Blackboard to video clips for students to view. ‘It often encourages critical thinking [because] I get them to talk about it and share their experiences, what they think of it, [and] how they might use those ideas in their own practice.’ Problems utilising the same video clip arose however, when the file owner removed the file from YouTube, preventing access to the learning material. They take it off, so you have to be
careful...[and] check all the links to material intended for class use. "Especially if I teach a class once a year", said one teacher, "I need to make sure the links work again." Another issue that created challenges involved students' lack of access to broadband to use YouTube. "The bandwidth is abysmal outside of metro areas", and so if students 'haven't got good internet... it might be hard [for them to access resources, and so] I have to be careful of uploading' to this platform. One teacher expressed indifference towards using YouTube. "I would actually need someone to explain how it would increase productivity, I would need that explained to me quite directly for me to even bother."

Other challenges involved the quality of some YouTube videos. One teacher was reluctant to engage with YouTube content unless the files were 'recorded to the quality of the lectures... on TV or on TED talks', which filmed using 'multiple perspectives', and were more likely to increase 'engagement' levels. Otherwise, he asserted, 'you get people standing up' and walking out, 'and it just doesn't work'. In his experience, 'that's the standard students expected.' Failure to achieve this would mean that 'even a good lecture would not be good.'

In other instances, teachers required that students video record a task and upload this file to YouTube. One teacher explained how this method was 'pretty simple' to undertake, and made students' demonstration and assessment of tasks 'easier for everyone'. Another teacher, who anticipated 'that some students might have problems videoing themselves... give them ample advance warning'. Outlining requirements for usage, he reminded the students 'I'm going to expect you to do this, this is your responsibility to start a camera and upload [the video clip] to YouTube.' Expecting that some students might feel 'uneasy about exposing themselves on a public website like YouTube', the teacher informed them that they could 'upload it anonymously'. Reflecting on his experience, he admitted that while students had 'no problems at all', he 'could have done an example demo, and uploaded that for them, as an example to follow'. He continued 'the other thing I could have done was... a tutorial', explaining 'how to upload your video... tips about videoing, and where to put the camera.'

One teacher stated that the use of YouTube supported 'equity between the on-campus and off-campus students', as he 'was able to give the students a similar opportunity to demonstrate their work between the two cohorts.' However, another teacher cautioned 'using [YouTube just] for the sake of it', and hoped that usage was 'for a real purpose' in support of innovation and students' 'experiences for specific interactions... rather than a showy thing'. While the 'related videos' on YouTube were considered as 'really helpful', teachers admitted that it was 'easy to get distracted by other videos'. For others, YouTube delivered an easy and efficient method for uploading and sharing files. 'It's very easy to use. YouTube is very forgiving.' Explaining its ease of use, one teacher stated 'it doesn't matter what format the video is in, you just upload it and [YouTube] will convert it and do everything for you.' Teachers also valued the efficient way in which YouTube handled large files. 'What's awesome about this, is that... it splits your files up, [and] while it's uploading, you can put all the [supporting video] into up.' Others appreciated its visual appeal 'to all types of learners', making it a 'valuable... way of learning.' One teacher believed that YouTube held value for those who found reading difficult. 'YouTube is great for those who struggle with the printed word', applying this to 'young ones [who] are more comfortable with YouTube', rather than 'old ones [who] are more comfortable with written' materials.

**EOT: Online Networking Tool**

*Example: Twitter*

*Description:* Twitter is an information network made up of 140-character messages called Tweets, which registered users can post and read (Twitter Inc., 2015). Twitter is a 'social networking and asynchronous tool' with 'low levels of fidelity' that facilitates 'remembering, understanding,
applying, and analysing techniques, and is being used to support ‘learner to expert’ interactions (Tuapawa et al., 2014).

Experiences: The experiences of teachers using Twitter to interact with students revealed positive views of its ability to ‘add life’ to in-class learning, and encourage student engagement in and out of class. However concerns were raised about privacy, and social equity and its link to a lack of technology to access Twitter. Teachers used Twitter ‘to liven up lectures’ and as a real-time alternative to giving and receiving feedback during lectures. Explaining how this worked, one teacher said ‘I encourage students to use Twitter to comment on what we’re chatting about in lectures.’ In her ‘popular culture course’ she employed a ‘tweet stream’ which engaged students, encouraged on-topic discussion, and provided a means for simultaneous teaching and communication. In-class Twitter activity generated a novel means of engagement with students, and at times became ‘quite hilarious’. Both teacher and students could ‘tweet interesting things into [the course] topic... [using] a hash tag as the course code.’

Twitter was also used alongside other in-class tools. While the lack of ‘technology in [her] classroom’ meant one teacher was unable to display ‘a PowerPoint [presentation] and concurrently show a Twitter feed’, she used her iPad alongside a visualiser to demonstrate engagement on Twitter. ‘When I see that tweets are happening, I’ll flick to the visualiser, and everyone will have a laugh and we’ll look at what’s on Twitter, and what they’re tweeting.’ This activity encouraged class buy-in to the use of Twitter, and enabled shy students to ask questions confidently. ‘Sometimes people will ask a question [in a comical but forthright manner]... like ‘what the hell is she talking about today?’ Question posed in this way provided an opportunity to immediately address confusion with the response ‘Do you need me to clarify?’ She was encouraged that ‘immediate... feedback [was forthcoming] if you used it right.’ Potential improvements to in-class Twitter activity would involve having the ‘Twitter stream alongside the presentation or video screen’, so that both could be viewed at once. Concerns then arose about its potential to ‘distract people’. To support learning in a ‘writing course’, students in one class were asked ‘to submit five wording examples’ to Twitter, to ensure they understood ‘the principle of 140 characters’. Teachers indicated that while Twitter hadn’t been ‘formally incorporated into assessment tasks’, students were encouraged to adopt the ‘idea of positive web presence’ by using such platforms to ‘create a digital persona’.

Twitter was also useful for keeping ‘people engaged between classes’, as ‘students do tweet a lot of the popular culture things between lectures, which is great’. Benefits which arose from Twitter use involved ‘a sense of community between some of the students who wouldn’t otherwise have communicated with each other’. This improved ‘social cohesion in class, and outside of class as well, as I’ve seen them down in the bar.’

Twitter had generated mostly positive experiences, being described as ‘quite good’ and working ‘quite well’. However, teachers were concerned about ‘social equity issues’ that prevented extensive use. ‘Not everyone has a Smartphone or iPad’, and at times staff were ‘reluctant to say I expect everyone to tweet through the lecture’. Limited or no access to technology restricted the use of Twitter, which for teachers created a ‘holdup with... integrating it more’ into learning. In some cases, due to a very high level of lower-socio economic background students’, teachers were ‘not expecting them to have access’ to Twitter. Despite equity issues, one teacher indicated that her ‘engagement with Twitter was student-pushed’. Without an introduction to Twitter by students, ‘I would’ve been a much later arrival and convert.’ Another challenge which arose concerning the use of Twitter related to ‘privacy’. Stressing the importance of ‘self-censor[ing] what [is] put up there’, one teacher admitted having to withhold ‘put[ing] up everything I’d like to blurt’. ‘I have a university following and a professional following’ she explained. Effective engagement without awkward encounters with students on Twitter required finding the ‘right balance between how much of your personal life you intermingle with your professional.’ While ‘I put enough of my personal life to make me seem real’, it is important to ‘keep [students] separate, because it could get very murky.’
EOT: Online Networking Tool

**Example: LinkedIn**

**Description:** LinkedIn is a ‘social networking tool’ designed for the business community, which allows members to establish and document networks or people they know professionally, and requires connections to have a pre-existing relationship (Tech Target, 2013). LinkedIn is being used as ‘a way of... tracking where [students] are going, [and] what they’re doing now’ (Tuapawa, n.d., p. 7).

**Experiences:** The experiences of teachers using LinkedIn to interact with students revealed positive views of its communication facilities, and provision for networking with industry professionals. Teachers were ‘happy to connect [with students] on LinkedIn’, and encouraged them to ‘develop a professional LinkedIn page as part of their... course’. Maintaining ‘a profile’ in a ‘professional space’ helped ‘current and past students’ expose themselves to ‘job opportunities’ and ‘stuff they think others might be interested in.’ One teacher valued the opportunity students had to create ‘a positive web presence’ and ‘digital persona’. A LinkedIn group [was started]... where I communicated to [students] and they to me.’ Students were ‘free to post onto a group page, and this enabled them to ‘message other members.’ Explaining the early success of using LinkedIn to interact with students, one teacher said ‘we’ve got close to 300 members... and we’ve only been going for 6 months.’ Potential existed for companies who employed graduates to ‘endorse our courses, having [received] a fabulous graduate.’ Students ‘are keeping in contact with me and other students via this network.’

Other teachers’ experiences involved the use of Blackboard Collaborate, Instagram, Adobe Connect, PeerWise, Blogs and Moodle.

**CONCLUSION**

Despite the significant growth and demand for online learning, considerable challenges impede the use of EOTs. The persistence of these challenges suggests that some stakeholder needs remain unmet, and that further action is required. It is imperative that TElS have a clear and current understanding of the EOT challenges facing teachers and students in BTEs, to deliver relevant, meaningful support. This paper is part of a phenomenological study that examined teachers’ and students’ experiences using EOTs in BTEs. Its aim was to understand how EOTs engagement was experienced, to inform insights on EOT interactions, challenges, functionality and benefits. Phenomenological interviews were conducted with 10 teachers and 10 students from New Zealand and Australia, and their EOT experiences explored under a range of different interactions. This paper reported on teachers’ EOT interactions with students.

Teachers’ experiences using EOTs to interact with students were varied and informative. Their descriptions indicated that effective EOT use contributed to enriched teacher-to-student interactions, whereas ineffective use created challenges that negatively impacted on teaching. Vivid descriptions of EOT challenges revealed the severity of teachers’ experiences, and the extent to which these obstacles limited their engagement in teaching. Some expressed frustration, disappointment, and annoyance when faced with technical or usability issues, others voiced indifference or confusion. Despite negative experiences, general recognition of the role EOTs played in enabling engagement was evident. Teachers indicated that improvements to EOT usability, customisation, compatibility, and design would reduce certain challenges, and enhance their interactions with students. Recommendations given by teachers for solutions to challenges signalled that they wanted change and relevant support, to ensure their commitment to EOT use. Teachers valued EOTs that afforded flexible delivery, networking opportunities, and enabled practical and novel ways of enhancing student engagement.

The following integrated summary of teachers’ experiences presents an outline of some key EOT issues.
LMS (Blackboard)
- Enables flexible learning and engagement for distance learners, valued for content storage, dissemination and discussion forum features.
- Negative views about usability and technical issues, poor design and lack of customisability, lack of cross platform compatibility, and lack of training to use this tool.

Online Video Platform (YouTube)
- Valued as a means to share useful video files, for showcasing hands-on tasks, and delivering practical learning experiences. Easy to use, and appeals to visual learners.
- Negative views about transience of video files, other videos may create distraction.

Online Networking Tool (Twitter)
- Useful for ‘adding life’ to in-class learning, and for stimulating student engagement in and out of class.
- Privacy issues, concerns about social equity and that a lack of technology limits access.

Online Networking Tool (LinkedIn)
- Positive views of its communication facilities, and provision for networking with industry professionals.

This research used a phenomenological approach to address a gap in knowledge about EOT challenges. By delivering clear, current explanations about how EOT engagement is experienced, it assists TEs to understand how, why and where EOT support for stakeholders is necessary. Close analysis of the experiences in this paper can help broaden TEs’ insights on EOT interactions, functionality and benefits. Application of this knowledge will enable TEs to design relevant approaches to tackle EOT challenges, make informed decisions on EOT use, deliver meaningful support to key stakeholders, and inform institutional strategies, to strengthen the future of BTEs.

While individual experiences of the phenomena are unique and specific to the EOTs identified, the findings may be used to support understandings of other similar EOTs. The meanings of these experiences may be applied across TEs to provide a basis from which to enhance future EOT experiences and provide informed stakeholder support.

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ENDNOTES

1 This is one of a series of six papers that form part of a phenomenological study, which examined teachers’ and students’ experiences using EOTs in BTEs.

2 While individual experiences of the phenomena are unique and specific to the EOTs identified, the findings may be used to support understandings of other similar EOTs.

3 The author has a background in tertiary education, and substantial teaching experience with extensive EOT use. The author has delivered training to both teachers and students on the effective use of EOTs, developed applications and materials to aid EOT use, and conducted and presented research in the areas of EOTs in BTEs. The author holds a Master’s Degree in Digital Media, Bachelor’s Degree in Computing Systems, Diploma in Multimedia and Web Development, Diploma in E-Business, and Diploma in Information and Communication Technology. The lens through which key stakeholder EOT experiences have been interpreted is applied by an individual with comprehensive and credible insights into this subject.

4 To lay a foundation for this study, the author undertook preliminary research to clarify and verify issues from the literature, and create a basis for the selection of stakeholders for the interviews. This research identified EOTs in BTEs (Tuapawa, n. d.; University of Newcastle, 2015), produced a classification system for EOTs (Tuapawa, Sher, & Gu, 2014, 2016), identified stakeholders in BTEs (Tuapawa, n.d.-b), identified EOT challenges of key stakeholders in BTEs (Tuapawa, 2016), and discussed a key challenge (resistance to change) in using EOTs (Tuapawa, 2015).

5 These EOT categories are based on the multi-dimensional taxonomy, called the Pentexonomy (Tuapawa et al., 2014), a robust, contextualised, and multi-dimensional framework for categorising EOTs.

6 Notwithstanding these caveats, the views expressed by participants reflect the state of development of software at a particular point in time, the ways in which it was implemented and maintained, and the manner in which it was used. Notwithstanding these realities, much can be gained from the comments of participants.

7 This word limit of this paper does not permit discussion on teachers’ experiences using these EOTs.
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8.12 Paper 12

Paper 12 is entitled “Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Teachers in Blended Tertiary Environments: A Phenomenological Study”. It was accepted for publication in the International Journal of Web-Based Learning and Teaching Technologies (IJWLTT).

**Contribution to research**

Paper 12 was the fifth in a series of six publications that formed the output of phenomenological research. It maps directly to research objectives 3 and 4, and outcomes 3 and 4 (see Figure 2). Through qualitative analysis involving the abstraction of themes, this paper made an interpretation of teachers’ EOT experiences with other teachers, in reference to their use of two types of EOTs. Its interpretations, which included descriptions of teachers’ EOT challenges, helped to inform a set of recommendations for effective EOT use that would assist TEIs in their efforts to address EOT challenges, meet stakeholders’ needs, and deliver relevant and meaningful EOT support.

While Paper 12 was developed as a *standalone piece* to contribute insights to a *specific segment* of the literature, it also formed part of a set of components that as a whole contributed to a *range of areas* across the field of educational technology in higher education. This research endeavour made a significant contribution to its overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a compelling first-hand insight into the phenomena of key stakeholders’ EOT experiences.
Interpreting Experiences of Teachers Using Online Technologies to Interact with Teachers in Blended Tertiary Environments: A Phenomenological Study

Kimberley Tuspawa, University of Newcastle, Newcastle, Australia

ABSTRACT

This research made a phenomenological interpretation of key stakeholders’ experiences with educational online technologies (EOTs), to determine their present EOT needs and challenges and provide a basis from which to propose methods for effective EOT support. It analysed the EOT experiences of 10 students and 10 teachers from New Zealand and Australia and interpreted the meanings of the phenomena through an abstraction of local and global themes. This paper is the fifth in a series of six publications that presents the local themes. It documents the interpretations of teachers’ experiences with other teachers, in reference to their use of two different types of EOTs: learning management systems (Blackboard), and online networking tools (Twitter and Facebook). These interpretations, which include descriptions of teachers’ EOT challenges, helped to inform a set of recommendations for effective EOT use, to assist institutes in their efforts to address EOT challenges and meet stakeholders’ needs.

KEYWORDS

Blended Learning, Online Technology, Phenomenology, Teacher Experiences, Tertiary Education

INTRODUCTION

Educational online technologies (EOTs) have universally transformed the delivery of higher education, creating exceptional opportunities for improved learning and teaching. In a period of rapid growth, their enhanced functionalities and affordances have revolutionised methods of instruction and engagement, engendering significant advances across the tertiary education sector. Traditional education spaces have evolved into interactive blended tertiary environments (BTIs), and channels of instruction have evolved from the type used in “traditional, face-to-face courses to ... [that of] online courses” (Picciano, 2015, p. 148).

These digital transformations foreshadow thrilling prospects for teachers and students, the key stakeholders in BTIs. Predictions about online education suggest that virtual universities are the trends in the future of tertiary-level learning (Peppers, 2016), and as “the pace of change” rapidly progresses, “hybrid classes will proliferate” (Anderson, Boyles, & Rainie, 2012, p. 17). This is now happening, as “millions of students [take] online courses” (Allen & Seaman, 2015, p. 21). Similar estimations suggest that the online delivery of coursework via web-based platforms will significantly change higher education (Anderson et al., 2012), and that in a globally “competitive environment”

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TEIs have no “other choice than to... [provide] online components,” “get smarter...doing more with less” and commit “to the nature of scale of the transformation” (Tuapawa, 2016b, p. 7).

Despite the astonishing growth and demand for online learning, significant obstacles impede the use of EOTs. Some of these challenges include attitudinal characteristics, insufficient design support (Panda & Mishra, 2007) and a “lack of training” or ineffective training (Merfert, 2016, p. 1). Others include time constraints, limited technology access, inefficient EOT usage, lack of motivation and unrealistic expectations (Tuapawa, 2016). These challenges pose an apparent risk to the future sustainability of blended spaces (Moskal, Dziuban, & Hartman, 2013) and inhibit stakeholders’ abilities to perform their roles efficiently.

Significant efforts have been made to better comprehend the nature of EOT challenges. Some contributions to the literature have centred on the integration of technologies into learning environments (Moore, 2013), the affordances and effectiveness of technologies in higher education (Arenas, 2015; El-Khalili & El-Ghaliyini, 2015), and e-learning issues faced by faculty members (Islam, Beer, & Slack, 2015). However, while “our research foundation is rich” and varied (Papandreou, 2013, p. 209), not all challenges have been thoroughly identified and addressed.

The perseverance of these challenges suggests that TEIs have experienced a gap in understanding the present state of key stakeholders’ EOT needs. Over time, these needs have altered and developed, and in an environment of prompt technological change have not been understood and addressed effectively. The dynamic nature of the environment in which TEIs operate means that their relevance is reliant on their ability to adapt and advance to meet their stakeholders’ needs. However, doing this successfully requires that institutes have up-to-date, in-depth understandings of their stakeholders’ EOT challenges, at a level that promotes the delivery of informed, relevant support.

Through a phenomenological approach, this research aimed to interpret key stakeholders’ EOT experiences, determine their current EOT needs and challenges, and present a basis from which to recommend methods for relevant EOT support. Using a 5-step qualitative analysis of data, it analysed the EOT experiences of ten students and ten teachers, categorized these to reflect the character of their interactions with other key entities and then interpreted the meanings of the phenomena through an abstraction and synthesis of local and global themes. The global themes developed an overall set of interpretations about the meaning of stakeholders’ EOT experiences with other students, other teachers and content, and the local themes delivered meanings that were specific to their use of individual tools.

This paper is the fifth in a series of six publications that documented the local themes of this research, through written interpretations that express the meaning of the phenomena. It documents teachers’ EOT experiences with teachers, in reference to their use of two different types of EOTs: Learning management systems (LMS) (Blackboard), and online networking tools (Twitter, Facebook).

Included in its interpretations are descriptions of stakeholders’ EOT challenges, which provide an authentic depiction of the phenomena to strengthen understandings of stakeholders’ needs. The interpretations helped to inform a set of recommendations for the skilful use of EOTs in teacher-to-teacher interactions. These were designed to assist TEIs in their efforts to adjust to meet stakeholders’ needs by providing a basis from which to manage EOT challenges and render relevant and meaningful EOT support.

To set the groundwork for this study, the author carried out preliminary research, which verified issues from literature, and created a foundation for the selection of interview participants. This research identified EOTs in BTEIs (Tuapawa, in press), produced a classification system for EOTs (Tuapawa, Shire, & Gu, 2014, 2016), identified key stakeholders in BTEIs (Tuapawa, 2016b), identified the EOT challenges of key stakeholders (Tuapawa, 2016a) and discussed a key challenge (resistance to change) in using EOTs (Tuapawa, 2015).
METHODOLOGY

The gathering and analysis of data was guided by the methodology of interpretive phenomenology, which aimed to make an interpretation of the meanings of peoples’ experiences (Padilla-Diaz, 2015; Slom & Rowe, 2014; Yüksel & Yıldırım, 2015). Oriented to the doctrine of Hegellegian philosophy (Reiners, 2012), this study of experience (Friesen, Henriksen, & Sævli, 2012) abstracted and explained emergent themes from key stakeholders’ first-hand descriptions into a series of written interpretations, to reveal the phenomena (Slom & Rowe, 2014) of EOT use. This methodological choice was swayed by the research aim, which sought to interpret key stakeholders’ EOT experiences in BTEs, the primary research questions (Marelli, 2016), which were: What were the EOT experiences of teachers and students in BTEs? and What interpretations could be taken from their meanings? and also, the author's 'interest in the meaning of a phenomenon as it [was] lived by other subjects' (Englander, 2012, p. 14).

A group of ten students and ten lecturers from institutes in New Zealand and Australia were chosen as participants using a purposive sampling approach (Yuksel & Yildirim, 2015). This strategy ensured that data would be gathered from individuals with personal experiences of the phenomena (Waters, 2016), in support of the objective of phenomenology, to understand a phenomenon “from the point of view of the lived experience” (Englander, 2012, p. 16). The justification for this number was based on research about phenomenological studies. Englander (2012), for example, showed that a large sample size, particularly when it involved qualitative research, was not necessary for generalisable results. Nicholls (2009b) indicated that “phenomenological studies ... commonly used[d] as few as five ... participants” (p. 639). Rawat (2014) likewise stated that normally “four or five respondents” were selected for these types of interviews. It was on this basis that 20 participants were stipulated (Englander, 2012; Nicholls, 2009b; Padilla-Diaz, 2015).

Additional criteria were set to filter the selection of participants. To be interviewed, they had to be lecturers on full-time tenure with an accredited TEl delivering a course in a blended learning form. If they were students, they had to be aged 18 years or older, enrolled full time with an accredited TEl and in a programme delivered in a blended learning form. Lecturers were identified from TEl website profiles of faculty staff lecturing in New Zealand or Australia. Students were identified with the support of a staff member at each TEl. Invitations sent to participants indicated that engagement was voluntary. Efforts were made to recruit both male and female participants.

The justification for the selection of only lecturers and students was based on preliminary research by the author (Tuapawa, 2016b), which identified key stakeholders in BTEs and explained their roles. Through an analysis of literature about key stakeholder identification (Chapleo & Simms, 2010; Coleman et al., 2013; Gross & Godwin, 2005; Leijeye, Westerheijden, Epping, Faber, & De Weert, 2013; Mainordes, Alves, & Raposo, 2013; Power & Morven-Gould, 2011; Sanderson, 1997; Singh & Weligamage, 2012; Tang & Hussin, 2011; Wagner, Hossain, & Head, 2008) and semi-structured interviews with 13 blended learning experts from New Zealand, Australia and Canada, students and lecturers were shown to be among those identified most prominently and frequently as key stakeholders in BTEs. Students were identified as key stakeholders by 12 of 13 participants (Tuapawa, 2016b, p. 5). Their ability to participate in discussion, provide feedback, and improve “connectedness or community” (Balaji & Chakraborti, 2010, p. 17) contributed significantly to the success of learning experiences (Tuapawa, 2016c). Lecturers also were identified as key stakeholders by 11 of the 13 participants, and regarded by nine of them to be among those contributing most significantly to BTE success.

Phenomenological interviews, noted for being “exceedingly common in qualitative research studies” (Nicholls, 2009b, p. 640) were considered fitting for collecting idiomatic data. These interviews followed a semi-structured arrangement and were conducted via Skype and audio recorded. Participants set aside approximately 45 minutes of time to take part (Simone & Goes, 2012) and were asked a set of 27 questions. They responded with first-hand descriptions (Dowling & Brown, 2012;
Moustakas, 1994; Waters, 2016) of their EOT experiences, which included comments about their application of various types of EOTs to interact with various sets of key entities (students, teachers and content). Specifically, students and teachers were asked for a “description of a situation in which [they had] experienced the phenomenon” (Englander, 2012, p. 25) of using an EOT in a BTE. The situational features of their explanations were critical to the research, since understandings of the phenomenon (i.e., using an EOT) had to be “connected to a specific context in which ... [it was] experienced” (i.e., a BTE) (Englander, 2012, p. 25).

The interview questions were crafted to encourage students’ and teachers’ recollections of their technology experiences or contact with different key entities. These types of connections were based on the classification by interaction taxonomy augmented by Culatta (2011) and the original classification proposed by Moore (1989). This framework classified technologies by the relationship between learners and other groups. The first three interaction types of the original taxonomy were learner to expert, learner to learner, and learner to content. Culatta (2011) introduced a fourth category: learner to context. Tucawa, Sher, and Gu (2014, 2016), presented a fifth category: learner to media. These categories were adjusted to support and structure interviews with teachers, as follows: (1) teacher to student, (2) teacher to teacher, (3) teacher to content, (4) teacher to context, and (5) teacher to media. The use of the relationship-based system for arranging the questions helped refine participants’ experiences into relevant EOT interactions. It also revealed variations between phenomena occurring in distinct key relationships, and established a structure through which to arrange the phenomenological themes (Waters, 2016). Table 1 shows the questions that were asked of teachers about their experiences with other teachers.

To prompt conversation and encourage a comfortable interview environment, the researcher assumed an amiable, interested and attentive disposition (Yin, 2015). Thoughtful conversation with interviewees, a mindful attitude and conversational qualities in “talking to people” (Nicholls, 2009a, p. 533), helped solicit their viewpoints (Saldana, 2011, p. 75). It also ensured that “sufficient interview data” (Saldana, 2011, p. 34) was gathered, until the point of saturation was met and repetition occurred.

Recordings of the interviews were transcribed onto pre-formatted question-and-answer templates. Although doing this was time-consuming, it permitted the researcher to develop an intimate level of familiarity with the content (Daniels, 2016) and prepare it for evaluation. Yin’s (2015) five phases of qualitative data analysis, compiling, disassembling, reassembling, interpreting, and concluding, were used to frame and structure the analysis. Table 2 shows the link between these five phases, and the phenomenological methods used.

NVivo qualitative analysis software (QSR International, 2015) was used to import, compile, and organise the transcripts into a logical arrangement (Yin, 2015). Data from these documents were disassembled into smaller pieces and then coded. Using the Nodes coding utility, the data were set apart into categories that corresponded to the interview questions. These nodal categories, which were labelled using shortened versions of the questions, represented the data clearly and enabled it to be logically assigned, labelled, referenced and contained in convenient groupings (Williams, 2003). Table 3 demonstrates the link between the node labels used for coding, and the interview questions.

<table>
<thead>
<tr>
<th>INTERACTION TYPE</th>
<th>QUESTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher to teacher</td>
<td>a) Describe an experience in which you used an EOT in a ‘teacher to teacher’ interaction while teaching in a BTE?</td>
</tr>
<tr>
<td></td>
<td>b) Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td></td>
<td>c) What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td></td>
<td>d) What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td></td>
<td>e) Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>
Table 2. Phases of qualitative analysis vs interpretive phenomenological research techniques

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage description</th>
<th>Phenomenological research technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Composing</td>
<td>Data transcripts imported and arranged</td>
</tr>
<tr>
<td>2</td>
<td>Disassembling</td>
<td>Data descriptions coded using nodes</td>
</tr>
<tr>
<td>3</td>
<td>Reassembling</td>
<td>Meanings used to build understandings of phenomena</td>
</tr>
<tr>
<td>4</td>
<td>Interpreting (thematic analysis and interpretation of data)</td>
<td>Local and global themes abstracted, meanings of experiences explained through written interpretations</td>
</tr>
<tr>
<td>5</td>
<td>Concluding (conclusions and recommendations)</td>
<td>Interpretations used to develop recommendations for effective EOT use that supports stakeholders' needs</td>
</tr>
</tbody>
</table>

Table 3. Nodes linked to teacher interview questions

<table>
<thead>
<tr>
<th>Node</th>
<th>Node description</th>
<th>Related question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teacher-to-teacher Q2a</td>
<td>Describe an experience in which you used an EOT in a teacher-to-teacher interaction while teaching in a BTE.</td>
</tr>
<tr>
<td>2</td>
<td>Teacher-to-teacher Q2b</td>
<td>Did you face issues or challenges using the EOT in this case? Explain.</td>
</tr>
<tr>
<td>3</td>
<td>Teacher-to-teacher Q2c</td>
<td>What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td>4</td>
<td>Teacher-to-teacher Q2d</td>
<td>What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td>5</td>
<td>Teacher-to-teacher Q2e</td>
<td>Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

The data were then reassembled, which required that they be moved from the nodal position into analytic memos (Yin, 2015), where they could be used to build on concepts and ideas (QRS International, 2015) and help build understandings about the phenomena (Saldana, 2011). Finally, the data were subjected to interpretation, through a thematic analysis, which required an abstraction of local and global themes (Padilla-Diaz, 2015) using a reflexive perspective (Sloan & Bowe, 2014). In this process, themes, the meanings or essences of the phenomena, were perceived through reflective involvement with descriptions of the experiences (Waters, 2016), and worked into a series of written interpretations, to reveal the phenomena (Sloan & Bowe, 2014) of EOT use. The global themes, which were wide-ranging, generated high-level interpretations of the phenomena. The local themes, developed through a deep but narrow scope, built descriptions from the use of single EOTs.

The highlighted example in Figure 1 demonstrates how the data were gathered, transcribed, sorted and coded and stored using nodes, refined into a teacher-to-teacher-based memo and interpreted through an analysis of local themes. This provided the foundation for the discussion of results in this paper.

**DISCUSSION OF RESULTS**

This section explores the local themes that were abstracted from teachers’ EOT experiences with other teachers. These are delivered as a series of written interpretations of teachers’ lived experiences (Sloan & Bowe, 2014; Waters, 2016) and organised into three sections according to the EOT types they had identified: Learning management systems (LMS)(Blackboard), online networking tool (Twitter), and online networking tool (Facebook). Each of these sections includes a description of the EOT exemplar, a set of local themes related to its use and an interpretation of teachers’ experiences, which include their comments on EOT challenges, potential usage, and solutions. The labels used to describe the EOT types are based on the Pentecostomy (Tuapwa et al., 2014, 2016), a robust multidimensional framework for categorising EOTs.
EOT: Learning Management System

Example: Blackboard

**Description**

Blackboard is a flexible e-Learning software platform that provides a complete course management system (Blackboard Inc., 2015). It can be used as a repository for learning resources or as "an e-learning portal around a particular programme of work, course or set of activities" (Tuapawa, in press, p. 4).

**Themes**

Facilitated communications, shared teaching resources, content migration. Usability and technical issues, teacher-generated course content.

**Experiences**

Teachers’ experiences using Blackboard to interact with other teachers involved communications, the sharing of teaching resources, and migration of content. Their negative views of Blackboard involved issues with its usability and technical functionality, and with the course design of other teachers. One lecturer, who taught ‘with another academic…[on] the same course but [with] a different cohort of students’ collaborated to share knowledge about how to upload and use materials on Blackboard.

They ‘needed to upload a quiz … and [so] we made a bargain that I would figure out how to upload the quiz and … would give him instructions on how to do that.’ He ‘uploaded the quizzes onto his site, as well as on to mine’, and we were able to ‘share [our] Blackboard sites’. Other teachers used Blackboard ‘mainly…to communicate with tutors’ and other staff. Some experienced challenges as they attempted to migrate content and resources from the previous year into a content space for the new semester. One explained that ‘when we prepare[d] the new teaching sessions’ we [took] some of [the previous] year’s material and…ha[d] to get it into [the current] year’s Blackboard site.’ It required ‘figuring out how to download [the material] and upload it to the [new] site.’ It was a joint effort that was completed ‘with [her] colleague.’ But the process could be ‘kind of tricky.’ ‘You [had] to go through all these steps in Blackboard’, including ‘exporting…saving the content as a file…then import[ing] it into the site.’ One teacher admitted that ‘it could [have been] easier. They could have [had] two sites,’ which would have allowed them to ‘drag and drop’ the content. Having a drag-and-drop function that enabled faster content migration ‘would [have been] fantastic’. One teacher suggested improvements involving the addition of a ‘Skype feature’ to enable real-time text or video chat, and enhance interactions with colleagues.

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Teachers’ challenges with Blackboard involved problems with its usability and technical features. ‘The greatest challenge’ stated one teacher, was ‘the response time’. They felt that it did not ‘allow for many people at once to all interact’. Others found the layout ‘confusing’ and the layout of some teachers’ course sites ‘messy’. After having ‘looked at the design of other lecturers’ courses’ one had thought that other teachers ‘really [didn’t] care’. Interacting with their badly built pages made him ‘cringe sometimes’. ‘You load[ed] it’ and then in seeing their work responded ‘oh, God, the visual is the first layer, the aesthetic appreciation of it. The second layer is functional.’ Thought and consideration was needed when developing course pages, to prevent negative EOT experiences. Teachers felt that for Blackboard to be used more effectively, ‘better support and training in general’ was needed for their colleagues.

EOT: Online Networking Tool

Example: Twitter

Description

Twitter is an information network made up of 140-character messages called ‘tweets’, which registered users can post and read (Twitter Inc., 2015). It is a ‘social networking and asynchronous tool’ that facilitates “remembering, understanding, applying, and analysing” techniques, and was being used to support a range of interactions (Tuapaiva et al., 2014).

Themes

Facilitated networking between teachers and colleagues, information searches and access, professional exposure

Experiences

Teachers’ experiences using Twitter to interact with other teachers involved communications, networking, information searches, and professional exposure. They valued its social and networking affordances, quick access to material and other professionals, post brevity, and its ability to provide access to specific information. Teachers used Twitter for ‘professional work’, and to connect with other staff members or industry professionals. One indicated that she had ‘buddies on there,’ who were ‘a mix of industry and professional’. Valuable networking opportunities arose for teachers who used this platform. One ‘managed to get some good contacts through [it]’ and then ‘go along to the occasional educational technology conferences [where]…the attendees [were] usually quite heavy Twitter users.’ Teachers using Twitter valued having ‘that interaction’ with individuals who shared their interests. You [could] have a conversation about what [was] going on, and could ‘get to know a lot of people.’ Using Twitter helped teachers realise they were ‘not alone’, but were part of a community, and could ‘collaborate with people outside of [their] institution.

One described Twitter as ‘probably her’ best teacher-to-teacher environment,” explaining that as a group, her colleagues ‘ha[d] a communication[s] list’, which enabled them to ‘all see what [had been] tweeted in the previous period.’ This led to ‘direct messaging [activity]… with other staff and educators.’ Twitter also allowed them to ‘be quite [topic] specific.’ The benefits came with ‘getting[ing] info that [was] very… niche.’ Another advantage of Twitter involved its ‘shortness of posts’. Although ‘you [had],… the character limit… you [could] link to other sources’, and easily access material and interact with others even during busy periods. ‘If you’re waiting for a bus, you [could] find a story and link to [it],’ and you could ‘favourite things [that] you want[ed] to read later.’ The ‘brevity’ and immediacy of access to information on Twitter was also valued. ‘It [was] a very quick communication tool.’ Providing support was recommended as a way to persuade ‘academics… to use these tools.’ One teacher stated that ‘more academics should be encouraged’ to overcome their fear of using tools like Twitter. Their anxiety prevented effective use of tools like this, because ‘a lot of academics tend[ed] to be quite introverted about these things.’ They would say ‘I don’t want to be on the web, [and] I
don't want people to find me.' But reasoning on this issue, one teacher had responded 'surely you would want your research to have impact.' The exposure Twitter could provide would be 'good for your academic career [and so you should] be more aware of the tools that [were] out there.'

Teachers who used Twitter also enjoyed unimpeded communications with professionals who might have otherwise been difficult to contact. 'Everyone [on Twitter was] easily accessible,' said one teacher, and although 'you might [have thought] oh, I [couldn't] approach them, you could find [a subject] that interest[ed] them, and then get into a conversation that way.' She recommended Twitter as a tool for 'finding the professionals you want[ed] to work with.' Twitter was seen as a tool with which to 'approach people for jobs' and for 'professional networking'. It was also considered useful for those 'posting interesting industry research' and wanting to 'keep up to date with industry matters.' Using Twitter in this manner would enable teachers to increase the value of their interactions with others. However, improving their engagement on this platform would require that 'more help...in using the tools relevant...be given to academics by universities.' This would help overcome teachers' negative views, some of which involved complaints about Twitter's 'inefficiencies' and difficulties experienced in sourcing exact data. 'I [could] only find five to ten percent of the things I [was] looking for,' said one teacher. This could have been due to its minimalist structure, 'a characterisation through hash tags, a mini description in 140 characters, and then a web link.' Some found its arrangement of material challenging. 'It hasn't got an abstract, back or forward [features], [and] finding the key information [was] quite challenging.' Others cautioned against inhibiting privacy, and recommended care when 'using outside accounts'. Heesmite, an online tool used for managing and scheduling social media posts, was found to be 'quite good for augmenting [features in] Twitter'.

**EOT: Online Networking Tool**

**Example: Facebook**

**Description:**
Facebook is a globally popular social networking tool that provides highly accessible publishing techniques, and allows the generation and exchange of user content with the capability of reaching small or large audiences (The Social Media Guys, 2010). Its “significance and potential...in educational terms” cannot be underestimated (Moore, 2013, p. 358).

**Themes**
Facilitated social and professional networking between teachers and colleagues, networking with industry professionals

**Experiences**
Teachers' experiences using Facebook to interact with other teachers involved social and professional networking and communications. They used it to connect with and message other teachers. 'Work communications' said one teacher, were often facilitated through Facebook messaging. Another used Facebook for work-related discussions, but cautioned against 'the ephemeral nature of [Facebook] messages.' 'It's a bit evanescent...[and could] start getting very messy.' Giving an example, she role-played a situation in which two teachers might misinterpret a situation via Facebook. Teacher 1 might say 'Oh, you said you'd take my class. on Facebook, and then you didn't [take it]. Teacher 2 might then deny having received the initial message. Avoiding 'these issues' required having a 'paper trail...[in an email] to confirm the discussion' rather than rely on messages which could get lost. One teacher found 'it difficult, when [she] got a friend request from another colleague'. It got 'a bit tricky', and she felt 'pressure[ed] to be friends with [them], and would [then] have to sensor what [she did] on Facebook'. She wanted privacy, and didn't 'particularly want them to see [her] personal life'. Thinking it reasonable to expect a barrier between professional and private activity, she explained that 'Facebook [was her] way of contacting [her] daughter who's not living in the city'. She overcame
this challenge by ‘quietly unfriend[ing] them.’ Interestingly, teachers ‘who felt most comfortable’ using social media tools like ‘Facebook...had been using it in their personal spaces’, which ‘gave them confidence to try it out in the professional space’. One teacher explained how, for example, if the ‘CEO [came] down and ask[ed] should we have a Facebook page’, and if the person they’re asking already [had] a Facebook page, they’d [say] ‘yes’! Unfortunately, ‘older people...were loath to adopt those technologies in professional life.’ Overcoming this resistance to change and engaging with new EOTs such as Facebook would require that ‘more guidance’ be provided, that training for its use be delivered, and that ‘everyone turn up to a nominated training day.’ While improving the level of teachers’ online engagement might ‘be a tough nut to crack...there need[ed] to be a lot more support.’

Teachers’ experiences using Blackboard, Twitter and Facebook to interact with other teachers were varied and informative. Their descriptions indicated that effective EOT use contributed to enhanced teacher-to-teacher interactions, whereas ineffective use created challenges that negatively impacted on their teaching. Their vivid descriptions of EOT challenges revealed a realistic portrayal of the phenomena and demonstrated the extent to which these obstacles limited their engagement with their colleagues. Some expressed frustration, disappointment, and annoyance when faced with technical or usability issues, whilst others voiced indifference. Despite negative experiences, their recognition of the role EOTs played in enabling engagement was evident. Teachers indicated that improvements to EOT usability, technical support, and design would reduce certain challenges, and enhance their interactions with other teachers. Their recommendations for solutions to such challenges suggested that they wanted change and relevant support, to ensure their commitment to EOT use. Teachers valued EOTs that afforded networking opportunities, resource sharing, and general communications between teachers. Their experiences also involved the use of EOTs, such as LinkedIn, Hootsuite, video conferencing, online forums, Moodle, Yammer, Google+, Skype, Wikispaces, and YouTube.

CONCLUSION

This study made a phenomenological interpretation of key stakeholders’ EOT experiences to build understandings about their EOT needs and challenges and provide a foundation from which to recommend methods for effective EOT support. It examined the EOT experiences of ten students and ten teachers from TEIs in New Zealand and Australia and interpreted the meanings of the phenomena through an abstraction and explanation of local and global themes. This paper was the fifth in a series of six publications that documented the local themes of the research. It documented the interpretations of teachers’ EOT experiences with other teachers, in reference to their use of two different types of EOTs: Learning management systems (LMS) (Blackboard), and online networking tools (Twitter, Facebook). These interpretations, which delivered insights into the reality of teachers’ EOT challenges, helped to inform a set of recommendations for effective EOT use, to assist TEIs in their efforts to tackle EOT obstacles and issues through appropriate, meaningful EOT support.

The limited sample size used in phenomenological studies made it challenging to generalise results across large populations (Waters, 2016). However, the descriptions of teachers’ experiences provide a credible and authentic means from which to extract knowledge about the phenomena. Although teachers’ experiences were unique, the interpretations of these established themes that were common across participants. The views expressed by teachers reflected the state of the software at a specific point in time, and the ways in which it was used. Notwithstanding these realities, much could be gained from teachers’ descriptions.

The interpretations in this study could be used to build knowledge about other similar EOTs. For example, the themes drawn from teachers’ experiences with Blackboard could in some cases be applied to Moodle. This research could be replicated and applied to benefit other TEI stakeholders, such as managers or technical support staff, to strengthen understandings of their EOT challenges and needs. A summary of recommendations for addressing some of the EOT challenges described in these experiences is noted below:
- Teachers share and collaborate on specific EOT techniques that have worked well, considering encouraging colleagues to use EOT features that have improved engagement with others. “Faculty must ... begin to collaborate with other professionals” (Theriault, 2015, p. 1). Encourage teachers to join online communities to gain understanding of what makes digital content great” (Gupta, 2016, p. 1).

- TEIs review teachers’ EOT training needs and implement methods to support their growth and professional development. “The call for professional development is even more important, as the tech integration can only be beneficial when teachers know how to handle various technologies” (Gupta, 2016, p. 1). “Professional development opportunities must be made available to all faculty and incentivized if possible” (Theriault, 2015, p. 1).

- Teachers to be encouraged to use Twitter and other professional networking sites to increase collaboration, and create exposure for their research and other professional interests.

- Teachers to encourage colleagues who are anxious about engaging with EOTs to ‘take small steps’, and engage with EOTs in a social manner, before progressing towards educational use. Teachers can create a positive influence through peer-support systems.
REFERENCES


ENDNOTES

1 This section also includes a small amount of data from interviews with blended learning experts, some of whom were teachers. While these interviews were conducted to obtain data that verified issues in the literature, they also contained real-life experiences that added value to this discussion.

2 This word limit of this paper does not permit discussion on teachers’ experiences using these EOTs.

Kimberley Tuapa is an educator, company director, and PhD student, located in Hawkes Bay, New Zealand. She is a published author with extensive teaching experience, and has presented research in countries including New Zealand, Australia, Malaysia, and Jakarta. She has developed, managed and delivered multi-media projects used to aid student learning, and has consulted on projects which help teachers improve their understandings and application of online tools. Kimberley was previously a Lecturer and Regional Centre Coordinator for the Eastern Institute of Technology. She holds a Master’s Degree in Digital Media (MOM), Bachelors Degree of Computing Systems (BCom), Diploma in Multimedia and Web Development (DipMWD), Diploma in Information and Communications Technology (DipICT), and Diploma in e-Business Support (DipeBus).
8.13 Paper 13

Paper 13 is entitled “Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments: A Phenomenological Study”. It was accepted for publication in the International Journal of E-Learning and Educational Technologies in the Digital Media (IJEETDM).

Contribution to research

Paper 13 was the sixth in a series of six publications that formed the output of phenomenological research. It maps directly to research objectives 3 and 4, and outcomes 3 and 4 (see Figure 2). Through qualitative analysis involving the abstraction of themes, this paper made an interpretation of teachers’ EOT experiences with content, in reference to their use of two types of EOTs. Its interpretations, which included descriptions of teachers’ EOT challenges, helped to inform a set of recommendations for effective EOT use that would assist TEIs in their efforts to address EOT challenges, meet stakeholders’ needs, and deliver relevant and meaningful EOT support.

While Paper 13 was developed as a standalone piece to contribute insights to a specific segment of the literature, it also formed part of a set of components that as a whole contributed to a range of areas across the field of educational technology in higher education. This research endeavour made a significant contribution to its overall body of knowledge, providing a comprehensive evaluation and robust development of key EOT issues and a compelling first-hand insight into the phenomena of key stakeholders’ EOT experiences.
Interpreting the Experiences of Teachers Using Educational Online Technologies to Interact with Content in Blended Tertiary Environments: A Phenomenological Study

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ABSTRACT

Although educational online technologies (EOTs) have enhanced the dissemination of learning in higher education, key EOT obstacles have hindered their effectiveness, preventing widespread implementation. The persistence of these obstacles suggests that tertiary education institutes (TEIs) have experienced difficulties in understanding their key stakeholders’ EOT needs. This research made an interpretation of key stakeholders’ EOT experiences, to establish their existing EOT needs and challenges, and provide a foundation from which to recommend methods for effective EOT support. It analysed the experiences of 10 students and 10 teachers from New Zealand and Australia and interpreted the meanings of these phenomena through an abstraction of local and global themes. This paper is the sixth in a series of six publications that presents the local themes. It documents the interpretations of teachers’ experiences with content, in reference to their use of two types of EOTs: learning management systems, and online video platforms. These interpretations, which include descriptions of teachers’ EOT challenges, helped to inform a set of recommendations for effective EOT use, to assist TEIs in their efforts to address EOT challenges and meet their stakeholders’ needs.

KEYWORDS

Tertiary education, blended learning, online technology, student experiences, phenomenology

1 INTRODUCTION

Educational online technologies (EOTs) have revolutionised the delivery of online education, making a significant contribution to the global increase in demand for higher learning. In an era of considerable online growth, their rapid emergence, adoption and demand has engendered significant advances across the higher education sector. Traditional classroom spaces have evolved into dynamic blended tertiary environments (BTEs), providing tertiary education institutes (TEIs) with a modern means through which to augment course delivery. These transformations signal exciting prospects for teachers and students, the key stakeholders in BTEs.

Despite the growth and demand for technology-based learning, considerable obstacles impede the use of EOTs. Such challenges include, but are not limited to attitudinal pre-dispositions, insufficient training and inadequacies in instructional design support [2]. Other challenges include resistance to change, ineffective EOT usage, lack of motivation, technical constraints, and accessibility [3]. These challenges pose a clear risk to the future success of BTEs [4], and create difficulties for stakeholders as they deliver and engage in learning.

Significant efforts have been made to learn more about EOT challenges. These have resulted in considerable subject-specific research, with varied and noteworthy contributions to the literature. Some studies have considered technology integration into blended environments [5], technology to support institutional roles [6], barriers to adoption of online learning [7], and the needs of online students [8]. However, while “our research foundation is rich” [9], not all problems have been adequately identified and addressed.

The continuation of these challenges suggests that TEIs have experienced difficulties in
understanding their key stakeholders’ EOT needs. Over time, these needs have evolved, and in an environment of rapid technological change have not been addressed effectively. With their operations based in a dynamic environment, TEs must maintain relevance by evolving and adapting to meet their stakeholders’ needs. However, doing this effectively requires that they have sound, up-to-date understandings of their stakeholders’ EOT challenges, to deliver relevant and meaningful support.

Through a phenomenological approach, this research aimed to interpret key stakeholders’ EOT experiences, establish their existing EOT needs and challenges, and recommend methods for effective EOT support. Using a 5-step qualitative analysis of data, it analysed the EOT experiences of ten students and ten teachers, categorised these to reflect the nature of their interactions with other key entities and then interpreted their meanings through an abstraction of local and global themes. The global themes delivered a broad set of interpretations about the meaning of key stakeholders’ experiences with other students, other teachers and content, and the local themes developed meanings that were specific to their use of distinct EOTs.

This paper is the sixth in a series of six publications that present the local themes of this research, through written interpretations that describe the meaning of the phenomena. It documents teachers’ EOT experiences with content, in reference to their use of two different EOTs: Learning management systems (LMS) (Blackboard), and online video platforms (YouTube). Included in its interpretations are descriptions of stakeholders’ EOT challenges. These delivered a realistic portrayal of the phenomena to help strengthen knowledge about stakeholders’ needs. The interpretations helped to inform a set of recommendations for effective EOT use in teacher-to-content interactions. They were designed to assist TEs to adapt to meet their stakeholders’ needs by providing a basis from which to tackle EOT challenges and deliver support.

To lay a sound basis for this phenomenological study, the author undertook preliminary research, which clarified and verified issues from the literature, and created a basis for the selection of participants. It identified EOTs in BTEs [14], produced a classification system for EOTs [15][16], identified key stakeholders in BTEs [17], identified the EOT challenges of key stakeholders [3] and discussed a key challenge (resistance to change) in using EOTs [18].

2 METHODOLOGY

The analysis of this data was guided by the methodology of interpretive phenomenology. It aimed to make an interpretation of the meanings of stakeholders’ experiences [30]; [40]; [41]. Linked to the principles of Heideggerian philosophy [42], this analysis of experience [29] abstracted themes from students’ and teachers’ experiences into a range of interpretations, to illuminate the phenomena [40] of EOT activity. This choice in methodology was influenced by the research aim, which aimed to interpret key stakeholders’ EOT experiences in BTEs, the key research questions [43], which were: What were the EOT experiences of key stakeholders in BTEs? and What interpretations could be made from their meanings? It was also influenced by the researcher’s “interest in the meaning of a phenomenon as it was] lived by other subjects” [27].

A group of ten students and ten teachers from TEs in New Zealand and Australia were chosen as participants using a purposive sampling strategy [41]. This ensured that the data would be gathered from those with first-hand experiences of the phenomena [44]. The rationale for this number was based on literature about qualitative and phenomenological research. Nicholls [28] for example, explained that “phenomenological studies ... commonly used as few as five ... participants” (p. 639). Rawat [5] also stated that usually “four or five respondents” were chosen for such interviews. It was on this basis that 20 participants were chosen [27]; [28]; [39].
Further criteria were set in the selection of participants. To be interviewed, teachers had to be on full-time tenure with an accredited TEI, delivering a course in a blended learning modality. Students had to be aged 18 years or older, enrolled full time with an accredited TEI and in a course delivered in a blended learning modality. Teachers were identified from TEI website profiles of staff teaching in New Zealand or Australia. Students were identified with the help of a staff member at each TEI. Invitations sent out stated that participation was voluntary.

The rationale for the selection of only teachers and students was based on a study by the author [17], which identified key stakeholders in BTEs. In this study, students were recognized as key stakeholders because of the requirement for them to “buy into” blended learning, “participate fully, and be convinced” of its value [17]. Teachers were acknowledged as key stakeholders due to their direct involvement in the teaching and learning process and their everyday focus on and influence over learning activity.

The phenomenological interviews followed a semi-structured format and were conducted using web-based conferencing technology (Skype) and recorded using Pamela software. Participants set aside approximately 45 minutes to engage [46] and were asked a set of 27 questions. They responded with first-hand narratives [35]; [47]; [44] of their EOT experiences, which included descriptions about their use of different EOTs to interact with various key entities (students, teachers, and content). The situational aspects of their descriptions were crucial to the study, since understandings of a phenomenon (i.e., EOT use) had to be “connected to a specific context in which the phenomenon [had been] experienced” [i.e., a BTE] [27].

To encourage a candid portrayal of the phenomena, the questions were developed to draw out experiences that included descriptions of stakeholders’ EOT challenges. Probes were used to clarify and encourage participants’ in-depth explanations [48]; [37]; [44]. The questions were also framed to encourage their recollections of encounters with different key entities. These types of encounters were based on the classification by interaction taxonomy augmented by Culatta [19] and the original classification proposed by Moore [20]. These categorised technologies by the relationship between learners and other entities. The first three interaction types of the original taxonomy were learner to expert, learner to learner, and learner to content. Culatta [19] presented a fourth category: learner to context. Tsapawa, Sher, and Gu [15][16], recommended a fifth category: learner to media. These categories were adapted to interviews with teachers, as follows: (1) teacher to student, (2) teacher to teacher, (3) teacher to context, (4) teacher to content, and (5) teacher to media. The use of a relationship-based taxonomy for arranging the questions helped refine stakeholders’ experiences into recognisable EOT interactions. It revealed distinctions between the phenomena in different key relationships, and established a structure through which to arrange the themes or meanings of the phenomena [44]. Table 1 outlines the questions asked of teachers about their EOT experiences with content.

<table>
<thead>
<tr>
<th>Interaction type</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher-to-content</td>
<td>(a) Describe an experience in which you used an EOT in a teacher-to-content interaction while studying in a BTE?</td>
</tr>
<tr>
<td></td>
<td>(b) Did you face issues or challenges using the EOT? Explain.</td>
</tr>
<tr>
<td></td>
<td>(c) What do you think would be a solution to this issue?</td>
</tr>
<tr>
<td></td>
<td>(d) What do you think would have helped you make more meaningful use of this EOT?</td>
</tr>
<tr>
<td></td>
<td>(e) Did you experience benefits in using this EOT? Explain.</td>
</tr>
</tbody>
</table>

Recordings of the interviews were transcribed using pre-formatted templates. This process enabled the researcher to become deeply familiar with the content [49] and prepare it for analysis.
Yin’s [50] five phases of qualitative analysis, compiling, disassembling, reassembling, interpreting, and concluding, were used to structure and conduct the analysis. Table 2 shows the connection between these phases, and the techniques used.

Table 2

<table>
<thead>
<tr>
<th>Stage</th>
<th>Stage description</th>
<th>Phenomenological research technique</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Compiling</td>
<td>Data transcripts imported and arranged</td>
</tr>
<tr>
<td>2</td>
<td>Disassembling</td>
<td>Data coded with nodes</td>
</tr>
<tr>
<td>3</td>
<td>Reassembling</td>
<td>Memos used to build understandings of EOT phenomena</td>
</tr>
<tr>
<td>4</td>
<td>Interpreting (thematic analysis and interpretation)</td>
<td>Themes abstracted, meanings of phenomena described through written interpretations</td>
</tr>
<tr>
<td>5</td>
<td>Concluding (conclusions and recommendations)</td>
<td>Recommendations made for effective EOT use to support stakeholders’ needs</td>
</tr>
</tbody>
</table>

The data were reassembled, and moved from the nodal position into analytic memos [50], where they were used to elaborate ideas [21] and develop understandings about the phenomena [23]. Finally, the data were subjected to a thematic analysis, which involved an abstraction of local and global themes [59]. In this process, the essential meanings of the phenomena, were discovered through engagement with the descriptions of the experiences [44]. These were written into a series of interpretations to illuminate the phenomena [40] of EOT use. The global themes developed broad interpretations of the phenomena, whereas the local themes derived meanings from the use of individual EOTs.

The example in Figure 1 demonstrates how the data were gathered, transcribed, sorted and coded using nodes, refined into a teacher-to-content based memo and interpreted through an analysis of themes. These provided the foundation for the discussion of results in this paper.

Figure 1: Process of data analysis

Table 3

<table>
<thead>
<tr>
<th>Node</th>
<th>Node</th>
<th>Related question</th>
</tr>
</thead>
</table>

3 DISCUSSION OF RESULTS

This section discusses the local themes that were abstracted from teachers’ EOT experiences with content. They deliver as a series of written interpretations of teachers’ lived experiences [40], [44] and organised into two sections based on the EOT types teachers had identified: Learning management systems (LMS)/Blackboard, and online video platforms (YouTube). Each section includes a description of the EOT brand exemplar, and an interpretation of teachers’ experiences, which include their comments on EOT issues, challenges, usage, and solutions. The labels used to describe the EOT types are based on the Pentonomy [15][16], a robust, contextualised and multi-dimensional framework for categorising EOTs.

EOT: Learning management system
Example: Blackboard

Description Blackboard is a comprehensive and flexible e-Learning software platform that provides a complete course and learning management system [24]. It is designed as a ‘repository’ for learning resources, or be used in more innovative ways such as ‘an e-learning portal around a particular programme of work or sets of activities’ [14].

Experiences Teachers’ experiences using Blackboard to interact with content revealed that their EOT activity involved editing materials, providing links to resources, and marking and uploading assessment material. Negative views of Blackboard involved problems with usability and technical issues, large file sizes, and copyrighted content. One teacher described Blackboard as the ‘central means to formalising content’, and commented on its value for disseminating materials. “I like being able to take content and upload it to Blackboard,” he said, “because then... it exists in a virtual area that everyone can access.” Another teacher used Blackboard as an upload point for his lecture recordings, and as a repository for slides that students would later use for course revision. “You haven’t got anything locally on your computer... it’s all on Blackboard.” This meant that teachers ‘(didn’t have to) download anything to their computer, [they could] do it all online’, which ‘was handy’. One teacher adapted her content to suit both distance students and on-campus students, so that ‘all students’ had access to ‘all the material every week that they had’ lectures.’ Another ‘put material up... which was fairly low quality’ to ensure that students who ‘were out in the wild, and might not have a very good [internet] connection could access the learning materials. Some uploaded content that included ‘PowerPoints and mp3 recordings of the lectures’. Others made ‘tutorial links’ available, and some developed content that instructed students ‘where they should be at’ in their course progress.

Using Blackboard to edit and maintain content meant ‘there was no printing out... no formatting’ because ‘it was [all] there online’. For teachers interacting with assessment content, Blackboard also provided an efficient method for ‘online marking’, which ‘made it easier’. ‘You could mark and give feedback online, without having to put anything down on paper.’ Explaining the ease in doing this, one teacher said ‘it’s there online, you put the marks in, put comments in... and then at the end of the course, you download the spreadsheet, and can get [access] to all the marks.’ Pleased with Blackboard’s efficient assessment methods, one teacher stated that it was ‘just easier to mark online.’ Despite these benefits, various challenges impacted teachers’ experiences with
content. ‘Blackboard has quirks,’ said one teacher, ‘it suddenly freezes...it is slow’. Expressing her frustration, she added ‘I find Blackboard very annoying’ because ‘the screen layout is messy’ and requires that I ‘constantly change tabs’. Blackboard was described by others as ‘clunky’. Some experienced problems interacting with assessment functions. ‘You end up with several different places you can enter marks’.” This led to ‘a bit of uncertainty’ as to whether ‘comments...[were]...going to get to the student’. One teacher recommended improving ‘the interface, [it] need[ed] cleaning up’, and ‘could do with some smoothing out’.

Another challenge related to oversized file uploads which contained media-rich content. ‘Often the recordings...[could] be very large.’ While ‘that’s great if you’ve got a good download speed...if [however] you’re out in the country, that’s not good’. Teachers suggested taking time to consider how bandwidth issues impacted content interactions. ‘Having a built in “way of lowering the quality” of files would improve its efficiency.’ Another teacher recommended creating or augmenting the ‘system...[to] enable...[to] reduce [that] quality downloads...to make it easier’, since the use of large files ‘has[d] become an issue’. Stating where the responsibility lay, one teacher stated that ‘the manufacturers at Blackboard need[ed] to work at it, and come up with some answers.’ Another commented on the importance of achieving a balance between download speed and quality visual content. ‘It’s a mixture, [but] visual people learn better with visual prompts.’ While improvements to content were justified, some felt that “technology was still not there in almost all of these aspects.” Reflecting on the content issues he experienced using Blackboard, one teacher remarked ‘I would love them to come into my office, when I’m having a hard time so I [could] ask, “why is it doing this?” Why can’t it do this?” Some also expressed frustration over Blackboard’s lack of ‘intuitive design’, describing its “literal style” as “outdated” One recommended that “the design of the environment be more customizable.”

Teachers recognised the work involved in creating and delivering effective content, but asserted that in some cases the system made it “problematic.” ‘Copyright issues’ around posting academic content also raised challenges for teachers. ‘We’ve got to be very careful about putting up chapters’. Acknowledging the need for access to this content, one admitted ‘you’ve got people who are away from libraries...who may be out in the middle of nowhere’ where unfortunately, ‘there are no libraries’. While these users ‘rely on...online journals’, help is limited because ‘our copyright rules get in our way...and really slow things down.’ Teachers said that while ‘having some of the chapters online would be good...we can’t do it.’

**EOT:** Online video platform
**Example:** YouTube

**Description** YouTube is designed to enable users to upload and share videos that can be viewed by anyone [25]. It utilizes repositories to enable users to manage their profiles, share content and collaborate [25]. YouTube is being used extensively to showcase video clips that support learning. ‘One of the trends’ is to ‘put the media clips’ on YouTube...instead of using local storage or LMS’ [14].

**Experiences** Themes from teachers’ experiences about the use of YouTube to interact with content showed they valued it as a means to view, edit and upload teaching materials that showcased hands-on tasks, and delivered practical learning experiences. They valued the level of ‘currency’ that YouTube content added to their teaching. The difficulty with ‘textbook examples’ was that ‘even if you’re using a 2014 textbook,’ the examples within these chapters [were] 2013, 2012.’ Explaining the advantage of using online videos, one teacher stated that ‘you could use really current examples’ to support learning activity. One teacher used YouTube as a repository for teaching content, and had a ‘YouTube channel that [she] put videos on’ and also a ‘a class YouTube channel which contained links to useful websites and games’ to support student activity. Teachers also valued YouTube’s ability to handle large files. ‘What’s awesome about this [capability], is that...it splits your files up, [and] while it’s
uploading, you [could] put all the [supporting video information] into up.' Similarly, another teacher valued being able to store files on YouTube instead of using local storage or LMS storage.

Despite the advantages of using YouTube to interact with content, some teachers experienced a lack of 'control over what you're linking to in the long term.' Explaining this problem, one teacher indicated that 'a YouTube video' planned for use during class 'might [later] not be there, or might be replaced with something inappropriate.' File owners occasionally removed their files from YouTube, creating issues for teachers who interacted with this content on an ongoing basis. 'More often than not,' she explained, 'the video I'd linked to had been made private,' preventing access to learning material. Other video clips 'had been...taken down for copyright reasons,' which increased the workloads of teachers who had to 'run around trying to update links.' 'Trying to keep those links up to date' was difficult, but teachers knew it was important to 'make sure there had been no exchange to inappropriate materials.' Referring to one example, a teacher explained how she 'had a link to a commercial site, which used a game [that taught] people how to reference correctly.' She had 'checked it again before the lecture,' only to find that 'it now linked to a spam site'. This had happened because the URL had 'been let go,' and now the site contained 'flashing, gaudy advertising.' Reflecting on the possible outcome, she admitted that 'this interaction could have [had an adverse effect on class] and made [her] look crappy.'

Other challenges with YouTube involved creating content intended for upload. 'Technical issues with the screen capture' gave one teacher difficulty, and she had 'to fiddle around...to get it to work.' Frustrated, she explained that while 'sometimes it would work,' she didn't know 'how to make it work reliably.' The potential for these issues occurring created anxiety. 'You [did not] want to give a half-hour lecture,' she stated, 'and then find out you didn't record the sound. [and realize that the students would]...see...the slides [without sound], it [would] not [be] very good.' Admitting however, that expecting free software to work consistently without failure was unreasonable, she admitted 'I'm expecting a lot.' Training was recommended as a solution. 'Someone [should] give you a workshop and show you how to do this,' because 'there were so many tools, it's very complicated...and it's almost bewildering how many...you can actually use.' Others felt that while 'there was support there...there could be more.' Some said that 'effort' was required 'to get over the hard part'. One teacher praised the efforts of her institute's education development centre, which provided one-of-one EOT help to teachers. For others, 'it's better if someone can give you a workshop and show you how to do this.' 'Workshops or seminars for academics to come along' was recommended as a way to help teachers improve their YouTube skills.

One teacher was reluctant to engage with YouTube content unless the files were 'recorded to the quality of the lectures...on TV or on TED talks,' which filmed using 'multiple perspectives,' and were more likely to increase 'engagement' levels. Otherwise, he asserted, 'you get people standing up and walking out, and it just doesn't work.' Searching for a solution, he continued 'if I was going to record my lectures for uploading to YouTube, I'd want multiple angles, and the same treatment as TED talks.' Comments like these about YouTube emphasised how the perceived level of content quality influenced teachers buy-in to its use. Content was often developed using other EOTs, and then 'uploaded to YouTube. For example, one teacher explained 'sometimes [we] use Jing, but most of us will use Camtasia or Adobe Connect, do it locally,' and copy it to YouTube. In doing 'content preparation,' teachers found they could 'merge from one [EOT] to another.'

Other teachers' experiences involved the use of Moodle, Mindomo, Pecwise, Word Cloud, Echo360, Prezi, Jing, Camtasia, Google Drive, WikiEducator, Vimeo, Blogger.

Teachers experiences using EOTs to interact with content were varied and informative. Their descriptions indicated that effective EOT use
contributed to enriched teacher-to-content interactions, whereas ineffective use created challenges that negatively impacted on their activity. Teachers’ descriptions of EOT challenges revealed the reality of their experiences, and the extent to which these obstacles limited their engagement with content. Some expressed frustration, disappointment, and annoyance when faced with technical or usability issues. Despite negative experiences, general recognition of the role EOTs played in enabling engagement was evident. Teachers indicated that improvements to EOT usability, technical support, and design would reduce certain challenges, and enhance their interactions with content. Their recommendations for solutions to challenges signaled that they wanted change and relevant support, to ensure their commitment to EOT use. Teachers valued EOTs that afforded the efficient editing, linking, marking, uploading and demonstration of content.

4 RECOMMENDATIONS

A summary of recommendations for addressing some of the EOT challenges described in teachers’ experiences is outlined below:

- TEs investigate the potential for extending, enabling and improving LMS features to accommodate teachers’ online course delivery and assessment needs
- Managers urge and facilitate teachers’ ongoing needs-based training for LMS use, to ensure they have relevant skills to undertake effective online course construction and delivery
- Teachers consider bandwidth limitations, and ensure that online file sizes do not impede access to learning, but can be downloaded efficiently
- Teachers ensure teaching content from external sources is current and appropriate for course delivery
- Teachers investigate the potential and feasibility for developing higher quality video lecture recordings, e.g. capture in-class activity from multiple angles
- Teachers ensure that sound and audio equipment works effectively to support in-class learning experiences

5 CONCLUSION

This research made a phenomenological interpretation of key stakeholders’ EOT experiences to strengthen understandings about their EOT needs and challenges and provide a basis from which to recommend methods for effective EOT support. It analysed the EOT experiences of ten students and ten teachers from TEs in New Zealand and Australia and interpreted the meanings of the phenomena through an abstraction of themes. This paper was the sixth in a series of six publications that presented the local themes of this research. It documented the interpretations of teachers’ EOT experiences with content, in reference to their use of two different types of EOTs: Learning management systems (LMS)(Blackboard), and online video platforms (YouTube). These interpretations, which delivered insights into the reality of teachers’ EOT challenges and needs, helped to inform a set of recommendations for effective EOT use, to assist TEs in their efforts to address EOT challenges and needs through relevant, meaningful EOT support.

The small sample size normally used in phenomenological studies makes it challenging to generalise results across large groups [44]. However, the descriptions of first-hand experiences provides a rich and authentic means from which to extract in-depth levels of knowledge about the phenomena. Although an interpretative phenomenological approach supported the researcher’s “interest in the meaning of a phenomenon as it [was] lived by other subjects”, it also permitted their personal preconceptions to affect the analysis of data [27].

The interpretations in this research could be used to support understandings about other similar EOTs. For example, the themes drawn from students’ experiences with Blackboard could in some cases be applied to Moodle. This research...
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The Society of Digital Information and Wireless Communications (SDIWC), 2017 ISSN: 2410-0419 (Online)

has the potential to be replicated and applied to other TEI stakeholders, such as administrators or educational support staff, to strengthen understandings of their EOT challenges and needs.

6 REFERENCES


42. Reiners, G. M. (2012). Understanding the differences between Husserl’s (descriptive) and Heidegger’s (interpretive) phenomenological research. Journal of Nursing & Care, 11(5). doi:10.4122/2156-1168.1000119


Appendix

8.1 Additional literature

This section provides additional material about the identity of key stakeholders in BTEs that was prepared for (but not included) in Paper 5. It provides a brief review of four existing stakeholder identification studies that were examined during the review of literature, and compares and contrasts their approaches and results.

8.1.1 Theoretical exploratory case study

The first study involved a theoretical exploratory work by Mainardes, et al. (2013), which identified stakeholders through a case study and provided an overview of the current status of research by summarising existing studies. They deemed it necessary to undertake an initial “exploratory study...given the scarcity of empirical studies identifying and categorising university stakeholders” (Mainardes et al., 2013, p. 5). Through the literature and by means of interviews, this study identified and ranked 21 distinct groups of university stakeholders, with the final results identifying students, teaching and research staff, and employers as the primary stakeholders (Mainardes et al., 2013). An overview of the results is outlined in Table 15.

Table 15: List of University Stakeholders

<table>
<thead>
<tr>
<th>Rank</th>
<th>List of University Stakeholders</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Students</td>
</tr>
<tr>
<td>2</td>
<td>Teaching staff and/or researchers</td>
</tr>
<tr>
<td>3</td>
<td>Employers</td>
</tr>
<tr>
<td>4</td>
<td>Research and development partner companies</td>
</tr>
<tr>
<td>5</td>
<td>National government, ministries, accreditation bodies</td>
</tr>
<tr>
<td>6</td>
<td>Municipality hosting the University (local public authorities)</td>
</tr>
<tr>
<td>7</td>
<td>Non-teaching staff</td>
</tr>
<tr>
<td>8</td>
<td>Other universities and/or higher education institutions (public or private)</td>
</tr>
<tr>
<td>9</td>
<td>Local community surrounding University (population, company, services)</td>
</tr>
<tr>
<td>10</td>
<td>Secondary level schools</td>
</tr>
<tr>
<td>11</td>
<td>Student families</td>
</tr>
<tr>
<td>12</td>
<td>Research and development actors (incubators, technological parks, patent agencies, research centres, external researchers)</td>
</tr>
<tr>
<td>13</td>
<td>Society in general</td>
</tr>
<tr>
<td>14</td>
<td>Senior University Management (Council)</td>
</tr>
<tr>
<td>15</td>
<td>Professional orders</td>
</tr>
<tr>
<td>16</td>
<td>Private financiers (business angels, risk capital firms, investors)</td>
</tr>
<tr>
<td>17</td>
<td>Business commercial organisations</td>
</tr>
<tr>
<td>18</td>
<td>Ex-students</td>
</tr>
<tr>
<td>19</td>
<td>Scientific communities and their publications and output</td>
</tr>
<tr>
<td>20</td>
<td>European Union (n/a outside of region)</td>
</tr>
<tr>
<td>21</td>
<td>International students</td>
</tr>
</tbody>
</table>

Adapted from Identifying Stakeholders in a Portuguese University: A Case Study (Mainardes, et al., 2013)
8.1.2 Case study and stakeholder analysis

The second study was a higher education stakeholder analysis by Chapleo and Simms (2010). Its aim was to understand stakeholders and the nature of stakeholder management, and identify stakeholders. The study obtained qualitative data from semi-structured interviews with ‘opinion-formers’, and was based on a grounded theory methodology which used inductive reasoning. Once stakeholder groups were identified, interviewees were asked to rank the groups in importance, by using a scoring system that enabled comparisons through importance weighting. *Table 16* outlines the first 10 stakeholder groups that were identified and then ranked. Groups with a higher total score were considered as having greater general importance in a number of specific areas, which are not considered relevant to this research.

*Table 16: List and scoring of stakeholders*

<table>
<thead>
<tr>
<th>Stakeholder group</th>
<th>Total score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>37</td>
</tr>
<tr>
<td>Staff</td>
<td>26</td>
</tr>
<tr>
<td>Funders</td>
<td>21</td>
</tr>
<tr>
<td>Commercial</td>
<td>9</td>
</tr>
<tr>
<td>Government (including sub departments and government-funded organisations related to higher education)</td>
<td>8</td>
</tr>
<tr>
<td>Community</td>
<td>8</td>
</tr>
<tr>
<td>Governing and academic bodies</td>
<td>8</td>
</tr>
<tr>
<td>Research councils</td>
<td>6</td>
</tr>
<tr>
<td>Educational community</td>
<td>6</td>
</tr>
<tr>
<td>Graduate recruiters</td>
<td>5</td>
</tr>
</tbody>
</table>

Adapted from *Stakeholder Analysis in Higher Education* (Chapleo & Simms, 2010)

8.1.3 Literature and stakeholder analysis

The third study was a work by Wagner, Hassanein & Head (2008). After having reviewed the e-learning literature, it compiled a stakeholder list, and used this to inform the development of a stakeholder analysis and responsibility matrix, which was purposively subjected to critique from multiple experts using a feedback methodology. The main stakeholders were students, instructors, educational institutions, content providers, technology providers, accreditation bodies, and employers. Students were described as the consumers, enrolled at undergraduate or graduate level. Instructors guided the educational experiences of students and “may or may not have [had] face-to-face interaction with their students” depending on the mode of delivery (Wagner et al., 2008, p. 29). Content providers comprised instructors, or external organisations that may have specialised in commercialised educational content. Technology providers were responsible for developing and delivering the technology that enables learning delivery. This provision may have involved facilitating individual courses or learning management systems (LMS) (Wagner et al., 2008). Accreditation bodies “assess[ed] the quality” of educational
offerings made by the institute, providing a mark of “credibility that non-accredited institutions [would] not possess” (Wagner et al., 2008, p. 31).

8.1.4 Case studies and literature

The fourth study was a report by Sanderson (1997), which considered distance learning strategies and best practice, included a systems description of distance learning, and was based on actual and reported case studies and literature. It determined that the main stakeholders within a distance learning environment included regulators, purchasers of training, suppliers, and end users. The suppliers of training who were creators and providers of training and programmes included the relevant departments of all organisations involved in the development, design and delivery of the programme. Amongst other identities, these included content providers, learning theory and pedagogic experts, designers, media providers, administrative support, human resources, technical providers, and site coordinators. At end user level, this stakeholder group comprised two parts, those who provided the teaching material and those who were learning. Provision of teaching materials may have come from instructors, group tutors or facilitators, other learners, subject matter experts, or prepared course material (Sanderson, 1997).

*Table 17* outlines the approaches and results from each of the studies, and indicates a ranking of importance where available.

**Table 17: Summary of results from existing studies**

<table>
<thead>
<tr>
<th>No</th>
<th>Study</th>
<th>Approach</th>
<th>Results (Stakeholders identified)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mainardes, et al., (2013)</td>
<td>Theoretical exploratory case study (ranked, top 10)</td>
<td>Students Teachers, researchers Employers Research and development partners Government, accreditation bodies Local public authorities Non-teaching staff Other higher education institutes Local community Secondary level schools</td>
</tr>
<tr>
<td>2</td>
<td>Chapleo &amp; Simms (2010)</td>
<td>Case study and stakeholder analysis (ranked, top 10)</td>
<td>Students Staff Funders Commercial Government Community Governing and academic bodies Research councils and</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Sanderson (1997)</td>
<td>Case studies and literature (not ranked)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regulators Purchasers Suppliers (creators and providers) Content providers Learning experts Designers Media providers Admin support, HR Technical providers Site coordinators End users (teachers and learners)</td>
<td></td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Wagner et.al (2008)</td>
<td>Literature and stakeholder analysis (not ranked)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Students Instructors Educational institution Content providers Technologies providers Accreditation bodies Employers</td>
<td></td>
</tr>
</tbody>
</table>

### 8.1.5 Comparing and contrasting the approaches

There were a number of similarities and differences between the approaches used in these four studies. The similarities provided insights into the connections between approaches, and the differences provided insights into the expressed variations and perspectives. Both similarities and differences provided a pool of knowledge from which to draw in establishing the most appropriate method for obtaining data during the preliminary research. The similarities are discussed first.

The first similarity in these studies concerned their reliance on literature as an initial step towards gaining a sound background and informing results. Mainardes et al. (2013) theoretical exploratory study for example, undertook a review of existing empirical studies concerning identification of stakeholders, the results of which were used during the subsequent interviews to suggest answers which aligned to existing research. Sanderson’s (1997) best practice report was based on case studies and literature. Wagner et al. (2008) compiled a stakeholder list after reviewing the literature, and used this to inform the development of a stakeholder analysis and matrix. Experts were used to provide feedback on this work. While the critical points of current knowledge comprised the initial stages of most research works, these studies also used literature as a substantive basis for informing or influencing results.

The second similarity involved their use of case studies as a step towards providing a descriptive analysis. Sanderson (1997) for example, used actual and reported case studies to support the analysis and descriptions of best practise in distance learning. Chapleo and Simms (2010)
employed a case study approach which focused on a large modern university in the United Kingdom, and Mainardes (2013) “opt[ed] in favour of a Portuguese public university” for their case study (p. 5). In these scenarios, using a single-case approach was considered appropriate to conducting intensive analysis and providing a platform on which to build new theory.

The third similarity related to the exploratory nature of and use of inductive reasoning, to construct meaning and understanding as part of the process of discovery (Nicholls, 2009a). Mainardes et. al (2013) deemed it necessary to incorporate an “exploratory-qualitative methodology due to the lack of studies identifying stakeholders...” (p. 5). Chapleo and Simms (2013) used “a predominantly inductive approach” (p. 14). These techniques could result in theory which expanded knowledge about stakeholders in BTEs.

The fourth similarity concerned their use of purposive sampling as a method for obtaining data from knowledgeable subjects. Wagner et al. (2008) subjected a newly compiled stakeholder list to analysis by multiple experts, and Chapleo and Simms (2010) obtained data from semi-structured interviews with ‘opinion-formers’. Interestingly, an activity that increased the credibility of findings involved feedback from those with prolonged engagement in the field (Nicholls, 2009b). Both studies used participants that could expertly inform the purpose of the study.

The first difference between these studies involved the random selection of interviewees versus purposive sampling techniques. In Mainardes et al.(2013) study, “interviewees were chosen randomly, with the only criterion being [to ensure] heterogeneity” (p. 6), although efforts were made to ensure that data came from staff groups across the full scope of faculties and departments. Whereas, in the study by Chapleo and Simms (2010), data were obtained from those specifically chosen for their knowledge and experience.

The second difference concerned the pool from which participants were chosen. While both Chapleo and Simms (2010) and Mainardes (2013) selected participants from one large university, the origin of participants in the Wagner et al. (2008) study was not stated. Rather, their authorship and individual academic titles were described, without focus placed on their affiliation to an institute. The study results were reviewed by authors described as ‘experienced professors’ and ‘a student’.

Comparing and contrasting the approaches used in these studies expanded the researcher’s understandings into appropriate methods for obtaining data during the stage of preliminary research. These insights involved:

• the value in using literature both as an initial step towards gaining a sound background for the subject of stakeholder identification, and to an extent informing results.
the value in using experts to provide feedback, and the use of purposive sampling as a method to select them.

- the value of the exploratory nature and use of inductive reasoning, to construct meaning and understanding, especially in light of the shortage of studies on stakeholder identification.

- the value of knowledge about how participants were referenced, whether by institute or role, which showed that a benchmark to guiding the identification of participants by their institution or role was not necessary.

8.1.6 Comparing and contrasting the results

There were a number of similarities between the results of these studies. Three out of the four studies ranked students as a key stakeholder. Teachers, instructors and staff occupied a key position, secondary to students in most cases. Bodies supplying accreditation or providing some form of governance were present within the top 10 stakeholders listed within each study. Providers of media, technology and funders also factored significantly in most cases. The local and educational community were also listed as key groups having considerable influence.

There were a number of differences between the results of these studies. Employers were listed within the top 10 stakeholders in two studies only. Other educational institutes were listed within the top 10 stakeholders in two studies only. The decision to rank the stakeholders by importance was made only in the studies by Mainardes et al. (2013) where respondents were “requested [to]...rank [stakeholders] in accordance with their respective importance” (p. 8), and by Chapleo and Simms (2010), where participants identified the “stakeholders of greatest salience or priority to the University” (p. 17). In contrast, the report by Sanderson (1997) listed the stakeholders in an unordered list and without an associated rank, and in the study by Wagner et al. (2008), the stakeholders were listed as separate units within a matrix and without specific weighting. Comparing and contrasting the results used in these different studies provided a basis from which to correlate our understanding of the results from preliminary interviews.
8.2 Information statements

FACULTY OF ENGINEERING
AND BUILT ENVIRONMENT

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Student Participant Information Statement for the Research Project:
An Examination of the Lived Experiences of Key Stakeholders Engaged with Educational Online Technologies in Blended Tertiary Environments: A Phenomenological Study
Document Version 1.1; dated 30 August, 2014

You are invited to participate in the research project identified above which is being conducted by Kimberley Tuapawa, from the School of Architecture and Built Environment at the University of Newcastle. The research is part of Kimberley’s PhD studies. Her supervisors are Associate Professor William Sher and Dr. Ning Gu from the School of Architecture and Built Environment.

Why is the research being conducted?
The purpose of the research is to explore the lived experiences of key stakeholders who use educational online technology (EOT) in a blended tertiary environment (BTE). It aims to understand and interpret the meanings associated with the phenomena of stakeholders’ EOT experiences, to obtain insights into their present issues and needs, and subsequently the factors that impact on the sustainability of modern BTEs.

Who can participate in the research?
We are seeking students to participate in this research. Your name was identified by Dr. David Skelton, EIT as a potential participant, living and studying in New Zealand or Australia. We see that you are enrolled as a student with an accredited tertiary institute, are enrolled in an academic course in a blended learning context, and are 18 years or older. If you do not fit the above criteria, then unfortunately you are not eligible to participate.

What will you be asked to do?
If you agree to participate, you will be asked to participate in an interview with Kimberley Tuapawa, PhD student. We request that you set aside at least 45 minutes of uninterrupted time to participate in the interview. The interview will be conducted either face-to-face or via web-conference technology (Skype). If the interview is conducted face-to-face, Kimberley will travel to your institute. If the interview is conducted via web-conference technology, Kimberley will initiate the interview using Skype technology, and you will need to be seated at an internet enabled computer. The interview will be audio recorded.

The aim of the interview is to gather descriptions of first-hand lived experiences, issues and challenges, regarding the use of educational online technologies in blended tertiary environments. You will be asked a series of questions to obtain a rich description of your own learning experience concerning the use of educational online technologies in a blended tertiary context. You will also be asked to complete a short information sheet which requires your demographic characteristics, such as age, course subject, and affiliated tertiary institution.
What choice do you have?

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you. If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data which identifies you.

How much time will it take?

The interview should take about 45 minutes to complete.

What are the risks and benefits of participating?

There are no expected risks or discomforts that will come from participating in this research. Your participation will contribute to the advancement of knowledge and understandings in the field of educational technology. Your participation may bring a greater sense of awareness of the challenges facing key stakeholders concerning the use of educational online technologies, and subsequently the issues that impact on the success of blended tertiary environments. Your contribution will also help to provide valuable insights and a level of awareness to a range of key stakeholders concerning the issues teaching colleagues and fellow students experience in using educational online technologies.

How will your privacy be protected?

Any information collected by the researchers which might identify you will be stored securely in the office of the Chief Investigator, and only accessed by the researchers, unless you consent otherwise, except as required by law. You will be able to review the interview transcripts to edit or erase your contribution. Data will be retained for at least five years at the University of Newcastle. Information which might identify you as a participant will not be disclosed without your prior consent. Softcopy data will be stored by the researcher on a computer hard drive and in removable storage backups with a password protected folder. Hardcopy materials will be scanned and a softcopy will be stored by the researcher on computer hard drive and in on removable drives.

How will the information collected be used?

This research will be presented through conference and journal publications. This investigation will be presented as a phenomenological study, as part of PhD research being undertaken by Kimberley Tuapawa. Individual participants will not be identified in any reports arising from the project. Non-identifiable data may also be shared with other parties to encourage scientific scrutiny, and to contribute to further research and public knowledge, or as required by law. Participants may obtain a summary of the results written in plain English by sending a request to the Chief Investigator via email: willy.sher@newcastle.edu.au.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, contact the researcher. If you would like to participate, please complete the attached Consent Form and return it in the reply paid envelope provided. Alternatively the Consent Form may be scanned and emailed to tuapawa@slingshot.co.nz. I will then make contact with you to arrange a time for the interview to occur.

Further information
If you would like further information, please contact Associate Professor William Sher, School of Architecture and Built Environment, Faculty of Engineering and Built Environment, The University of Newcastle. Phone: +61 2 4921 5792, Email: willy.sher@newcastle.edu.au.

Thank you for considering this invitation.

Associate Professor William Sher
Chief Investigator, Project Supervisor

Dr. Ning Gu
Senior Lecturer, Project Co-Supervisor

Kimberley Tuapawa
PhD student

Complaints about this research
This project has been approved by the University’s Human Research Ethics Committee, Approval No. H-2014-0257.

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.
Information Statement for the Research Project: Blended Learning Expert
An Examination of the Lived Experiences of Key Stakeholders Engaged with Educational Online Technologies in Blended Tertiary Environments: A Phenomenological Study

Document Version 1.1; dated 30 August, 2014

You are invited to participate in the research project identified above which is being conducted by Kimberley Tuapawa, from the School of Architecture and Built Environment at the University of Newcastle. The research is part of Kimberley’s PhD studies. Her supervisors are Associate Professor William Sher and Dr. Ning Gu from the School of Architecture and Built Environment.

Why is the research being conducted?
The purpose of the research is to explore the lived experiences of key stakeholders who use educational online technology (EOT) in a blended tertiary environment (BTE). It aims to understand and interpret the meanings associated with the phenomena of stakeholders’ EOT experiences, to obtain insights into their present issues and needs, and subsequently the factors that impact on the sustainability of modern BTEs.

Who can participate in the research?
We are seeking people considered to be experts in blended learning to participate in this research. Your name was identified from educational conference proceedings and University website profiles of academic staff living and teaching in New Zealand or Australia or Canada. We see that you have occupied an academic role for at least 10 years in a tertiary blended learning context, hold a post-graduate qualification, and have published research in the area of blended learning. If you do not fit the above criteria, then unfortunately you are not eligible to participate.

What will you be asked to do?
If you agree to participate, you will be asked to participate in an interview with Kimberley Tuapawa, PhD student. We request that you set aside at least 45 minutes of un-interrupted time to participate in the interview. The interview will be conducted either face-to-face or via web-conference technology (Skype). If the interview is conducted face-to-face, Kimberley will travel to your institute. If the interview is conducted via web-conference technology, Kimberley will initiate the interview using Skype technology, and you will need to be seated at an Internet enabled computer. The interview will be audio recorded.
The aim of this interview is to explore, clarify, and verify issues from the relevant literature which relate to the identity of key stakeholders in blended tertiary environments, and their experiences, challenges, issues and needs regarding the use of educational online technologies in blended tertiary environments. You will also be asked about your demographic characteristics, such as age, extent of blended learning expertise, and affiliated tertiary institution.
What choice do you have?

Participation in this research is entirely your choice. Only those people who give their informed consent will be included in the project. Whether or not you decide to participate, your decision will not disadvantage you. If you do decide to participate, you may withdraw from the project at any time without giving a reason and have the option of withdrawing any data which identifies you.

How much time will it take?

The interview should take about 45 minutes to complete.

What are the risks and benefits of participating?

There are no expected risks or discomforts that will come from participating in this research. Your participation will contribute to the advancement of knowledge and understandings in the field of educational technology. Your participation may bring a greater sense of awareness of the challenges facing key stakeholders concerning the use of educational online technologies, and subsequently the issues that impact on the success of blended tertiary environments. Your contribution will also help to provide valuable insights and a level of awareness to a range of key stakeholders and experts concerning the issues teaching colleagues and fellow students experience in using educational online technologies.

How will your privacy be protected?

Any information collected by the researchers which might identify you will be stored securely in the office of the Chief Investigator, and only accessed by the researchers, unless you consent otherwise, except as required by law. You will be able to review the interview transcripts to edit or erase your contribution. Data will be retained for at least five years at the University of Newcastle. Information which might identify you as a participant will not be disclosed without your prior consent. Softcopy data will be stored by the researcher on a computer hard drive and in removable storage backups with a password protected folder. Hardcopy materials will be scanned and a softcopy will be stored by the researcher on computer hard drive and in on removable drives.

How will the information collected be used?

This research will be presented through conference and journal publications. This investigation will be presented as a phenomenological study, as part of PhD research being undertaken by Kimberley Tuapawa. Individual participants will not be identified in any reports arising from the project. Non-identifiable data may also be shared with other parties to encourage scientific scrutiny, and to contribute to further research and public knowledge, or as required by law. Participants may obtain a summary of the results written in plain English by sending a request to the Chief Investigator via email: wiltyshe@newcastle.edu.au.

What do you need to do to participate?

Please read this Information Statement and be sure you understand its contents before you consent to participate. If there is anything you do not understand, or you have questions, contact the researcher. If you would like to participate, please complete the attached Consent Form and return it in the reply paid envelope provided. Alternatively the Consent Form may be scanned and emailed to ktuapawa@slingshot.co.nz. We will then make contact with you to arrange a time for the interview.
Further information

If you would like further information, please contact Associate Professor William Sher, School of Architecture and Built Environment, Faculty of Engineering and Built Environment, The University of Newcastle. Phone: +61 2 4921 5792, Email: will.y sher@newcastle.edu.au.

Thank you for considering this invitation.

Associate Professor William Sher
Chief Investigator, Project Supervisor

Dr. Ning Gu
Senior Lecturer, Project Co-Supervisor

Kimberley Tuapawa
PhD student

Complaints about this research

This project has been approved by the University's Human Research Ethics Committee, Approval No. H-2014-0257.

Should you have concerns about your rights as a participant in this research, or you have a complaint about the manner in which the research is conducted, it may be given to the researcher, or, if an independent person is preferred, to the Human Research Ethics Officer, Research Office, The Chancellery, The University of Newcastle, University Drive, Callaghan NSW 2308, Australia, telephone (02) 49216333, email Human-Ethics@newcastle.edu.au.
Consent Form for the Research Project: Blended Learning Expert

An Examination of the Lived Experiences of Key Stakeholders Engaged with Educational Online Technologies in Blended Tertiary Environments: A Phenomenological Study


I agree to participate in the above research project and give my consent freely.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to participating in an interview either face-to-face or via web-conferencing technology.

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

Print Name: ________________________________

Email: ________________________________

Postal address: ________________________________

Signature: ________________________________ Date: ________________________________
Consent Form for the Research Project:

An Examination of the Lived Experiences of Key Stakeholders Engaged with Educational Online Technologies in Blended Tertiary Environments: A Phenomenological Study


I agree to participate in the above research project and give my consent freely.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to participating in an interview either face-to-face or via web-conferencing technology.

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

Print Name: ____________________________________________

Email: _________________________________________________

Postal address: ________________________________________

Signature: ____________________________________________ Date: __________________________

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William Sher  
Associate Professor of Construction Management  
School of Architecture and Built Environment  
The University of Newcastle  
University Drive, Callaghan  
NSW 2308  
Australia  
Tel: +61 2 4921 5782  
willy.sher@newcastle.edu.au

Consent Form for Release of Contact Details for the Research Project:  

An Examination of the Lived Experiences of Key Stakeholders Engaged with Educational Online Technologies in Blended Tertiary Environments: A Phenomenological Study  
Document Version 1.1; dated 30 August, 2014

I give my consent freely, to allow my contact details to be sent to the researcher of this project, for the purpose of making contact with me to participate in the above research project.

I understand that the project will be conducted as described in the Information Statement, a copy of which will be sent to me.

I understand that my personal contact information will remain confidential to the researchers.

Print Name: ____________________________________________

Signature: ___________________________ Date: _______________________
Consent Form for the Research Project:

An Examination of the Lived Experiences of Key Stakeholders Engaged with Educational Online Technologies in Blended Tertiary Environments: A Phenomenological Study
Document Version 1.1; dated 30 August, 2014

I agree to assist in the above research project and give my consent freely.

I understand that the project will be conducted as described in the Information Statement, a copy of which I have retained.

I understand I can withdraw from the project at any time and do not have to give any reason for withdrawing.

I consent to assisting by distributing the information sheet entitled 'Student Participant Information Statement for the Research Project' to at least 30 students who fit the criteria for students.

I understand that my personal information will remain confidential to the researchers.

I have had the opportunity to have questions answered to my satisfaction.

Print Name: ____________________________________________

Email: ________________________________________________

Postal address: _________________________________________

Signature: ____________________________ Date: ________________
8.4 Transcription templates

NAME | EXPERT INTERVIEW TRANSCRIPTION

<table>
<thead>
<tr>
<th>Age:</th>
<th>Gender:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity:</td>
<td>Institution:</td>
</tr>
<tr>
<td>Role:</td>
<td>Years within role:</td>
</tr>
<tr>
<td>School / Faculty:</td>
<td>Discipline:</td>
</tr>
</tbody>
</table>

EOTS

Which educational online technologies (EOTs) are being used in blended tertiary environments (BTEs)? Give examples.

What kind of feedback have you received from teachers and students as regards the changes you’ve made to Moodle?

KEY STAKEHOLDERS AND BTEs

Please identify group(s) or individual(s) you consider to be key stakeholders in a BTE? Please explain why.

Which of the key stakeholders identified in question 3 provides the most significant contribution to the success of a blended tertiary environment? Please explain why.

What kind of challenges might the key stakeholders identified in question 3 experience concerning the use of EOTs in BTEs? Please explain why. (Identify challenges for each stakeholder in order)

How might these challenges impact on the success and sustainability of BTEs?

How do you think these challenges could be overcome?

Do you think that the needs of key stakeholders in BTEs are shifting or evolving? Please give reasons for your answer.

If answer to Question 8 is ‘yes’, do you believe these issues are becoming more challenging with the increased growth and demand for online technologies?

Do you think that the needs of key stakeholders in BTEs are being understood by tertiary institutes and met effectively? Please give reasons for your answer.

How do you think that the needs of key stakeholders in BTEs can be understood by tertiary institutes and met effectively? Please give reasons for your answer.

Should tertiary institutions be concerned about the challenges faced by key stakeholders concerning EOT engagement in BTEs?

Do you think that a gap (shortage) exists in the way support is provided by tertiary institutions to key stakeholders concerning EOT usage in BTEs?

OTHER

Are there any final comments you would like to make?

Do you have questions for the researcher?
Did you experience benefits in using the EOT in this case? If so, please explain.

Please describe an experience in which you used an educational online technology in a ‘learner to media/teacher to media’ interaction while studying/teaching in a blended tertiary environment?

Did you face issues or challenges using the EOT in this case?

What do you think would have helped you make more meaningful use of this EOT?

Did you experience benefits in using the EOT in this case?

Do you feel as though you are receiving support for the use of EOTs from the institute at which you are enrolled?

If improvements are needed, what do you think these are?

OTHER

Are there any final comments you would like to make?
Please describe an experience in which you used an educational online technology in a 'learner to teacher'/teacher to student' interaction while studying/teaching in a blended tertiary environment?

Did you face issues or challenges using the EOT in this case? If so, please explain.

What do you think would have helped you make more meaningful use of this EOT?

What do you think would be a solution to this issue?

Did you experience benefits in using the EOT in this case?

Please describe an experience in which you used an educational online technology in a 'learner to learner'/teacher to teacher' interaction while studying/teaching in a blended tertiary environment?

Did you face issues or challenges using the EOT in this case?

What do you think would be a solution to this issue?

What do you think would have helped you make more meaningful use of this EOT?

Did you experience benefits in using the EOT in this case?

Please describe an experience in which you used an educational online technology in a 'learner to content'/teacher to content' interaction while studying/teaching in a blended tertiary environment?

Did you face issues or challenges using the EOT in this case?

What do you think would have helped you make more meaningful use of this EOT? What do you think would be a solution to this issue?

Did you experience benefits in using the EOT in this case? If so, please explain.

Please describe an experience in which you used an educational online technology in a 'learner to context'/teacher to context' interaction while studying/teaching in a blended tertiary environment?

Did you face issues or challenges using the EOT in this case?

What do you think would have helped you make more meaningful use of this EOT? What do you think would be a solution to this issue?
Did you experience benefits in using the EOT in this case? If so, please explain.

Please describe an experience in which you used an educational online technology in a ‘learner to media/teacher to media’ interaction while studying/teaching in a blended tertiary environment?

Did you face issues or challenges using the EOT in this case?

What do you think would have helped you make more meaningful use of this EOT?

Did you experience benefits in using the EOT in this case?

Do you feel as though you are receiving support for the use of EOTs from the institute at which you are enrolled?

If improvements are needed, what do you think these are?

OTHER

Are there any final comments you would like to make?
8.5 Paper 1

EDUCATIONAL ONLINE TECHNOLOGIES IN BLENDED TERTIARY ENVIRONMENTS: A REVIEW OF LITERATURE

Kimberley N. Tuapawa
University of Newcastle - University Drive - Callaghan, NSW 2308, Australia

ABSTRACT
This is a review of the literature surrounding five popular media-rich educational online technologies (EOTs) currently being used by educationalists to support blended learning within tertiary environments. This review considers the following EOTs: 1) connective media, 2) interactive gaming, 3) virtual worlds, 4) web conferencing and 5) learning management systems (LMS), and provides educational stakeholders with an insight into the capabilities, current applications and observed benefits of using these technologies to facilitate student learning. As stakeholders across institutes focus on technology as a way to minimize costs, increase efficiencies and better meet student needs, this knowledge can support them in understanding, prioritising and applying new online tools in an effective manner. This review makes a contribution to the growing field of research concerning the integration of EOTs into blended tertiary environments.

KEYWORDS
Online, technology, education, blended, engagement, learning.

1. INTRODUCTION

Educational online technologies (EOTs) play a significant role in the delivery of online education, supporting the global increase in demand for higher learning, and contributing to opportunities for enriched student engagement. Within blended tertiary environments, online advances are improving traditional methods of delivery by fostering increased levels of “connectedness, community and collaboration”, marking the Internet as an important catalyst for growth in education (Boni and Graham, 2006).

Educationalists have striven to respond “to the opportunities to harness” the benefits by developing their knowledge and application of rapidly evolving technologies (Gregory et al., 2010). In facilitating innovative EOT usage, those whose ideologies entail an adaptive approach to better learning (Tuapawa, 2013) are championing transformations towards the “future needs of learners and teachers” (Gregory et al., 2010).

This is a review of the literature surrounding five popular media-rich educational online technologies (EOTs) currently being used by educationalists to support blended learning within tertiary environments. This review considers the following EOTs: 1) connective media, 2) interactive gaming, 3) virtual worlds, 4) web conferencing and 5) learning management systems (LMS), and provides educational stakeholders with an insight into the capabilities, current applications and observed benefits of using these technologies to facilitate student learning. As educationalists across institutes focus on technology as a way to adapt to change, increase efficiencies and meet student learning needs, this knowledge can support them in understanding, prioritising and applying new online tools in an effective manner.

While targeted primarily towards educational stakeholders, this review also provides valuable information for business groups. As corporate leaders across all industries focus on online media as a way to gain competitive advantage, the use of emerging tools is “commanding organisations to assess and manage the impact these technologies may have on their business” (PriceWaterhouseCoopers LLC, 2013). Using this material can increase understandings towards the application of new tools, assist in EOT-based decision-making “within the context of ... business goals”, and support commercial growth (PriceWaterhouseCoopers LLC, 2013).
The following sections introduce the aforementioned technologies, selected at random to represent a cross section of ECTs currently being used to support blended learning within tertiary environments. The first section discusses **connective media**.

## 2. CONNECTIVE MEDIA

Connective media or "online social networks, [are] renowned for social discourse and relationship building... [and] have become the major online application" with "over 4.5 billion active users... in 2012" (Harasim, 2010, p.25). High-ranking social platforms such Facebook, which "by 2012... had 1 billion users" (Harasim, 2010, p.25), MySpace, Youtube and Twitter enable students to "practice their identity" and "seek to make connections". Designed to connect people together, these mediums have demonstrated "significant potential for supporting learning..." (Kear, 2011). Providing social affordances not dissimilar to physical learning environments, these sites have facilitated an "innovative means of expression" and have acted as a "source of entertainment" by providing spaces where students can communicate freely with friends or acquaintances and affiliate with groups having similar learning interests (Goodman, 2012). Participation in collaborative learning environments including technologies such as social sites, wikis, blogs and instant messaging has fostered sociability and social identity and presence through community-driven learning that for many students "feels real" (Kear, 2011). The next section discusses **interactive gaming**.

## 3. INTERACTIVE GAMING

Interactive games are being utilised within blended learning environments to support student engagement. Games and simulations have yielded "better attitudes toward learning when compared to traditional teaching methods" (Vogel et al., 2006). "People enjoy a challenge...[and] executing the actions..." states Adams (2010), "it's fun to fly a plane, shoot a rifle, design clothing, build a castle, or sing and dance." When gameplay, the primary source of entertainment, is incorporated into a blended programme of learning, students are challenged to approach a problem and improve their skills in a fun and entertaining manner. "Key findings from a review of 89 research papers providing empirical data on the application and effectiveness of computer-based games indicated that the effects of computer-based games on learning were positive (Ke, 2008). Similarly, the outcomes of a meta-analysis where trainees were taught through the use of gaming activities indicated that "simulation games [were] effective for transferring learning in many key areas" (Kapp, 2012). Other studies focusing on online games have yielded promising results for the importance of pedagogy (Harasim, 2012). The next section discusses **virtual worlds**.

## 4. VIRTUAL WORLDS

Virtual worlds, or three-dimensional immersive environments are also being utilised within learning environments to support student learning. "Virtual worlds" are considered by some as "the foremost in adaptability" providing opportunities to tailor environments to "ensure realistic interaction and imagery" which promotes full “emotional and intellectual engagement in any scenario" (Visual Purple, 2012). In other environments, virtual world technologies have facilitated rich real-time interaction, unique experiential learning scenarios, wider reach across remote regions, and learnable interactive interfaces (Turpinwa and Skelton, 2012). Notably, virtual worlds have been heralded as ideal vehicles for androgogy experiential learning (Salt et al., 2008). Experiential learning within a virtual world has enabled students to benefit from being "exposed to different ways of learning, not only books or lectures, but by more practical and immersive ways" (Gregory et al., 2010).

Empirical studies have indicated that collaboration within a virtual world has contributed to higher levels of dynamism. After teaching nine university courses, Professor Calongne from Colorado Technical University, commented on how collaboration within a virtual world promoted an experience that was "lively, engaging and rich with social networks, interaction, and expression" (Calongne, 2008). The Virtual Worlds
Working Group (VWWG), stated in a case study and analysis of 21 Australian institutions using virtual worlds that the simulation characteristics of the virtual world encouraged greater sharing of ideas and collaboration in an engaging online medium (Gregory et al., 2010). Successful uses have leveraged “opportunities for visualisation, simulation, enhanced social networks, and shared learning experiences”, creating “a mix of content and activity to support” all learning styles, “auditory, visual, and kinesthetic” (Calonge, 2008). The next section discusses web conferencing.

5. WEB CONFERENCING

Web conferencing enables “a group of users to enter a shared virtual ‘room’ that supports synchronous interactions through a variety of modalities”. In an effective way, this technology has been able to “provide an increased sense of co-presence, ... offer new possibilities for concept representation” and create real-time collaborative opportunities (Bower et al., 2011). Shared features such as whiteboards, screen sharing, chat functionality, voting and file sharing are among those which “we use...to connect, share, educate, interact, and build trust” (Salke, 2012). Although lacking “the spatial component found in... 3D virtual environments...these [technologies] are powerful tools that [have] enabled participants...to engage in a variety of meaningful ways” (Annette et al., 2010). Web-based platforms such as Adobe Connect have the potential to “improve online learning by enriching synchronous interactions in audio, video, and text formats, encouraging student collaborations, increasing both social and teaching presence of an online course, providing students with instant feedback...boosting student motivation to learn and self-efficacy on online learning...” (Wang et al., 2013). The next section discusses LMS.

6. LEARNING MANAGEMENT SYSTEMS

Many institutions utilise integrated electronic learning environments, such as Blackboard, to efficiently administer and support the delivery of online programmes of learning. The basic functions of these usually commercial and customised learning management systems (LMS) cover student administration, class management, class resource management, courseware delivery, asynchronous and synchronous conferencing, document exchange and access to support services (Gooley and Lockwood, 2012). “Few educational technologies are as widely adopted and implemented as course management systems” (West et al., 2007). A LMS is “an excellent vehicle for training, evaluating and tracking results” (Brown and Johnson, 2007). A key advantage is that a centralised learning environment ensures consistency in delivery and evaluation and easy design and deployment for customised training modules.

7. CONCLUSION

This review has considered five popular media-rich technologies currently being used by educationalists to support blended learning within tertiary environment. These are connective media, interactive gaming, virtual worlds, web conferencing and LMS. Connective media is fostering student social identity and online presence. Interactive gaming is improving student attitudes towards learning and augmenting learning strategies. Virtual worlds are providing immersive scenarios for enriched and authentic activity. Web conferencing tools are offering real-time collaborative opportunities with varied functionality for meaningful engagement, and LMS are enabling consistent online course delivery mechanisms. These online tools are improving traditional methods of delivery by fostering increased levels of connectedness, community and collaboration. Stakeholders who continue to develop their knowledge and application of emerging EOTs will contribute towards improved learning opportunities for current and future students. Business organisations too can benefit by using this material to increase their understanding and application of online tools within a commercial context. Other EOTs not discussed, but which are influencing online delivery includes mobile applications and Web 3.0 technologies.
Further research by the author will attempt to 1) develop an appropriate classification system to help guide tool selection and categorise the extensive range of EOTs, and 2) conduct an investigation towards resolving the disparities that exist between stakeholder needs and EOTs within blended tertiary environments.

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8.6 Framework for technology integration

Figure 32 displays a conceptual framework for the integration of learning technology developed by Stoner (1996). It draws on systems analysis and design methodologies that are used to assist the implementation of systems.

**Figure 32:** Phenomenological EOT experiences: a basis for providing EOT support
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