Designing Lecture Presentations Using Cognitive Load Theory and Visual Communication Principles

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BDes(Hons)

Master of Education
June, 2013
STATEMENT OF ORIGINALITY:

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# CONTENTS

## 1. Introduction

<table>
<thead>
<tr>
<th>Background</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim and Scope</td>
<td>2</td>
</tr>
<tr>
<td>Overview of the Study</td>
<td>3</td>
</tr>
</tbody>
</table>

## 2. Instructional Design, Cognitive Load Theory & Teacher Clarity

<table>
<thead>
<tr>
<th>Introduction</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of Relevant Research</td>
<td>6</td>
</tr>
<tr>
<td>Conclusion</td>
<td>22</td>
</tr>
</tbody>
</table>

## 3. Graphic Design and Visual Communication Principles

<table>
<thead>
<tr>
<th>Introduction</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview of Relevant Research</td>
<td>25</td>
</tr>
<tr>
<td>Conclusion</td>
<td>40</td>
</tr>
</tbody>
</table>

## 4. Methodology and Theoretical Perspective

<table>
<thead>
<tr>
<th>Introduction</th>
<th>43</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis</td>
<td>43</td>
</tr>
<tr>
<td>Methodology</td>
<td>45</td>
</tr>
</tbody>
</table>

## 5. Research Design and Methods

<table>
<thead>
<tr>
<th>Introduction</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationale</td>
<td>50</td>
</tr>
<tr>
<td>Participants</td>
<td>52</td>
</tr>
<tr>
<td>Instruments and Materials</td>
<td>53</td>
</tr>
<tr>
<td>Program and Procedures</td>
<td>60</td>
</tr>
<tr>
<td>Analysis</td>
<td>63</td>
</tr>
<tr>
<td>Conclusion</td>
<td>65</td>
</tr>
</tbody>
</table>

## 6. Results Regarding Lecturer Use of Principles

<table>
<thead>
<tr>
<th>Introduction</th>
<th>66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation of Research Procedure</td>
<td>67</td>
</tr>
</tbody>
</table>
Conclusion 106

7. Results Regarding Resistance to Change 107

Introduction 107
Themes of Secondary Data 107
Conclusion 127

8. Discussion 129

Introduction 129
Meaning of the Primary Results 129
Meaning of the Secondary Results 135
Implications for Future Study 143
Conclusions 146

References 148

Appendices 164

Appendix A – Interview and Focus Group Schedules 164
Appendix B – Recruitment Poster Design 165
Appendix C – Lecture Announcement 166
Appendix D – Screen-Shots of the Workshop Presentation 167
Appendix E – Workshop Notes Hand-Out 172
Appendix F – Workshop Script (Video Version) 173
Appendix G – Lecture Slides Evaluation Form 176
Appendix H – Recruitment Emails to Heads of School 177
Abstract

In an effort to expand upon our existing understanding of how we go about designing instructional material, a union of certain principles and effects were proposed from both the disciplines of Graphic Design and Education. Several instructional design phenomenon articulated in the field of Cognitive Load Theory were matched with complementary principles used in visual communication. The marriage of these two sets of knowledge offered a more complete and clear understanding of instructional design decisions, particularly in regards to how they might be practically applied. To observe how readily an instructor might adopt and implement such principles, several university lecturers were invited to attend a workshop that explained and modelled them. While the workshop did have a positive and observable effect on the visual material they produced for their presentations, the impact was disappointingly muted. However, various themes that emerged from the interview data offered explanation for what may have interfered with the willingness and ability of participants to use the principles in question. What might have been regarded as a collection of sensible advice regarding quite superficial visual modifications was apparently overridden by a number of affective barriers and resistance to change within the instructors. Several naïve pedagogical assumptions arose, many given to a strong dependency on content rather than concepts. The reoccurrence of self-efficacy, confidence and ego-defence was also noted, along with some technological and circumstantial interferences. This study sheds light on the issues surrounding staff development regarding instructional design and demonstrates why a ‘How-to-use-PowerPoint’ seminar will not be effective in isolation.
1. Introduction

Background

_Catalytic Inspiration_

The time had come for the last Faculty address to be made in the introductory sessions welcoming the university’s new research higher degree students. An enthusiastic senior academic appeared before the packed lecture theatre and proudly presented a multimedia extravaganza. Looping sound-files blared, multi-coloured bullet-points in Comic Sans spun into view, disproportioned and animated clip-art jiggled, all while the presenter excitedly hollered from a page of notes. The graphic designer within me retched, the teacher within me raised an eyebrow, and neither side of me had the slightest idea what I was meant to understand from it all. From the looks of bemusement and amusement on the faces of those around me, it seemed as though I was not the only one who detected a problem with what had just happened. It became clear to me after witnessing a number of similar events that my contribution to educational research should reside in improving the quality of instruction.

_Identified Problem_

As a skilled graphic designer and teacher, it may seem instinctively obvious to me what could have been done to improve and clarify the aforementioned presentation. I could even have taken the time to articulate, to its well-meaning author, some of the reasons behind the changes I would consider implementing. However, this does not mean that the author will consequently take hold of the fundamental truths I would be drawing upon and have them inform their own instructional design practices. To suggest that the instructor should hire a graphic designer, get a degree in visual communication or that either of those are valid solutions in and of themselves is not particularly constructive advice. Yet the problem remains teaching academics are not
automatically equipped with the ability to design instructional material and may not even detect a problem with the designs they present.

A corpus of work exists identifying problems with the design of instructional material from a pedagogical standpoint, suggesting quite logical solutions and tactics for dealing with them. An eclectic collection of material drawn on by designers also speaks upon the topic, with the exception perhaps of having a generally more aesthetic or visual consideration to offer. What has not been covered, however, is how these principles combined may be made accessible to the typical instructor.

Aim and Scope

The end goal of this study is to suggest how instructors might internalise and implement an understanding of instructional design informed by visual communication principles.

While “instructional design” may involve any number of teaching aids, this study has specifically concentrated on instructional material presented in the form of projected, digital multimedia. With digital presentations (such as those made using Microsoft PowerPoint (Shelly & Sebok, 2010; Wempen, 2013)) being the more ubiquitous method for imparting teaching material, it posed as a more pertinent vehicle through which to conduct such a study.

The instructors in question are university lecturers who deliver such material in a mass-lecture setting. Being one of the more economical and prevalent forms of face-to-face imparting of concepts on a grand scale within universities, lectures pose as a suitable forum to address. The instruction is still quite personal, the audience is largely captive and the pressure for the teacher involved to communicate clearly and effectively is high. The faculties and disciplines these lecturers represent are varied, however, those in the fields of Education and Graphic Design have been excluded. Academics within those two disciplines were likely to already have knowledge of some of the concepts and theories addressed in this study, which may have clouded the actual benefits that others may have gained from it.
The Visual Communication Principles (VCP) concerned directly relate to the reduction of cognitive load and the clarification of meaning in visual material. These principles also extend into sub-disciplines of graphic design, such as typography and graphical user interfaces.

Within instructional design, the branch of study devoted to cognitive load theory (CLT) brings a new vocabulary to many of the visual communication principles that relate to the field of instructional design. For this reason, it is the primary qualifier for determining which VCP are relevant to the study.

**Overview of the Study**

To achieve the above aim, the next two chapters review the current understanding of Instructional Design (ID), Cognitive Load Theory (CLT) Visual Communication Principles (VCP) and a variety of related material. The first of these concentrates on the relevant contributions made in the field of CLT, including explanations of cognitive architecture, known issues and scenarios regarding the overload of these structures and some of the effects that have been observed to either exacerbate or alleviate such problems. The subject of teacher clarity is also covered in this chapter, framing the important role that clear instructional material plays in the delivery of quality teaching. The next chapter offers some qualifiers for what constitutes VCP and highlights several areas of graphic design that present principles reinforcing and extending many of the concepts discussed in the preceding chapter. It explains some of the origins and practical applications of these principles and points out their relationship to the core question at hand.

With these two chapters forming a foundation for the study, Chapter 4 details the methodological and theoretical perspective of the researcher, along with the justification of several hypotheses regarding the marriage of VCP and CLT. Chapter 5 describes the design and methods of the research, the decisions and processes surrounding the selection of participants, research instruments the procedures involved and the techniques employed to analyse the data collected.
How these methods have been implemented and the information they yielded are have been separated into two chapters. Chapter 6 details the results that directly address the aim of the study, with attention placed on the participants as case studies as well as the generalisations that could be drawn from them as a group. Chapter 7, however, reports on a secondary body of results concerning a number of contextual themes of interest that emerged from the process.

The discussions of these two sets of results take place in Chapter 8, detailing not only the pertinence they have to the primary inquiry at hand, but also the phenomena involved that effect the magnitude of those results. A conclusive response to these discussions is also presented, directly addressing both the aim of the study as well as avenues that have been opened for further investigation.
2. Instructional Design, Cognitive Load Theory & Teacher Clarity

Introduction

Structure of the Background Chapters

These chapters have been divided into two areas to accommodate for the two main disciplines that this study straddles: Education and Design. However, as will be discussed in later chapters, further material has been reviewed to help explain the results that were generated, and will be covered in those chapters rather than here. This first background chapter will address material from the educational field of instructional design, with particular focus on cognitive load theory. It will also discuss some of the work that has been done under the banner of Teacher Clarity. The second background chapter musters together research that addresses topics pertaining to the field of graphic design and visual communication. While the roots of much of the material presented in the second background chapter can be traced back to a number of other disciplines, they have been selected because of their adoption by the visual communication field and their relevance to the graphic design activities involved in this study.

Structure of this Background Chapter

This is largely a descriptive chapter concerning existing theories and material from the field of Instructional Design (ID), and more specifically, progress made in the arena known as Cognitive Load Theory (CLT). Pockets of other educational studies have also been considered in this chapter, particularly those concerning Teacher Clarity. As has been described in the scope for this study, only the aspects of these fields that are pertinent to instructional material in the form of digitally projected multimedia in a mass lecture setting will be addressed.
Disciplinary Placement and Overlap

My native discipline is Graphic Design and Visual Communication. Compared to many other disciplines, it does not have a particularly prominent research culture, and often seems predominantly focused on the more vocational and professional aspects of the graphic design industry (N. Cross, 2001). However, a healthy community of practitioners, experts and academics exist who teach principles, discuss theories and communicate using a vocabulary that is discipline-specific (N. Cross, 1999; Lieberman, 1995). As a member of that community and as a member of an educational research community, I felt it was important to find common ground for both in which to develop this study. A significant portion of that common ground was found in the field of Instructional Design, particularly the research concerning Cognitive Load Theory (CLT). These fields of study still feel quite new to me, however, given that they have essentially provided a new language through which to articulate my existing graphical understanding of instruction, it seemed like the best body of knowledge to start with. I was also always taught to eat my peas and carrots first.

Overview of Relevant Research

Instructional Design

In General Terms

While a very brief definition of the ID domain might be “the design of instructions”, as a scientific field it covers quite a few branches of study that are concerned with teaching, learning and educational psychology. Of course, many authors have offered far more detailed definitions over the years than this. While these definitions have generally attempted to describe the field with accuracy, they have not necessarily placed any major limitations on it. Robert Reiser, a prolific author on the trends and history of ID (1989; 1985; 1988; 2001a; 2001b; 2011; 1990; 1996; 2002), proposed this definition in 2001:

\[
\text{The field of instructional design and technology encompasses the analysis of learning and performance problems, and the design, development,}
\]

...
implementation, evaluation and management of instructional and non-instructional processes and resources intended to improve learning and performance in a variety of settings, particularly educational institutions and the workplace. (Reiser, 2001a)

A similar definition formed earlier by the Association for Educational Communication and Technology (Seels & Richey, 1994) specifically divides the area into various stages, listing design, development, utilisation, management and evaluation as integral parts of the instructional design process. Many seminal works in ID focus on the design process in their descriptions, at which point the difference between ID definitions and ID models begins to blur, and the descriptions tend to slide into the practice of ID rather than the field of science that studies it. This can be seen in Dick and Carey’s Systems Approach for Designing Instruction (Dick, Carey, & Carey, 2011), Kemp, Morrison and Ross’ Instructional Design Plan (Morrison, Ross, Kemp, & Kalman, 2010) and the reasonably generic ADDIE (Analyze, Design, Develop, Implement, Evaluate) model (Molenda, 2003).

Aliases and a Clarification of Terminology

It should be established at this point that there are a variety of terms used in the literature to describe the ID field. While doing so, it is also an opportune time to clarify just how I intend to use these terms. Historically, the terms ‘Visual Instruction’ (Standley, 1928), ‘Visual Education’ (Weber, 1928), ‘Educational Technology’ (Seels & Richey, 1994), ‘Learning Technology’ (Oliver, 2000) and ‘Instructional Technology’ (Gagné, 1987; Saettler, 1968) can be largely regarded as interchangeable or even synonymous with ID. Motions to unify the field as ‘Instructional Design and Technology’ (IDT) were proposed in an effort to communicate that the field did not simply deal with ‘instructional media’ (computers, projectors, software, hardware) but dealt principally with the theories and processes behind their use (Reiser, 2001a). It seems, however, that the simpler label of ‘Instructional Design’ covers this association reasonably well and has widely prevailed in the literature for some time. For this reason, I too have chosen to stick with the term Instructional Design (ID) to describe the field of study.
However, as the word ‘design’ is known both as a verb and several nouns (much like the word ‘research’), the problem arises when attempting to describe the field of study, the process of producing an example of instructional material, and the manifest result of that process. For example:

_Several studies in Instructional Design indicate that the instructional designs produced by instructors are influenced by the length of time they were engaged in instructional design._

To alleviate this potential confusion, I shall refer to the act of producing an example of instructional material (such as gathering resources, developing ideas, producing visual material, evaluating concepts) as the ‘design process’. The finished product that emerges from this process (such as a set of digital presentation slides, a poster, a book, a user interface, a website) shall be referred to as a ‘design artefact’. Consequently, the example sentence used earlier will now read:

_Several studies in ID indicate that the design artefacts produced by instructors are influenced by the length of time they were engaged in the design process._

**As it Applies to Tertiary Education**

While the growth of ID has been generally observed in a wide variety of age groups and educational institutions, it has had a long tradition in the context of military training and adult learning (Saettler, 1990). Seminal works by ID pioneers such as Gagné (1985; 1987; 1988; 2006) put great emphasis on considering the various characteristics of learners before engaging in the design process, but tend to focus on the learners’ intellectual skills and inclinations as opposed to their particular age group.

Research on learning in ID typically takes the form of student-only, teacher-led or community-based (M. G. Moore, 1989), with a high concentration on the first and last of those forms in recent decades. The advent of the internet and the growing interest in online and distance learning has contributed to this trend and helps to explain why ID has been very active in the areas of experiential learning and constructivism (Huang, 2002). This can be seen in the importance that has been
placed on the contributions of authors such as Kolb (1984), Jonassen (2006), Duffy and Cunningham (1996).

As this particular study is concerned with the more traditional teacher-led format of lecturing that is still so prominent in university teaching (Foreman, 2003), the more relevant body of material to draw upon is that of the andragogically tested ID theories concerning cognitive psychology. Before visiting such theories, it is important that we first visit the contributions that ID has made regarding the other elements involved in this study.

**As it Applies to the Use of Digital Teaching Aids**

While visual aids in teaching can include everything from chalk-boards through to virtual reality, ID research on the development of digital instructional material has typically concentrated on highly interactive multimedia programs or systems, catering to self-regulated and learner-focused scenarios (Reiser, 2001a; van Merriënboer & Martens, 2002). Such scenarios tend to place the instructor in a role of a facilitation rather than delivery. While the field may not have paid as much specific attention to the dynamics of digitally projected teaching aids during a mass lecture presentation, several considerations are still raised in comparable ID scenarios that are quite relevant.

Firstly, there is a recurring caution and criticism in the literature regarding research that focuses on the authoring tools that might be used in the design process, as opposed to the instructional reasons determining their suitability for the task (Coppola, 1998; Mayer, 2003; van Merriënboer & Martens, 2002). Even quite specific presentation software such as Microsoft PowerPoint have attracted criticism because of the tendency that users of the product seem to exhibit in producing instructional artefacts that are passive and ignore many of the hallmarks of a stimulating presentation (Cyphert, 2004). A strong attraction or preference amongst both students and instructors for digitally projected presentations has been duly noted (Frey & Birnbaum, 2002; Ho, 2001; Pippert & Moore, 1999; Simpson, Pollacia, Speers, Willis, & Tarver, 2003), although the novelty may have waned in recent years (Savoy, Proctor, & Salvendy, 2009). Regardless, work in this area has
demonstrated that ID principles are generally as effective, irrespective of media or context (Bartsch & Cobern, 2003; Gustafson, 2002; Mayer, 2003). Studies comparing digitally projected with traditional lectures that have reported an improvement in performance are often simply reporting the benefits of introducing imagery to the presentation rather than the impact of the software involved (Erdemir, 2011). The impact of material presented in either static or dynamic form also seems to have little or no significance in terms of student performance or learning outcomes either (Pippert & Moore, 1999). It is, however, readily recognised that technology and pedagogy have had a reasonably symbiotic relationship throughout ID history, having a notable and generally positive influence on one another in terms of direction and development (Reiser, 2001a).

**As it Applies to Producing and Arranging Visual Material**

In a summative publication on the general role and purpose of ID, Merrill (1996) mentions several times that it should make the acquisition of knowledge not only effective and efficient, but also appealing. Similarly, Parrish (2009) asserts that instruction should be an aesthetic and immersive experience. Generating interest through dynamic visuals, along with the concept of enhancing education with enjoyment, is referred to in some contexts as ‘edutainment’ (Maushak, Chen, & Lai, 2001). Edutainment, similar to the concept of gamification (Renaud & Wagoner, 2011), is often celebrated as a method of triggering interest, engagement and motivation in many instructional contexts (Wang, Tan, & Bo Song Information Technologies and Applications in Education, n.d.). However the term can also be found being used as a condemnatory description of the practice of adding extrinsic visual effects and “eye-candy” to instructional material, adding very little, or even eroding, pedagogical integrity (Clark & Lyons, 2004; Okan, 2003; M. Resnick, 2004). The two extremes of an instructional artefact taking the form of either a bland wall of text or a zealous and superfluous application of colour and movement are both criticised in the literature in this manner, but very few specifically demonstrate how to achieve a balanced visual aesthetic.
All of the definitions and models mentioned earlier regarding ID tend to indicate a phase (or phases) whereby an instructor must perform the act of constructing or producing the content and elements that form an instructional artefact. When it comes to the generation, manipulation or organisation of visual elements, however, many of the core ID texts tend to fall silent.

In Brown and Green’s introductory text book on the subject of ID (2009), it is suggested that while it may well be the instructor that takes on an active role in the production process, the explanations of ID production offered concentrate almost exclusively on the management of a production team, with the generation and arrangement of visual material left largely to a “graphic artist”. Despite promoting the benefits of establishing a style guide for the material being produced (which includes making a decision about the typefaces, colours and style of graphics), how best to make those decisions are never addressed. Similarly, in Seel’s earlier book on ‘Instructional Design Fundamentals’ (1995), selecting display characteristics such as graphics, typefaces and colours are listed as important parts of the ID production process (page 129), but are no more specific about the task than that. In the chapter on educating instructional designers in the same book (page 223), it is interesting to note a strong suggestion that even the process of teaching ID principles might be best done in a format similar to that commonly found in “creative” disciplines such as graphic design. Indeed, even when directly addressing the aesthetic qualities of instructional material, the literature will often discuss it in quite abstract or distanced terms, drawing parallels with the broad narrative underpinnings of works of art at best, and generally avoiding the pragmatic details of graphic production and organisation (Parrish, 2009).

To provide a somewhat rare exception to this gap in explicit visual instructions, Clarke and Lyons’ book entitled ‘Graphics for Learning’ (2004) does begin to articulate some specifics regarding the visual qualities of instructional artefacts. Within it, visual examples are shown (albeit often stylistically primitive and unpolished) demonstrating and explaining some of the possible forms that many ID principles might take. It proposes and discusses systematic design processes, the different type of graphics that might be employed and their instructional values. As
theoretically thorough in its discipline as it is, however, it made quite clear in the book’s introduction that it is not a how-to guide for making graphics, directing readers to elemental graphics books instead. Nevertheless, it would seem that a publication such as this illuminates the task of directing specific visual qualities in ID more than others because of its inclusion of the work documented in the area of Cognitive Load Theory.

*Cognitive Load Theory*

The subject of cognitive load theory (CLT) has a number of active contributors presenting a variety of categories, perspectives and conclusions (Paas, Renkl, & Sweller, 2003). On an elementary level, the issue that would seem to put all of this research under the one umbrella is the core notion that the human brain has a limited capacity to process information. In understanding those limitations it is commonly suggested that certain measures can be developed and employed to use cognitive capacity in a more optimal fashion. However, as a closer examination of CLT literature will reveal, a generally accepted underlying architecture exists as well as a number of observed effects and overload scenarios. These studies, as well as their underlying theories provide us with guidelines and reasons for the way that we organise visual material in an instructional artefact.

*Cognitive Architecture*

As argued by Sweller et al (2003; 2002; 1998), human cognitive architecture possesses two main types of memory - working memory and long-term memory. Working memory is primarily responsible for the selective processing of information gathered by our senses (such as auditory and visual) and has a very limited capacity and duration. We use our working memory to make sense of the information we receive, organising and constructing more complex concepts into what are referred to as schemas. Schemas are stored in and retrieved from our long-term memory, which, unlike working memory, has a comparatively unlimited capacity. Schemas retrieved from long-term memory give us the ability to automate our learning and understanding without consuming the same amount of working memory that was
expended in the creation of those schemas. The varying levels of automation that each schema provides allows us to learn increasingly difficult and complex material.

**Cognitive Load Categories**

Several categories of cognitive load have also been established. They are best known as intrinsic cognitive load, extraneous cognitive load and germane cognitive load (Paas et al., 2003). Intrinsic cognitive load describes the situation whereby a concept or piece of information is by its very nature difficult to understand as all the elements within it interact, and without such interaction, meaning is lost. When the development of schemas in working memory is disrupted by other incidental or irrelevant information, it is referred to as extraneous cognitive load. Germane cognitive load on the other hand, is introduced cognitive load for the purpose of enhancing schema acquisition rather than interfering with it.

Extraneous cognitive load is undesirable in most learning contexts and its reduction or removal is what authorities such as Richard Mayer would regard as a core goal in achieving what he calls the ‘coherence principle’ (2008). In an instructional explanation of how a diesel engine functions, an example of extraneous cognitive load might be the precise dimensions of each engine part or the inclusion of a picture of a mechanic holding a spanner. Because extraneous cognitive load is a comparatively easier problem to deal with than intrinsic cognitive load, quite a number of different strategies have been developed to reduce it and have given place to a number of observable effects.

**Multimedia Principle and Individual Differences**

Many of the studies conducted within the framework of CLT, have contributed to what is variously referred to as the ‘multimedia principle’ (Cohen, 2005; Liu & Chuang, 2011; Zhao, 2011) or ‘multimedia effect’ (Brünken, Plass, & Leutner, 2003; Cohen, 2005; Mayer, 2003), both of which effectively assert that words and images combined help students learn better than words alone. Whenever the multimedia effect is mentioned, it is often credited to the material published by Mayer (2008; 2009; 2010) on the topic of multimedia learning. In testing such effects, Mayer has shown that the impact of visuals in instructional material is best
observed in certain types of learners, particularly those with little prior knowledge of the material being presented and those with high spatial abilities (Mayer & Sims, 1994).

**Split-Attention Effect, Modality Effect and Off-Loading**

Chandler and Sweller (1992) identify the ‘split-attention effect’ as the situation whereby a passage of text and a diagram must be integrated using working memory in order to understand an instruction or concept that neither the textual or pictorial components could convey independently. Split-attention occurs because there are two separate sources of information that can only be examined one at a time. While reading the text, one is unable to look at the diagram, and vice versa. The ‘modality effect’ describes the utilisation of both audio and visual sensory input channels, thus effectively expanding the capacity of a working memory that is only really utilising one of the two channels. The typical example of a split-attention effect is where the textual component is being transmitted as a spoken narration instead, freeing the visual sensory channel to focus solely on the graphical component. Although not completely generalisable in all circumstances (Tabbers, Martens, & van Merriënboer, 2010), quite a number of experiments have been conducted yielding a convincing body of findings supporting the modality effect (Jeung, Chandler, & Sweller, 1997; Mousavi, Low, & Sweller, 1995; Tindall-Ford, Chandler, & Sweller, 1997), many of which stress its importance in a multimedia-training environment. Upon analysing a similar scenario, Mayer and Moreno (2003) described the method of moving some of the essential processing from the visual channel to the auditory channel as ‘off-loading’. Off-loading written text to spoken text, thus freeing-up visual real estate on a presentation slide, is a key aspect to organising visual material in a lecture presentation. In practice, the act of simply removing many of the written component labels and descriptions from a diagram of a diesel engine and verbally naming each part as they become relevant would be a form of off-loading.

**Redundancy Effect and Signalling Effect**

Another important conclusion drawn by Mayer and Moreno, and supported by others (Bartsch & Cobern, 2003; Leahy, Chandler, & Sweller, 2003), is that there is
credibility in what is referred to as the ‘redundancy effect’. This effect is a reference to the cognitive load induced by the presence of non-essential or unnecessary information – particularly content duplication and materials involving animations (Mayer, 2008). It was noted that in the case of having an audible narration accompanied by a visual text of identical content, learners were reported as not performing as well as when an auditory narration was the only word-based transmission present. Similarly, another scenario describes a learning situation in which a narrated animation included an excessive amount of interesting, but ultimately digressive material. One method successfully employed to reduce cognitive load in this instance was referred to as a ‘signalling effect’ and involved the implementation of various audio and visual cues, directing the viewer’s focus to the most critical information throughout the presentation. Some of the signalling methods used included accentuating key words in the audible narration, adding coloured arrows to indicate important images, and grouping the text and images under meaningful headings and sections. This signalling facilitated a more appropriate and concentrated process of selecting and structuring relevant information for the viewer.

**Spatial and Temporal Contiguity Effect**

Similar to the signalling effect, the linking inference created by the physical proximity of related information has been described as the ‘spatial contiguity effect’ (Mayer, 2003). While the examples used to illustrate this effect have largely been paper-based (Mayer, 2008), the basic premise is that when using written text along with diagrammatic material, having them physically paired together in the layout as they incrementally correspond (as opposed to the instructions being segregated from the illustrations) increases learner performance. Transferred to a slightly different scenario, if an animation is accompanied by an auditory narration, having them timed as such so that they correlate in relevance (as opposed to being presented at separate times) learner performance is also improved. This effect, again identified by Mayer, is known as the ‘temporal contiguity effect’. While both of these effects have been demonstrated in numerous experiments by Mayer (1994), given that the redundancy effect, the modality effect and the coherence principle all advocate the
removal of written words in a multimedia presentation, the temporal contiguity effect would seem most relevant in the case of this study.

**Expertise Reversal Effect and Fading Technique**

In the late 1990s, a number of cognitive load theorists began concentrating on an observable phenomenon now known as the expertise reversal effect (van Merriënboer & Sweller, 2005) whereby some of the methods developed to reduce cognitive load, appeared to have a lesser effect, and eventually an adverse effect, on learners who were considered to have obtained a high level of familiarity or experience with the general subject matter being presented. In a typical example of a split-attention effect, Kalyuga et al. (1998) demonstrated that the text components of an instructional presentation eventually became redundant material for a learner with a high level of expertise, making a presentation of the same material without the text a preferable alternative. This would seem to support established cognitive architecture in that with every schema learned and developed, an appropriate ability to automate learning is also gained. So, as a novice develops into an expert, less cognitive effort is required to understand new material, therefore less information and instruction is required in order to lead them to that level of understanding. The accommodations made in instructional designs for this progressive reduction in instructor control and increase in learner control has earned the description of being a fading technique.

**Criticisms of CLT**

Jong (2009) argues that while CLT may well have united many of the principles that contribute to ID, it tends not to be accompanied by any absolute or accurate measures, and can conveniently explain every result without really being exposed to definitive contestation. He describes the largely infallible (and arguably unaccountable) nature of the different load categories in the following quote:

> …the fact that cognitive load is composed of three different elements that are “good” (germane), “bad” (extraneous), or just there (intrinsic) means that every outcome fits within the theory post-hoc. (Jong, 2009, p. 125)

Jong draws attention to inconsistencies amongst some CLT researchers (such as vanMerrienboer:2003wb c.f. Hasler, Kersten, & Sweller, 2007) as to whether
instructional methods actually have the capacity to dilute the innate complexity of conceptual material labelled as having intrinsic cognitive load. Another point raised is that there is little specificity regarding how to add germane cognitive load without it also being a case of extraneous cognitive load or cognitive overload in general. This, like the expertise reversal effect, brings focus to the context of the design artefact; for an expert’s germane cognitive load would be a novice’s extraneous cognitive load, whilst a novice’s germane cognitive load would be extraneous to the expert. This presents a challenge to the expert who fails to discriminate content on the basis of developmental relevance while producing an instructional design artefact. Although many of the fragilities of the work conducted in CLT is pointed out, Jong does seem largely content with the cognitive architecture it is built upon, that the prior knowledge and skills of the students involved is a critical factor, and that instructional scenarios that generate cognitive overload should be avoided.

Other Contributions

While ID has certainly made significant contributions of relevance to the design process involved in digitally projected lecture presentations, other scholarly efforts from outside of this field bring further light to the subject.

On Lectures and PowerPoint Slides

A quote attributed to Edwin Emery Slosson on the nature of the university lecture states that:

Lecturing is that mysterious process by means of which the contents of the notebook of the professor are transferred through the instrument of the fountain pen to the notebook of the student without passing through the mind of either. (Miller, 1927, p. 120)

Academic material warning us that the common lecture is not an ideal learning situation is not a recent phenomenon (Robbins & Bernier, 1978). The nature of the lecture format makes it largely unsuitable in terms of adequately catering to individual learners (O’Neill & McMahon, 2005), facilitating meaningful feedback or two-way interaction, or generally affording the learner with any control over the pace, order or depth of the material they are attempting to comprehend (Foreman,
2003). Studies have demonstrated that multimedia courseware equivalents have been just as effective as the traditional mass lecture in terms of catering the same number of students (Aly, Elen, & Willems, 2004), and a series of concerns regarding declining student attendance of university lectures have also become more prevalent (G. E. Kelly, 2012). Conversely, others assure us that there is still no more interactive or rich an experience than human-to-human communication and that performer-audience scenarios have elements of valuable two-way interaction (Boyarski, 2010). Nevertheless, mass lectures still persist as an economically attractive method of large-scale, face-to-face course delivery in universities and predictions of its demise (Folley, 2010) have so far been unfulfilled.

As far as educational presentations go, lectures certainly have their pedagogical flaws. They have not, however, been as openly condemned and associated with poor communication as vehemently as the software commonly employed in their delivery. Microsoft PowerPoint, in particular, has been accused of facilitating the ‘dumbing-down’ of potentially interesting subjects, inducing boredom (Mann & Robinson, 2009), blocking improvisation and exploration (Gabriel, 2008) and closing-down debate on the topics being presented (Norvig, 2003). Edward Tufte, a notable PowerPoint antagonist, goes further to implicate the product as a contributor to the Columbia Space Shuttle Disaster of 2003 (2006), articulating the many problems featured in a text-heavy slide that was involved in NASA’s executive decision-making process preceding the tragedy. Tufte’s conjectures regarding the use of PowerPoint are predominantly based on the fragmenting and marshalling nature of the structures and style-sheets that dominate the program, claiming that such restrictions and pre-formatting is at least partly responsible for the degradation of the intellectual significance or meaning in a message. The strong predisposition of PowerPoint slides to consist of a series of lists and bullet-points, for example, is something that Gabriel (2008) points out as generating several inferential problems with the content being presented. Some authors have chosen to compose detailed taxonomies of the different types of organisational text that are featured in the typical PowerPoint template, rather than the cognitive complications generated by employing them (Farkas, 2005). However, to echo the many warnings mentioned earlier in this chapter regarding
placing too much emphasis on authoring software, design and cognitive science authorities such as Donald Norman soberly remind us of the source of the problem.

*Bullet point slides often lead to poor talks, but the problem is with the talk, not with the tool.* (Norman, 2005).

Another reoccurring observation concerning the use of PowerPoint slides for lectures is the practice among lecturers to use the very same file for both the presentation and as set of notes or hand-outs for the students attending it (Cyphert, 2004; Frey & Birnbaum, 2002; Mann & Robinson, 2009; Szabo & Hastings, 2000). As a tool to encourage or facilitate note-taking in a lecture setting, students have expressed concerns about the difficulty in attempting to absorb the material being presented as well as compose coherent notes (Pippert & Moore, 1999). Students in lectures have also expressed a strong preference to have access to copies of the slides (either digital or printed), with both students and lecturers generally believing that doing so aids revision, knowledge retention, and performance (K. James, Burke, & Hutchins, 2006), despite there being minimal empirical benefits recorded (Szabo & Hastings, 2000). Given that the printed version of a PowerPoint file is only effectively one mode (visual only) of a duel mode presentation, a significant portion of the lecture in question is actually missing. This, perhaps, offers at least one explanation as to why the typical incarnation of PowerPoint handouts seem to be only marginally effective. The fact that a lecture is not an example of self-directed or self-paced instruction, but rather an excellent example of cognitive overload, would also seem to offer further explanation of such concerns and frustrations. Even the act of reading instructional text is not often continuous and, in the case of a digital presentation, the audience is regularly changing focus between the projected slides and the presenter (Hartley, 1986), adding yet another case of split-attention. Many of these concerns regarding the distraction of audiences in a lecture due to pressure created by note-taking or reading are articulated in Paola Domizio’s guide to good lecturing (Domizio, 2008).

Donald Norman (2005) proposes that in order to meet the needs that most speech-givers expect Microsoft PowerPoint to serve, there are, in fact, three separate, and very different, documents required; personal notes, illustrative slides and handouts. Likened to something between palm-cards and comprehensive scripts, personal notes
are for the speaker’s eyes only and are to help with the pacing of the presentation, reminding the speaker of the various points they wish to make as well as any relevant anecdotes or exact wording of quotes or verse that they wish to recite. Illustrative slides use the communicative power of visuals to add clarity and depth to the points at hand, with minimal text, if any at all. Handouts, Norman suggests, are the place for details on the key points that aid revision and further study such as references to source material, as well as tables and graphs that may be data-rich, but not especially suited for a fixed-pace presentation. Studies by Grabe (2007), Vandehay, et al. (2005) and Murphy (Murphy & Cross, 2002) suggest that students are not only likely to use supplementary material such as this when supplied (particularly condensed summaries of the lecture rather than detailed accounts), but are likely to perform better and attend lectures just as regularly. Recent iterations of the PowerPoint program have attempted to address some of these points through the introduction of ‘Presenter View’ (Microsoft, n.d.), allowing the addition of speaker notes to each slide, hidden from the projection shown to the audience. This feature does, of course, require that the presenter uses a secondary display aside from the main projection in order for them to see these notes while presenting. PowerPoint has also recently made allowances for the presenter to include additional content to the handouts it can produce, as well as export the otherwise quite prescriptive layout it produces into Microsoft Word for further manipulation (Microsoft, n.d.).

The time commitment required for lecturers to both master the software and produce the slides is another common concern that has been raised in the literature. Qualitative data gathered in such studies indicate that academics often find it difficult to justify the amount of time it takes to assemble a digital presentation and that the time constraints they are usually under do not allow for a quality result (Pippert & Moore, 1999). While there is time expended in learning and using the presentation software, quite a lot the extra time required involves searching for relevant images online on in resource banks purchased by their institution (Bartsch & Cobern, 2003). It has, however, been noted that compared to the time and effort required to produce an equivalent presentation using overheads and slide projectors,
digital presentations offer significant advantages such as high image quality, convenient editing, and portability (Gunderman & McCammack, 2010).

**Teacher Clarity**

Efforts designed to analyse how clear a teacher’s instructions are and how easily understandable a student perceives them have been given the label of 'teacher clarity'. As there is often a difference between how clear a teacher believes their own instructions to be and how clear their students believe them to be, the area generally focuses on identifying what preconceptions, strategies and behaviours that an instructor might have that either inhibits or enhances clarity (Chesebro, 2003; Chesebro & McCroskey, 1998). In contrast to several studies found in ID and CLT, teacher clarity has not always focused on improving student performance and exam results as the primary goal. While high teacher clarity has been reported to have a significant benefit in terms of student achievement and cognition (Comadena, Hunt, & Simonds, 2007), it has also been effective in terms of student motivation (Rodger, Murray, & Cummings, 2007), satisfaction (Hativa, 1998; Hines, Cruickshank, & Kennedy, 1985), self-efficacy (Rodger et al., 2007) and affect (Sidelinger & McCroskey, 1997).

Components and factors of teacher clarity typically include organisational and explanatory tools such as using headings, providing an outline of the content and structure, indicating a change in topic, using concrete examples, using multiple examples, repeating complex concepts, using imagery, emphasising critical points, suggesting practical applications and summarising regularly (Murray, 1983). They tend to be aspects of teaching that, although differing slightly amongst disciplines and student groups, educational institutions value and promote (Ribera, BrckaLorenz, Cole, & Laird, 2012).

While the majority of studies of teacher clarity are indeed focused on instructor behaviour and performance (including posture, eye-contact, gestures, expressiveness and humour), distinctions have been made between the clarity of the teacher and the clarity of the message (Civikly, 1992). There are also several factors regarding the organisational features of a presentation in teacher clarity research that seem to have
direct relevance to this study. For example, several studies demonstrate the value of stressing the most important aspects of the content, using examples to aid explanation, and structuring a logical and even-paced presentation (Cruickshank, 1985; Hines et al., 1985; Simonds, 1997). It is mentioned in several of these cases that visuals are employed (Hines et al., 1985; Simonds, 1997), however the exact nature of their use is not documented in any detail beyond the device used to display them. It is assumed, in the spirit of how these studies have been reported, that the use of imagery and visual aids has been in a manner that aligns with the behaviours that were measured.

Teacher clarity research certainly emphasises the impact and importance of the qualities and characteristics of a lecturer as a performer. However, other studies such as those regarding the ‘Dr. Fox Effect’ also show how influential these qualities can be in a pedagogically neutral or negative sense (Abrami, Leventhal, & Perry, 1982; J. E. Ware & Williams, 1975). Studies such as these illustrate how a charismatic, enthusiastic and engaging presenter may in fact elicit student motivation and satisfaction (and even admiration) without the use of any clear structure, valuable content or understanding of the topic being presented. Being beyond the scope of this study, the role of teacher immediacy and the performance skills that an instructor may possess are factors to be wary of, but not necessary ones to measure.

Conclusion

As is frequently indicated in the literature, much of the focus in ID has been placed on eliciting a particular response from the students involved, or generating an immersive or interactive experience that allows the learner to pace themselves or take active control of the learning process. While this is of substantial value to contexts such as online or distance learning, virtual environments, educational multimedia and other forms of programmed instruction, the principles it presents can be equally valuable in a teacher-led context such as the humble lecture presentation. Granted, a typical lecture does not afford a significant opportunity for student interaction or regulation, nor is it always concerned with communicating a “set of instructions”. It is, however, concerned with delivering conceptual material of a complicated or expert
nature to a body of novices who are expected to understand it and to apply that understanding.

From the literature, it can also be argued that CLT identifies the need for appropriately designed presentations and demonstrates reasons and circumstances that require intervention. In keeping with the modality effect and off-loading, there seems no reason that many of the hallmarks of teacher clarity do not also apply to visual material, giving weight to the signalling effect in particular.

While work that tests combinations of CLT effects has demonstrated that factors such as individual learning differences and prior knowledge are also important factors to consider in regards to the arrangement and design of multimedia (Austin, 2009), large-scale lectures can only really cater to common denominators in an audience. Nevertheless, while the format of the lecture and the authoring tools used to present in them have their flaws and pitfalls, the foundations for structuring an instructional artefact designed for optimal learning have been set.
3. Graphic Design and Visual Communication Principles

Introduction

Structure of this Background Chapter

This chapter covers the wide and eclectic corpus relevant to graphic design and visual communication practices and to the scenario stated in the aim and scope of this study. In particular, it focuses on the principles and theories in the discipline that tend to echo those established by ID and CLT, thus presenting another perspective on the matter at hand. Before exploring these parallels, some time is dedicated to clarifying what ‘Visual Communication Principles’ are, and the elemental visual aspects that underpin them.

The Graphic Design Vocation

The modern professional graphic designer (also sometimes referred to as a ‘graphic artist’) is normally recognised as being a person who exercises the art or skill of visually communicating a concise message to a particular audience. Elizabeth Resnick (2003) summarises this activity in a similar fashion:

*Basically, graphic designers develop images to represent the ideas their clients want to communicate. This is usually accomplished by combining images (photographs, film, video, art, or illustration) and words (typography) into a unified form that responds to the content and conveys a clear message.* p.16

These are fairly broad definitions considering that they implicate many of the practices of typographers, photographers, illustrators, printers, web developers, film directors, animators and copy editors, extending also into occupations such as sculptors, interior decorators, architects, industrial engineers, public relations, special effects and computer programmers and others.
In light of the depth and breadth of the graphic design and visual communication profession, identifying a definitive set of principles that govern all of its associated practices seems a rather ambitious and ineffectual exercise to embark upon. Those who have tried, inevitably find that they have collated material grounded in an equally diverse conglomeration of disciplines (Lidwell, Holden, & Butler, 2003 for example). However, for every task that a graphic designer has, a number of recognised fundamental truths and governing characteristics are generally employed to complete it. Those that are most pertinent to the task of designing a digitally projected presentation for an undergraduate lecture are reviewed in this chapter.

Overview of Relevant Research

Clarification of Terms

The term ‘Visual Communication Principles’, or VCP, is not one readily found in the literature reviewed for this study. It is a term that I have generated to draw a distinction between the common and often indiscriminate use of the label ‘design principles’ and the specific, higher-order principles that apply to visual material. In the interest of briefly untangling the many descriptors found in the literature regarding visual material, several categories are proposed and set in a conceptual hierarchy.

Design Elements

The use of the terms ‘design elements’ and ‘design principles’ in the literature is often in reference to quite primal aspects of visual material. It is not unusual to find two separate authors using one of each of these terms to describe the very same feature or phenomenon. While it is not critical to review each of the elements of design in depth here, the words of Kenneth Bates (1960) give reason as to why even the most rudimentary of visual material is important in terms of cognition.

*In order for these elements of a design to communicate to the observer at first glance, they must not be lost in a maze of extraneous and nonessential elaboration. p.17*
Design elements can be referred to as the very building blocks or base-level characteristics of any given design. They are often very difficult to illustrate in absolute isolation and are useful as descriptive terms when articulating the nature and construct of visual material. In fact, elements such as ‘point’ and ‘line’ are regarded by some as exclusively conceptual elements (Lupton & Phillips, 2008; Wong, 1972; 1993); technically unable to take physical form in its purist sense and unable to meet the basic requirements of two-dimensionality. Other elements such as colour and texture are inherently visual, but again, difficult to make manifest without the addition of other elements. Still, other elements, such as direction and balance, speak more of the relationship of multiple forms rather than an element that might be attributed to an individual form. The following chart offers an organisation of common design elements using these three categories. As the terms listed build from left to right, they become less elemental in definition and begin to represent design principles that directly influence the meaning, intention and function of a design.

![Figure 3-1. A collection of terms that have been described in graphic design literature as either 'design elements', 'design principles' or both.](image-url)
As can be seen from the various terms listed, some of these qualities do not sit squarely in a single group. Depending on the context in which they are used, some of them may vary in potency, category or definition. ‘Size’, for example, is certainly a visual quality (for every form features it as an observable attribute), but can only be described as such when compared to something else, so it could also be regarded as a relational element. The fact that many of these design elements cannot technically be demonstrated in complete independence of any other element, or are subject to individual perception and interpretation, might also suggest that they are actually conceptual in nature. Such have been the kind of conversations commonly found on the topic, with publications ranging from lengthy declarations about the artistic, perceptive and even cathartic value of individual qualities (Bevlin, 1985; Cannon, 1948), through to concise, distilled and illustrated glossaries (Wong, 1988).

While these fundamentals are widely regarded as important and require a certain level of mastery and experience to know when and how to use them in the broader context of a piece of visual communication, many of the terms in question are intrinsically molecular and self-evident. Some of the terms listed as relational elements in the chart above describe an effect or structural quality that can only be achieved by combining several visual elements in a very deliberate way. However, perhaps such qualities are not significant enough to be given the status of ‘Principle’ as other authors have (Peterson, 1996; R. Williams, 2008; Zelanski & Fisher, 1984), particularly if it is a quality that does not appear to be anything more than the sum of its parts.

**Design Principles**

This mixture of terms and titles in the literature for fundamental visual qualities may simply be due to the fact that the disciplines involved have not typically regarded their activities as a strict or objective science (N. Cross, 2001). Another explanation might be that early definitions and uses of the word ‘principle’ included reference to “an essential element, constituent, or quality” (McKechnie, 1958). In a rare case where an author in the field has taken the time to articulate what might constitute a design principle, Graves (1951) can be found offering the following description:
A principle of design, therefore, is a law of relationship or a plan of organization that determines the way in which the elements must be combined to accomplish a particular effect. p.17-18

As a definition of a design principle, it bears remarkable similarity with those that are readily attributed to principles in the modern scientific community at large. This is particularly so in regards to its inclusion of relational causality and the production of an effect (Dilworth, 1994). In response, the design principles of particular interest to this study are generally higher-order principles with a specific goal or purpose beyond its own existence. They are concerned with an observable effect that is repeatable by others through the deliberate organisation of visual material, eliciting in its viewer a particular cognitive response or meaning. It is these effects and principles that I will refer to as ‘Visual Communication Principles’ (VCP).

Visual Communication Principles

Highlighting and Visual Priority

Focal points, visual priority and hierarchy have arguably been some of the most heavily used organisational techniques in the graphic design industry since it began. Bringing attention to the most vital information in a piece of visual communication first is almost always a primary consideration, particularly in a society heavily saturated in advertising, marketing and media, all competing for consumer attention. The practice of effectively directing a viewer’s attention to a particular section of text or imagery is also known as highlighting (Lidwell et al., 2003). Highlighting is effectively addressing the upper-end of a priority of visual elements in a design, facilitating a hierarchy of importance and directing the viewer from the most critical information through to the least. Lupton (2008) asserts that the notion of hierarchy can be observed in almost every organisational aspect of the world around us, and demonstrates several instances of visual priority in typography and design, all of which typically use a form of contrast (p.114-125). Contrast, as a relational design element, is often seen at the core of examples used to demonstrate visual priority in graphic design publications manipulating more basic design elements such as scale, colour, weight, alignment, position or shape to differentiate a selection from its

While there might seem to be a limited amount of empirical research specifically addressing the various highlighting qualities of individual design elements, a rich and detailed corpus of studies can be found in the discipline of neuroscience under the title of ‘visual attention’ that addresses the more mechanical process of how we look and see. In a collection of base-level laboratory experiments involving a variety of primate participants, Carrasco (2011) draws together and discusses a large number of the advances in visual attention research that seem to go to complicated lengths to prove the rather intuitive. Amongst them, it has been established that we have covert attention (peripheral vision) and overt attention (where we are focusing), and that our attention is a selective process that is both guided by our prior knowledge of what is likely to happen, and seized by the visual cues that appear to be in contrast to their surroundings (p.1486). Visual cues that are detected with our covert attention tend to be drawn into our overt attention, which then prioritises and steers our cognitive and behavioural processes, bringing clarity to the matter at hand. While our attention is limited by our brain’s capacity to process visual information, our visual attention, in turn, facilitates a state of concentration, reducing the noise created by competing stimuli and enhancing the apparent contrast, luminance and detail of the subject in focus (p.1487).

Visual attention also states that when a target for attention is accompanied by a visual distraction, an interference in attention is generated, which increases with both the frequency of distracting visual elements and their proximity to the target (p.1489). To a graphic designer, this phenomenon might be better known as “clutter”. Further to this, if the distracting visual elements share visual traits with the target, target acquisition is hampered (p.1504). A classic case of this might be a lecture slide in the form of a wall of text - a dense grid of marks, all identifiable as letters, all the same size and colour, all the same distance apart except for the spaces between words. In addition, if a particular stimulus is used in excess, the viewer becomes accustomed to, and eventually ignores such stimuli (p.1494). In other words, if you try to emphasise everything, you end up emphasising nothing. The use of fixation maps (Wooding,
2002) and other eye-tracking methods (Baudisch, DeCarlo, Duchowski, & Geisler, 2003) has documented what sort of features tend to capture our attention in works of art, revealing that our gaze typically settles on human figures and their faces, particularly eyes and mouths (Blais, Jack, Scheepers, Fiset, & Caldara, 2008), and then moves to locations that those figures are directing their attention to. Such studies in eye-tracking, while possibly establishing the obvious to the layman, give us insights into the mechanics of sight and confirm many of the tools that designers and artists use to direct our attention as viewers.

Returning to some of the material more specific to graphic design and typography, several publications in the past have presented various results, opinions and generalisations on the subject of typographical cues (Frase & Schwartz, 1979; Hartley, 1986), echoed by a number of contemporary and influential books that also comment heavily on the proper and improper uses of highlighting in typographical terms (Brinthurst, 2005; R. Williams, 2003). Williams addresses textual highlighting including attributes such as bold, italic, underlined, inversing, blinking, movement, colour-shift and typeface changes concluding that highlights such as all-caps and underlining were to be avoided in favour of a limited use of bold, italics and point-size increases. Similarly, Resnick (2003) proposes that highlighting text in the visual hierarchy of a design is best achieved by emphasising its size, weight or colour as opposed to any other method. On the specific application of text in instructional contexts, Hartley (1986) also argues in favour of the use of bold, italics and colour over the use of underlining and all-caps. One of the common reasons given for avoiding the use of all-caps to increase the visual importance of a particular segment of text is that the shapes created by the ascenders and descenders of lower-case glyphs are replaced by the comparatively featureless block-like appearance of that by a string of upper-case letterforms, causing the words that they form to be less recognisable at first glance (Alex W White, 2002).

In drawing a comparison to the material reviewed in the previous chapter, there is a clear correlation between highlighting and the signalling effect in CLT. The signalling effects described in various studies in CLT merely suggest that through employing a variety of signals in an instructional design, a greater level of
comprehension is achieved (Mayer & Moreno, 2003). The works on highlighting and typographical cues, however, insist that such devices require consistency and moderation to be truly effective, as well as expressing distinct preferences towards certain types of highlighting techniques over others.

**Gestalt Theory and the Grid**

Gestalt theory, psychology, laws or effects are based on a collection of various observations made in the early 20th century regarding how we tend to see groups of things as a whole before perceiving the individual components within it (Behrens, 1998; Wertheimer & Riezler, 1944). When specifically addressing aspects of grouping and proximity, gestalt theory is a governing principle regarding the positioning of objects so as to infer meaning and associations (Ben-Av, Sagi, & Braun, 1992). It serves as an explanation as to why we see “words” rather than a string of letters, why we see the dashes in the middle of the road as a dividing line, and, when watching a movie, why we see a moving picture rather than a string of rapidly changing photographs. Amongst the titles and terminology associated with gestalt effects are ‘figure-ground segregation’, ‘symmetry’, ‘closure’, ‘proximity’, ‘continuation’ and ‘similarity’ (P. Moore & Fitz, 1993b). Most of these terms are fairly self-explanatory in nature and all work towards clarifying the relationships between previously disassociated visual elements. An implementation of Gestalt laws has been shown to not only improve the perceived pedagogical value of instructional artefacts (Chang, Dooley, & Tuovinen, 2002; P. Moore & Fitz, 1993a) but to also assist the comprehension of instructional content, particularly diagrammatic material (Lemon, Allen, Carver, & Bradshaw, 2007; P. Moore & Fitz, 1993a).

In terms of the layout and visual organisation of a design, regardless of it being for screen or print (Vanderdonckt & Gillo, 1994), many of the effects of gestalt theory are facilitated through a grid structure (E. Resnick, 2003). An underlying grid structure creates a sense of unity and consistency throughout a single page and throughout an entire publication (Müller-Brockmann, 2010). It establishes rules such as the depth of margins, number of columns and the spaces between them (Samara, 2005). It provides the scaffold for establishing a visual hierarchy, aligning
associated material and it prevents visual elements in the layout from interfering with each other (Bokil, 2009). As will be discussed later in this chapter, gestalt laws have been described as being at least partly responsible for the aesthetic and even therapeutic qualities of a piece of graphic design (Moszkowicz, 2011).

**Picture Superiority Effect**

*Now tell me which is the nearer to the actual man: the name of man or the image of the man.* (Richter, 1888)

Paivio et al. (1968) is commonly credited with establishing the picture superiority effect, which essentially asserts that pictures are easier to recall than words. His later work offers a framework for explaining this effect known as ‘dual-coding theory’ (Paivio, 1991), which proposes that our acquisition, representation and articulation of information effectively takes the form of verbal associations and visual imagery. To refer briefly back to CLT, Paivio’s dual coding theory is also readily referenced as a critical and foundational contribution to modern theories of memory and cognition (Paivio, 2006). The dominance of visual stimulus over verbal stimulus in knowledge acquisition has been empirically demonstrated on numerous occasions (Jonassen, 2004), bringing resonance to the adage that “a picture is worth a thousand words”. Which thousand words a particular picture is worth is a slightly more semantic discussion, but one that the artistic and advertising professions have been utilising to great effect (Childers & Houston, 1984). The meaning we extract from visuals has been described as being at least partially dependent on our level of ‘visual literacy’ - something of particular interest in the design and use of illustrations in children’s books in education (O’Neil, 2011). Regardless of context, the level of recall and cognitive significance a picture might have heavily depends on the reason the picture was introduced and the function it serves in the design at large (Carney & Levin, 2002).

Further investigation regarding the picture superiority effect has indicated that the combination of pictures and words together are better remembered than either pictures or words alone (Childers & Houston, 1984). Its effects also extend into associative recognition (Hockley, 2008), conceptual material (Hamilton & Geraci,
2006; Stenberg, 2006), and has been demonstrated as most effective with an intellectually mature audience (Defeyter, Russo, & McPartlin, 2009; Whitehouse, Maybery, & Durkin, 2006). “Words”, as discussed earlier, can take on a number of manifestations though – written as visible text or spoken in an audible voice. While the relationship between both words and pictures in terms of memory and recall continues to be discussed and tested, the student preference for visuals over words in lecture presentations and the belief that it helps them with recall would so far seem to have validity (Frey & Birnbaum, 2002).

**Aesthetic-Usability Effect**

Authors such as Donald Norman (2002a; 2004) have argued that although the usefulness or utility of a system or set of instructions is important, if its appearance is not considered, it will not create the affect required for its utility to be realised. To be more direct, if information is ugly, people will not want to understand it, therefore it is unlikely to be understood. Conversely, if a system is regarded as beautiful, the users of such a system will be more willing use it, more willing to forgive it of its shortcomings and consequently more likely to absorb its benefits. The classic scenario used to illustrate this effect is often found in the field of Human Computer Interaction Design and typically involves an electronic interface such as an e-commerce website or an Automatic Teller Machine (Tractinsky, Katz, & Ikar, 2000), where the use of the system is quite critical to the user. More specific studies have indicated that this use of aesthetics is, in part, satisfying a person’s intrinsic need to trust something before using it (Karvonen, 2000), and a strong correlation has been established between aesthetics and affect (Badre & Jacobs, 1999; Kurosu & Kashimura, 1995). To further expand the notion of aesthetics beyond what simply looks good to us, some authors argue that there are ties to much more holistic human experiences such as immersion (Parrish, 2009) and pleasure (Hekkert, 2006).

In either case, the notion of aesthetics and beauty in design poses as a fairly difficult thing to quantify, measure or automate, with most attempts still resting heavily on the qualifying input of artists and graphic designers (Balinsky, Wiley, & Roberts, 2009; Ngo & Byrne, 1998). Manifestations of automated design can often be seen in
the form of layout templates in the context of authoring software. While such features certainly have their advantages to those who lack training in graphic design, the generic nature of a template insinuates a limited capacity to solve a specific design problem (Hassner, 2005). It could be argued that achieving aesthetics in design is simply a case of the considered application of many of the visual communication principles being reviewed in this chapter. In fact, many of the terms listed amongst the elements and principles of design covered earlier in this chapter can be found populating studies of aesthetics (Balinsky et al., 2009; Cawthon & Moere, 2007). What can be said about beauty is that it is often associated with the qualities of nature (Enquist & Arak, 1994) - filled with both the order and organisation of immense complexity as well as the unity and expanse of wonderful simplicity.

**Ockham’s Razor and the Principle of Simplicity**

The writings of medieval scholastic philosopher, William of Ockham, are often credited as the origin of ‘Ockham’s Razor’, which essentially exhorts that the most simple of explanations or strategies for a given situation tends to be the best (K. T. Kelly, 2007). Although in early manifestations it was generally regarded as a heuristic method of selecting a solution rather than a strictly scientific method (Baker, 2004), this approach has reappeared under a number of different banners ever since, including the Law of Parsimony (Epstein, 1984), the Law of Economy (Banks, 2004), the Principle of Simplicity (Chater, 1996; Feldman, 2003; Feuer, 1957), and the more colloquial iterations of ‘Keep It Simple, Stupid’ (KISS) and “Less is More”.

As a generally reoccurring edict amongst figures of historic scientific authority, advocates of simplicity include Albert Einstein, who is often cited as stating that “Everything should be made as simple as possible, but not simpler.” (2011), and Leonardo Da Vinci who is commonly credited with the quote, “Simplicity is the ultimate form of sophistication.” (Granat, 2003).

While simplicity as a principle is discussed and applied in a broad number of disciplines (Chater & Vitányi, 2003; Feuer, 1957), when referred to in visual applications it is often associated with gestalt theory and other studies of human visual perception (Behrens, 1998), and has been credited with facilitating cognition
in several instructional contexts. The interpretation of node diagrams, for example, is improved by reducing the number of visual interactions featured, such as line junctions (C. Ware, Purchase, Colpoys, & McGill, 2002). As an extension into other visual communication principles, discussions on the principle of simplicity have linked it to beauty, usability and the quality of design in general (Karvonen, 2000). This almost ethereal regard of simplicity as a guiding aphorism is reflected in that a number of its advocates consider it to be something that can neither be definitively defendable or accurately measured (Epstein, 1984; Glanville, 1999). Instead, it tends to be assumed and adopted in the absence of evidence to the contrary.

For a designer, the act of achieving simplicity is an innately difficult and complicated one, often involving the distilling of large amounts of detailed information in the context of an ill-defined problem (Glanville, 2007). Thus, the process of achieving simplicity is an intrinsically cognitive one. It forces the designer to thoroughly understand the components and consequences of a message before visually articulating it in a direct, coherent and powerful piece of communication. It is the act of making a whole from many parts.

An almost perfect overlap is seen in the description of the redundancy effect in cognitive load theory and the principle of simplicity. Both support the removal of digressive components in a design without compromising its most essential objectives. The technique of reducing the complexity of a message so as to maximise the effectiveness of its most critical and fundamental purposes is echoed in areas of study such as of the signal-to-noise ratio, progressive disclosure, form follows function and the path of least resistance.

**Progressive Disclosure**

A term most commonly used in the field of human-computer interface design (Apple Computer Inc., 1992; J. Johnson et al., 1989; Smith, Irby, & Kimball, 1982), progressive disclosure describes the process of concealing the enormity or complexity of information involved in a system to reduce the chance of a user experiencing an information overload. A typical case of this technique can be seen in drop-down menus employed within software interfaces so that only the immediately relevant or
requested information can be seen at any one time, thus retaining a high level of visual simplicity and clarity (Constantine & Lockwood, 2002).

In other contexts, progressive disclosure is used as a method of enticing a person to explore a system. One very simple example would be that of a season of thrilling television episodes, where each episode progressively discloses interesting information about the characters and the underlying plot without giving away the entire story in all of its complicated glory. Similarly, many theme-park rides have a built environment that both obscures discouraging information such as the length of the queue, as well as progressively discloses sensory stimulus about the ride while they wait, (e.g. video footage, sound effects, ride attendants in costume). This is also linked to the study of Narrative Architecture in the disciplines of Built Environment (Coates, 2010), Virtual Reality (Aylett, 1999) and Game Design (H. Jenkins, 2003) where a series of clues are disclosed in a controlled sequence with a final “reveal” at the end.

A lack of progressive disclosure, where all the information is presented simultaneously, generally results in a cluttered and overloaded interface. An example of this can be found in printed street maps, where the entirety of the page is crowded with everything from the names of suburbs down to the location of public toilets and car parks. The negative reaction evoked by such a dense wall of information has been described as “map shock” or “visual shock” (Dansereau, 2005), leading to the viewer hesitating to attempt to understand the material or to reject the material entirely.

To briefly link back to some of the CLT studies reviewed, the expertise reversal effect and fading technique are relevant aspects to the concept of constructing progressive disclosure. Academics, and indeed experts in general, may have difficulty preparing instructional material for students, for they have already acquired and constructed the schemas needed to understand advanced material in their field. If not mindful of the lack of such scaffolding of information in novices, the learning materials produced by experts are likely to lack the necessary elements for students to grasp the concepts being presented and produce a map shock response. The ability for an expert to
decompose their expertise in order to give students access to it is what would be needed to construct both an effective fading technique and progressive disclosure.

**Typographic Semantics and Legibility**

In design literature, typography has been described as “frozen sound” (Alex W White, 2002), and “the clothes that words wear” (Warde, 1956). Robert Bringhurst (2005) equates the role of typography in literature to the role of live performances in musical composition, while Beatrice Warde (1956) likens it to employing the perfect speaking voice. Such descriptions, however poetic, suggest that typefaces not only facilitate the reading of information, but also have a semantic influence on the content they visualise.

To examine the more clinical observations of typeface selection, several studies have emerged in regards to the semiotic and affective qualities of individual fonts. Detailed taxonomies of the “personality” attributes of various typefaces (such as futuristic, dramatic or elegant) have been documented, indicating that there is a commonality regarding the mood or tone that people detect from them (Mackiewicz & Moeller, 2004). Some studies have gone as far as to attempt to isolate the particular shapes and features of a typeface that enable it to generate these effects (Li & Suen, 2010; Mackiewicz, 2005), warning us against selecting typefaces simply based on personal preference rather than the tone required. The conclusions of such research have demonstrated that it is difficult to find a typeface that will, for example, simultaneously convey a sense of professionalism and friendliness, and that the historical-use and anatomical qualities of the typeface are both linked and influencing factors in these interpretations.

Studies have shown that typeface selection can not only alter a person’s perception of the message delivered by any given textual content, but also the intention, character and even credibility of the author (Shaikh, Fox, & Chaparro, 2007). An experiment conducted recently through the New York Times involving over 45,000 participants measured the effect that various typefaces had on whether or not people would agree with a passage of text, concluding that ‘Baskerville’ evoked the most support and ‘Comic Sans’ the least (Morris, 2012). In other words, the typeface chosen for a
particular passage can actually manipulate whether a person believes the content to be true and whether its source is trustworthy. This phenomenon also seems to give further weight to the aesthetic-usability effect.

On the topic of legibility and the significance of typography in the hands of a designer, Ellen Lupton offers the following comments:

> Designers provide ways into—and out of—the flood of words by breaking up text into pieces and offering shortcuts and alternate routes through masses of information. (...) Although many books define the purpose of typography as enhancing the readability of the written word, one of design’s most humane functions is, in actuality, to help readers avoid reading. (Lupton, 2004, p. 63)

Long-running debates have been had over whether serif or sans serif typefaces are easier to read, yielding very little empirical support for either case (Arditi & Cho, 2005; Josephson, 2008; Sheedy, Subbaram, Zimmerman, & Hayes, 2005). Michael Bernard attempted to determine what font is “best” or most preferred by certain readers in various age groups such as school children (Bernard, Mills, Frank, & McKown, 2001) or presentation formats such as on computer screens (Bernard, Lida, Riley, Hackler, & Janzen, 2002), with various results. Because these studies effectively concentrated on reading speed and accuracy (disregarding the actual content of the reading), measurements of attractiveness and preference seemed to have fairly limited use in terms of how appropriate the choice of typeface was. The most readable typefaces in most studies like this have typically highlighted fonts that are in most common use at the time (Paterson & Tinker, 1932b). Examples include Arial and Times, which are not only installed on most computers as a general standard with most operational systems (Granneman, n.d.), but are also typically the default fonts selected in the most widely used authoring software. This tendency for people to show efficiency and accuracy when reading typefaces that they are most used to reading seems logical, and reflects the opinions of certain type designers as well:

> The most popular typefaces are the easiest to read; their popularity has made them disappear from conscious cognition. It becomes impossible to tell if they are easy to read because they are commonly used, or if they are commonly used because they are easy to read. (Zuzana Licko in Alexander W White, 2004)
We read best what we read most, but there are several recognised factors that influence the legibility and readability of text. Just as the personality of a typeface might influence our perceptions of the content, the effort required to read it can also have a bearing on affect (Song & Schwarz, 2010), placing importance on the issue of legibility.

Firstly, most typefaces are designed for a particular practical application or context (Bringhurst, 2005). ‘Display’ typefaces are typically intended for headings, logotypes or visual embellishment, whereas others are specifically designed for use in body copy and blocks of text (Alex W White, 2002). Display typefaces tend to be more decorative and deviant in appearance, unlike those intended for general reading, which are quite generic in many regards. Using a typeface in a context that it was not designed for is a significant factor in legibility, and one that is generally recognised by researchers intending to measure it (Li & Suen, 2010; Shaikh et al., 2007).

Secondly, as mentioned earlier, the use of all-caps presents a notable reduction in reading speed and accuracy because of the homogenous effect it has on word shapes. This is a factor that has been of particular interest to those involved with public signage (Garvey, Pietrucha, & Meeker, 1997), which has a history and tendency to use capitalisation to gain attention.

Thirdly, there are several visual cues and constructs maintained by punctuation that, when removed or altered, have a significant bearing on readability. The obvious, or rather commonly ignored, cues in text that assist reading and comprehension are the periods, commas, quotation marks, capital letters and spaces between words that form grammatical structure (Amare & Manning, 2007). The lack of even a single comma can give a sentence like “Let’s eat, Grandma!” a completely different tone and meaning.

Lastly, several aspects of the formatting and typesetting process can either aid or inhibit the efficiency of text. Perhaps the most obvious factor in this regard is the size of the type. While many studies will conclude with a particular point size between 10pt and 14pt (Bernard et al., 2002; S. B. Chandler, 2001; Rubin, Feely, Perera, Ekstrom, & Williamson, 2006), experts on typographic anatomy will contest that the
x-height (the distance between the baseline and the top of a lowercase ‘x’) of a
typeface can override any point-size selection made (which is the distance between
the bottom of the descenders and the top of the ascenders) (Arditi & Cho, 2005). In
either case, the size of the type used in a lecture presentation is dependent on other
variables, such as the resolution of the computer and projector (Slattery & Rayner,
2009), the size of the lecture theatre and how close to the projection the audience
sits. Other formatting considerations include the lengths of lines of type, which
should not be too long (Rubin et al., 2006; Tinker & Paterson, 1929). Left
alignment of paragraphs are generally more fluent than right aligned and dual-
aligned/justified paragraphs. Excessive or inadequate leading (the space between lines
of type), tracking (the space between all letters in a line) and kerning (the spacing of
individual pairs of letters) also has a negative influence on readability (Bachfischer,
2005; Paterson & Tinker, 1932a). Paragraphs without visual cues such as indented
first lines or spacing between paragraphs tend not to fully communicate the more
global aspects of publication structure (Bringhurst, 2005; Lupton, 2004). The case is
even made that the presence of widows and orphans (individual lines of type that
have been separated from the rest of the paragraph in the layout) can generate an
undesirable interference with reading (Bringhurst, 2005). Admittedly, many of these
latter points are most relevant in the context of organising larger quantities of type
than what ought to be shown in a lecture. However, as mentioned earlier, the subtle
influences of visual formatting and alignment should not be underestimated.

Conclusion

As can be seen from the diverse collection of literature discussed in this chapter,
visual communication is a multi-disciplinary discipline. The comment could be
made, that many of the publications associated exclusively with the graphic design
vocation tend to be characterised by, and populated with, advice based on tradition,
opinions, anecdotes and personal preferences. It is also worth noting that empirical
evidence, widely accepted theories and established schools of thought from a number
of connected disciplines frequently reinforce a sizable portion of this advice. This, of
course, does not mean that the authority or rigour of any of the disciplines involved
are not subject to contest, but that fundamental truths can be found embedded in the intuition of practitioners. Disciplines who may not have a strong visual culture, but who have been concerned with testing aspects of graphics in a more clinical manner have helped to clarify, and occasionally quantify, many of the pillars of visual communication. This is now also evident when comparing VCP with CLT.

**Disciplinary Comparisons**

It would appear that although the fields of Instructional Design and Graphic Design have coexisted on a largely independent basis, a number of distinct similarities become apparent when comparing cognitive load theory to some of the principles held by the visual communication discipline. A partnership can be seen between the use of highlighting within a visual hierarchy and the signalling effect, between simplicity and the redundancy effect, and between progressive disclosure and the expertise reversal effect. Contributing to aspects of all of these partnerships are the cognitive and affective qualities found in gestalt theory and grid structures, picture-superiority, text legibility and the finer points of typography.

Perhaps the most distinct difference between the two traditions can be found in the importance they both place on cognitive stimulation. One of the primary motivations of CLT is to manage cognitive activity so that deep learning can still take place without overloading a person’s cognitive capacity. VCP, on the other hand, tend to place the clarity of a design’s message and meaning above that of inducing a concentrated level of thought from an audience. The motivation to have an audience commit that meaning or message to memory is still there, but repetition and saturation is often the favoured method of achieving this. While it might be a stretch to claim that advertising in this manner is an act of classically conditioning the consumer (Kahle, Beatty, & Kennedy, 1987), there is much to be said for the power of the mere-repeated-exposure-paradigm (Zajonc, 2001). One might conclude that this difference in approach between the two fields is largely due to the contrasting audiences that each of them typically address. CLT generally targets students, trainees or other willing participants who are deliberately and consciously attempting to understand or follow the instructional material in question. Graphic design and
visual communication, however, typically targets an otherwise occupied audience that may or may not be interested in the material being presented, and who is generally under no obligation to engage or respond. Although this question of intention requires resolve, it would still seem quite reasonable to expect that VCP can meet the requirements of deep learning without losing its inherent impact. With both disciplines presenting significant educative strengths, it is anticipated that the fusion of the two will yield a greater understanding of effective instructional design and lead to better instructional artefacts.
4. Methodology and Theoretical Perspective

Introduction

This chapter begins by presenting the hypothesis at the core of this investigation, commenting on some of the suggestions and dilemmas that have emerged from the material already covered in this thesis, and the bearing that it has upon the study at hand. The personal and professional contexts and biases introduced by the researcher that were likely to be influential in the identification and interpretation of these issues are then flagged. Finally, the philosophical and theoretical persuasions held by the researcher are described, identifying the strength of any ontological and epistemological loyalties.

Hypothesis

Questions Raised by the Literature

The literature suggests that the union of VCP and CLT is theoretically and practically quite feasible, resulting in a more complete understanding of ID and the advantages of visual features in an instructional artefact. That said, why has there been such a weak connection between the disciplines in addressing the visual specifics of the design process in ID so far? Are the principles of visual communication only at the disposal of the graphic designer? Can what seems to be a largely glossed-over topic in ID literature be made accessible to the common university lecturer? What sort of training could be employed to assist academics to both comprehend and apply this new understanding of ID practice?

This is certainly not the first publication to advocate a more passionate courtship between graphic design aesthetics and educational material. Some go as far as to suggest that all members of a faculty involved in the creation of instructional artefacts should undergo some form of basic graphic design training (David & Glore, 2010),
and that it should be conducted in the same fashion that most design students are taught, using studio settings and current technologies (Earle & Sheffield, 1995; Rowland, Parra, & Basnet, 1995). Could the reason that the average lecturer does not actively learn to master or manipulate visual material be because of a lack of self-efficacy with the technologies involved? Perhaps a belief exists that such practices are far too “artistic” or “creative” to be within the reach of a mere teacher, and that the art of making things look good is best left to “the professionals”. Could it be that academics don’t particularly value these aspects of their communication? Could it be that they simply don’t have (or make) the time to address it?

**Opinions, Presumptions and Propositions**

As a teacher who has witnessed many students develop in their understanding and application of the basics of graphic design, personal experience indicates that it takes several years of committed study and practice to become close to mastering them. I did not, therefore, have an expectation that a cohort of novices regarding visual communication could be transformed into competent graphic designers overnight. However, it has always been my conviction that anyone equipped with at least one working eye, an average intelligence, and one good hand, consequently has the capacity to observe, understand and articulate visual material. Given that this description seems to match that of a pirate, and given that most academics are slightly better-equipped and better-natured than pirates, the task of briefly guiding such a process in a university setting seemed possible in at least some measure.

Drawing from personal experience concerning inter-disciplinary academic collaboration, I suspected that most teachers would be quite welcoming of the opportunity to, at the very least, improve the appearance or “professionalism” of the material they presented to students. However, comments such as “I can’t draw a straight line to save myself” and “I haven’t got an artistic bone in my body” are heard regularly from those whom I have personally encouraged to do so. This sparked another suspicion that there would be reluctance among most academics to be the actual authors of these visual improvements. As a reasonable parallel, research on the training of teachers and their adoption of the technologies involved, indicate that a
confidence in using technology and the prospect of improving the presentation of their teaching materials are motivating forces (M. J. Cox, Cox, & Preston, 1999; Mumtaz, 2000). The same research has also indicated that time restrictions and difficulties with using software or hardware are negative or inhibiting factors for teachers in training.

The hypothesis at the core of this study is that it should be possible for university lecturers to implement aspects of certain visual communication principles into the design of their lecture slides, thus facilitating more efficient learning. It was also expected that, whether conscious of it or not, they were already doing so, even if only partially. Additionally, it was expected that in understanding the reasons behind these implementations, lecturers would not only increase their application of these principles, but also internalise many of them for strategic use.

Methodology

My Stance as a Researcher

The Disciplinary Contexts of Design and Education

As explained earlier, I am both a graphic designer and a lecturer. As such, the body of theoretical and philosophical influences that have informed my viewpoint as a design academic have primarily come from the discipline of design. Of course, that doesn’t necessarily mean that I completely align myself with all of them. The texts on design theory and thinking vary dramatically from authors such as Nigel Cross (2001) who has motioned that the discipline should avoid being “swamped” by research cultures from the sciences or arts, through to Herbert Simon (Simon, 1988) who describes a harmonious marriage of design practices with the natural sciences and openly describes a “science of design”. To add further diversity, Ranulph Glanville (1999) has argued that “scientific research” is actually a sub-set of design as opposed to the other way around. In many of these writings on the emergence of design research there is a general theme of defensiveness. There is often an implied concern that the traditions of scientific inquiry embedded in other (more academically productive) fields threaten the unique qualities of design research by imposing inappropriate
demands on how the discipline operates academically. Having said that, an air of liberation can also be detected, indicating opportunities for uninhibited, pioneering progress in the field.

To articulate a tacit sentiment, there seems to be a general caution or even disdain amongst academics in design regarding the (perceived) clinical, mechanical and systematic qualities of traditional scientific processes. An observation similar to that made by others in regard to the sentiments some design industry practitioners hold towards formal design education, and reflected in the tendency of design schools to prioritise trade skills before theory (Buchanan, 1998). For the average educator in art and design, the notion of measuring beauty, producing a precise formula for the perfect image or automating an illustration or artwork is likely to be a confronting or repulsive one. And yet, many of us who engage in teaching in this field do exactly this on a nearly daily basis. We reduce the work of our students to a percentage figure, perpetuate the use of the golden mean or the rule-of-thirds, and use image-making software that auto-traces imagery and applies a host of default settings and algorithms that we are not generally conscious of. There is a struggle at play in the discipline of design, and the two sides in this struggle are known by a variety of iterations. Is design an art or is it a science? Is the act of designing a case of intuition or intelligence? Is good design from the heart or the head? Does good design come from improvising or following the rules? Are designers born, or are they made? Holding the view that answering any of these questions as either one or the other would be an extreme and indefensible position, I am convinced that a balance must be struck. Science does not have a monopoly on rigour any more than art has a monopoly on beauty.

When introduced to the methodological material prevalent in the discipline of education, it appears that there have also been several philosophical territories defended and promoted over the decades. The most notable locking-of-horns has been between the qualitative and quantitative camps of research in the social sciences (Tashakkori & Teddlie, 1998), which seems to have been in a fairly stable state of ceasefire for some years now. After all, describing any particular research methodology as being “the best” for all manner of research problems seems no more
sensible than describing a single design process as the best for all design problems. As the echo of debates regarding the superiority of either quantitative or qualitative research methods soften with every new publication on the topic (Smeyers, 2008; Thomas, 2003), I feel safe to wave the banner of pragmatism as a researcher. Pragmatism, understood as evaluating theories and beliefs based on their practical application (Popkin & Stroll, 2004), is not concerned with whether a particular set of methods is supreme in every situation, but whether they work in a particular situation and practically contribute to the discovery of the quality of truth in the world. In the spirit of striking a healthy balance in both of the disciplines I contribute to and with my approach to research, this stance is one that seems both sensible and compatible with the convictions I have regarding the acquisition of knowledge.

**Ontology, Epistemology and Theoretical Perspective**

In aligning myself with many of the arguments of William James (1904) and the pragmatic method, the significance of many aspects of metaphysics seems to diminish somewhat. This is not to downplay the importance of paradigms or be interpreted as a convenient excuse to avoid abstract and detached discussions about the nature of the universe or whether things exist. My position in such matters is still developing and, with the intention of keeping an open mind, will always continue to do so. Suffice to say, that there is a tendency in my approaches to side with a positivist stance rather than a constructivist one. In light of the infinite regress argument (Musgrave, 1993), I do not consider this lack of strict ontological allegiance to be a significant weakness in my investigative endeavours, as no philosophical position is without its assumptions or critics. As such, I appeal to common sense and epistemological particularism (Sosa, 2008), albeit both notions that are also open to contestation. Additionally, should convictions of faith be regarded as relevant to my role as a researcher as James (1979) regarded them to be, what can be stated is that I support many of the premises of Christian existentialism. I trust in the existence of God, that we are all free agents determining our existence through the employ of the free will we have been equipped with, and that there are some things we simply do not, and never will, have the capacity to fully comprehend. Indeed, it would seem
that at least the last of these convictions is compatible with the theories so far
discussed regarding the limits of human cognition. The very fact that the world will
be slightly different tomorrow in a million microscopic ways (as will our own
understanding of it), is an indication that there will never be a point in time where
we will come to know anything in its fullest version.

On the subject of truth, I regard it to be similar to the concept of “perfect” or
“good”. They are best suited as a quality or attribute of something rather than a
definitive achievable result. Something that is “true” is probably best argued to be
“truthful” instead (W. James, 1908). Truth is as a direction or heading, such as East
or West, rather than a thing, or a place, or a state. There are ways to tell if we are
heading in the direction of truth (we devise experiments, make instruments, we test,
read the results, modify and re-test), but so long as there is more truth ahead of us,
we will never completely arrive there. To continue this analogy, if my hypothesis
declares "I’m quite confident that this way is East!" and yet the results of testing that
hypothesis are not quite as expected (but still positive), the conclusion might then be
"It wasn’t quite as Easterly as I had thought - but given that we did not go West, we
have still made some progress." With the view that truth is not something that can be
captured in all of its essence and purity, nothing about pure truth can be in any way
wrong or false. Ultimately, truth is an ideal. It is a mark always above the benchmark.
While it is an ideal that I am in pursuit of in my research (and is worth chasing), it is
not one I can completely isolate or capture. This view of truth, in many regards,
aligns with that of William Ernest Hocking on negative pragmatism (W. S. Sahakian
& Sahakian, 1993) which suggests that the search for truth is a never-ending testing
process to discover if what has worked (or was right) still works (or is still right).

To extend this theoretical perspective into the practice of both design and research
activities, I draw upon the work of Donald Schön (1983; 1987) and David Kolb
(Kolb, 1984) in regards to reflective practice enquiry and the value of learning
through experience. Schön places great importance on evaluating our tacit knowledge
through the practical application of it. In this way, a reiterative or cyclic process of
building knowledge and experience is facilitated. This can take the form of a
structured debriefing (Gibbs, 1998) or a more internal conversation (Glanville,
1990). In a broader sense, this notion informs many of my approaches as a practitioner, as a teacher and as a researcher, and is reflected in a simple saying commonly credited to Confucius:

*I hear, and I forget. I see, and I remember. I do, and I understand.*

While approaches and statements such as these are quite constructivistic in nature, they are more a reflection of the value and importance I place upon the practical application of knowledge rather than a broad advocacy for innate or introspective intuition.
5. Research Design and Methods

Introduction

Structure of this Chapter

The purpose of this chapter is to make transparent the conceptual and pragmatic mechanics behind this study. Firstly, the nature of the research task is described, followed by a rationale for using a case study approach, articulating both the advantages and limitations that such an approach introduces. The intended characteristics of the people, tools, timing, format and other resources involved in testing the hypothesis presented in the previous chapter will then be clarified and justified. Lastly, the manner in which the collected data is analysed is explained.

Rationale

Determining Appropriate Methods

The nature of the hypothesis articulated earlier warranted the employ of a flexible set of methods. This was particularly so when considering the many questions raised by the literature and the multi-faceted characteristics of the disciplines that hedge it. Methods were required that would not only test if the hypothesis “rang-true”, but also shed light on why it did or did not. The utility that this study may serve to future research is greatly dependent upon this. The methods used and instruments developed aimed to provide an indication as to which particular VCP are most readily understood and adopted by academics, and what sort of factors might be interfering with those that are not. They also intended to allow external, internal or self-generating factors in the process to be recognised and give the research program room to adapt to some of them. As indicated in my stance as a researcher, the qualities of effectiveness, rigour and repeatability are not necessarily compromised by retaining this flexibility, or by being actively involved in the research process. The
acknowledgement of limitations and the documentation of this process is central to maintaining this rigour, and is one of the core purposes of any thesis.

Justification for a Case Study Approach

Flexibility and Responsiveness

Given the nature of the task and the need to isolate the patterns and characteristics of issues that are emerging in a development of this kind, a case study approach presented itself as a viable option. As explained by Yin (2009), if the type of research questions at hand tend to be “how” and “why” questions, and there is a requirement to focus on both behavioural and contemporary events, case study methods are more suited than most alternatives. In exploring these questions in depth, a case study approach allows themes to solidify during the process, taking advantage of moments of pertinence and permitting the inquiry to respond to unexpected findings.

Structure and the Limitations of Generalizations

The case study approach, in this instance, has been structured in a way that has been described by Stake (Stake, 2007) as a ‘collective case study’ with instrumental rather than intrinsic purpose (p.237). That is, the focus is to shed light upon an issue or to aid in refining an explanatory theory rather than having a particular interest in the cases (or in this case, participants) themselves. As Borg and Gall (Borg & Gall, 1989) point out, case studies are typically chosen to represent a larger group of similar cases, and yet there is no guarantee that the chosen case is truly typical of that group. This, of course, means that drawing general conclusions from such methods is a precarious business. However, involving a number of replicated case studies in the investigation is a recommended way of alleviating this problem (Yin, 2009) and one that has been implemented in this instance. While case study method has not always been regarded as an especially strong approach from which to extrapolate generalisations, Stake (1978) has argued that because a case study often documents an experience or event, it tends to epistemologically connect with both the researcher and the reader. By extension, it also connects with a person’s natural inclinations to generalise and is a
powerful tool for facilitating an understanding of the matter at hand, as opposed to simply “swelling the archives” (p.5).

Participants

Participant Characteristics and Recruitment

Participants would be recruited as a matter of convenience from a single university campus where academics delivered lecture presentations in propria persona as opposed to being broadcast solely in recorded or online form. Between four and seven participants would be selected from those eager to participate on the basis that there would be a reasonably broad sample of different schools and disciplines represented. Lecturers in the disciplines of Education and Design were deliberately excluded, as it was possible that such participants may be well-versed in several aspects of the ID material, distorting what may be observed of which VCP are most readily adopted. It would be made clear to Heads of School during the recruitment process that participants were to be voluntary and were not to be individually encouraged or persuaded to participate. Doing so could have implied that a particular academic was in need of professional development and provided fertile ground for resentment or reluctance in fully participating in the study. To help protect the identities of participants in reporting the findings, preference was given to lecturers of courses that were large and reasonably non-specialised in nature. Ideally, courses with more than 100 students and that could be delivered by one of several other staff in the department. Interested parties could contact the researcher by phone or email to register their interest, upon which their suitability could be determined and a representational spread of disciplines, gender and contexts could be ensured.

In specifying that the study would involve the use of digital presentation software, it was hoped that participants would already have at least a moderate amount of experience with the relevant software and would not require an excessive amount of basic training. Notification of the existence of the research would be done utilising some of the existing communication channels of the university, such as noticeboards, pigeon-holes and email.
Instruments and Materials

Instruments

The Human Observer

As a predominantly qualitative study, one of the primary instruments employed was the human observer. As such, measures to ensure the suitability of the observer had to be considered. Attributes such as the observer’s technical and interpersonal skills, training and experience would all play a part in the integrity and relevance of the data collected. As is discussed in detail later in this chapter, it was not assumed that the perfect candidate would be obtainable to conduct this study, let alone exist. However, given that the abilities of the observer could be identified and declared, accommodations, compensations and anticipations could also be made where possible. Being a teacher, a graphic designer, a novice researcher and the most interested party in the outcome of this investigation, it seemed that I would be as suitable as any to assume the part of observer, interviewer and collector of all forms of other data.

Other than the participant lecturers being aware that they had volunteered to be involved in a study about instructional design, there was to be minimal contamination in terms of recording the initial state of their slide designs. The visual nature of the presentations they were delivering was to be as close to what they would have been if the study did not exist. As such, it seemed reasonable that I could become an observer of their lecture presentations alongside the many other students observing it in the audience. To take note of how the lecture unfolded, the various dynamics at play, and any unforeseen factors influencing the visual nature of the lecture presentation was best done through objective observation. With the expectation that the bulk of the audience would be making efforts to record the lecture in some basic form (hand-writing or typing notes, perhaps taking photos or audio recordings), an additional observer would not stick-out or present as a significant distraction compared to the normal course of events. While a video recording of the lecture would have provided a more accurate record of how it transpired, the presence of such equipment would have perhaps been a conspicuous
addition to all in attendance. The tactics I had planned to use were all an effort to keep the observer effect to a minimum.

**Semi-Structured Interviews**

To extract the developmental history of the slides used in a lecture and the intentions behind its visual appearance, a semi-structured interview with the lecturer (who was presumably also its primary author) had been selected. This was based on the reasonable assumption that the average academic is capable of articulating their own metacognition, emotions, instincts and inclinations, and is willing to allow this information to surface. The semi-structured interview provided the advantages of both giving a relatively standardised opportunity for participants to address the issues being investigated, while granting a certain amount of adaptability to the role played by the interviewer (Louise Barriball & While, 1994). It provided a desirable balance between objectivity and depth. If any relevant or interesting statements or themes were to arise during an interview (or the lecture presentation preceding it), they could be clarified or pursued by the interviewer. It was intended that the interview be conducted as soon as possible after the lecture was observed, so that the event was still fresh in the minds of both the lecturer and the interviewer. By implication, it made most sense for the interviewer to be the same person who observed the lecture. Given that executing both of these data-gathering roles would require the person to be both highly observant of the various visual nuances that form a design as well as be intimate with the aim and scope of this study, the most appropriate and convenient candidate for these roles was myself. The interviews were to be conducted at a location agreed upon by the participant, which would ideally be a non-threatening space, such as a vacant room, the lecture theatre after it had been vacated, or a more familiar and comfortable space such as their personal office.

There was a chance that several response effects might surface during these interviews for a number of different reasons. The respondents would, without doubt, come to know me throughout the course of the study as an expert in the area of graphic design who was observing the results of their own graphic design efforts. This could have resulted in a feeling of embarrassment, vulnerability or insecurity regarding their
abilities to design, perhaps generating a reluctance to expose what they might regard as inadequacies or shortcomings in their design process and artefacts (Rowley, 2012). In such a case, respondents might have felt compelled to say or do things in order to please me as an authority figure rather than be open and honest about any difficulties they may have been experiencing (Ehrlich & Riesman, 1961). The feeling of having one’s processes and work “judged” could have generated another form of intimidation. This could have manifest as defensiveness or a perception that their intelligence was being questioned, which, of course, would have interfered with interview responses. If a respondent regarded their existing practices as more than adequate and suspected that I might not share the same opinion, this could have triggered a compulsion to defend the decisions they had made, with the expectation that they would need to justify them in the face of demonstrated alternatives. After all, nobody likes the idea of being “wrong”. For these reasons, it was important that the purpose of the research was made clear from the outset, and that care was taken to ensure that the questions in the interview schedule were not leading or threatening (Locander, Sudman, & Bradburn, 1976). While it was expected that I was likely to be slightly younger than the average lecturer, it was also reasonable to expect that as a fellow teaching academic, a healthy rapport could be quickly generated with the participants and that a friendly and relaxed atmosphere could be retained during our interactions. A copy of the interview schedule used can be found in Appendix A.

Other Instruments Considered

The construction of a survey may also have had merit, except that the advantage of easily comparing narrowly formatted responses (ticked boxes) also restricts the richness of the data available and does not always provide us with initial responses. How difficult a participant might find a particular question to answer or whether they did not find the question relevant or interesting could be extracted from information such as pauses, searching for the right words, or body language – none of which could be easily gleaned from a survey. It was also assumed that the average participant of this distinction is more likely to be interested in being interviewed, (which can be quite a flattering proposition) rather than being asked to fill-in yet another questionnaire among the many others that typically pester those in academic
careers. Considering the number of participants required to warrant a significant result from a set of survey results, the interview was again the preferred method of gathering the amount of material required in order to substantiate a discussion of significance.

**Presentation and Workshop**

To facilitate an understanding of ID that incorporates VCP implied a session of training that supported the positive aspects, and addressed some of the weaknesses, of what was observed in the initial lecture presentations. In regarding the introduction of a new understanding of ID as the variable in this study, the system of delivering it needed to hold the variable as constant as possible. This seemed to exclude the scenario of individual tuition, as each instance would have a tendency to cater to individual situations and questions. Private study also presented problems, as there was no guarantee that the participants would spend an equal (or quality) amount of time studying it, if at all. Given that I have already argued for the value of reflective practice and learning through doing, a combined, practical workshop that models VCP offered the most fitting vehicle. In employing such a method, an odd, yet beneficial recursive element is introduced, whereby VCP are being used, explained and modelled simultaneously. In other words (at the risk of generating a tongue-twister), the instructor participants were being instructed as to how to instruct, through both the instructions that the workshop instructor was instructing them with, as well as by observing the instructional material as an example of instruction.

As a group, it was then proposed that the participants put these principles into practice with the assistance of the workshop instructor by re-working a set of lecture slides that they intended to deliver in the near future. As such, the most ideal setting for the workshop was a computer laboratory equipped with digital presentation equipment and the authoring software required to construct and edit presentations. Imparting the ID training to the participants simultaneously as a group also presented the administrative advantage of minimising the amount of time required to conduct the training. Again, being the most VCP savvy and conveniently available instructor who could deliver such a workshop, the part of the instructor and
demonstrator was played by myself. The workshop would consist of a 30 minute presentation on the use of VCP in PowerPoint presentations to aid the reduction of cognitive load and increase the clarity of communication. This was to be followed by a 1-hour practical application of these principles with the computers, where the participants would receive assistance in constructing or modifying their own presentations. Additionally, a set of notes summarising the workshop presentation would be provided to the participants for further reference (see Appendix D).

Focus Group

To gauge the initial impact that the workshop had upon the participants, a focus group would be held immediately after the workshop to discuss its contents. As each of the participants would have already been individually interviewed and would be aware of some of the emerging themes and issues regarding the visual nature of lecture presentations, the dynamics of a focus group would help to reveal or reinforce any consensus views regarding the adoption of the VCP being discussed. Granted, the dynamics of a group typically denies access to any intensely personal issues involved, but in the presence of other participants (and with the expert in the room now out-numbered), the focus group is a good tool for encouraging a certain level of self-disclosure not available using other methods (Wilson, 1997). The focus group may also serve as a mechanism for reflection, and perhaps revision, thus reinforcing the process of learning the principles being taught.

Materials Developed

Recruitment Poster/Flyer

With the assumption that academics are a largely occupied cohort, with little time for extraneous or extra-curricula activities, the recruitment poster needed to attract the eye and appeal as a useful activity to be involved in. It was important that the poster both looked professional and relevant, without giving the impression that it was simply a technical ‘how-to-use-PowerPoint’ computer workshop. The poster uses humour and a minimum of text to contextualise and summarise the nature of the study, as well as utilising many of the VCP it concerns (see Appendix B).
Evaluation Sheet

To aid a reasonably consistent and efficient process of observing the lectures involved in the study, a formatted evaluation sheet was designed in advance for the observer to use (see Appendix G). It solidified some of the visual evidence of interest into several statements with a simple, corresponding Likert scale. This provided for several points of comparison between both the lectures from a single participant and between the lectures of each participant. Space for additional field notes was also provided at the foot of the page for observations concerning the dynamics of the lecture presentation as a whole.

The ten questions listed on the evaluation sheet represent the VCP of interest in the presentation and were to be rated against a five-point scale from zero (not present) through to four (fully present). The first question covers the principles of visual priority and highlighting, which links to the signalling effect in CLT. The second question points to the visual unity and consistency of style advocated by the Gestalt effect and the grid. The third and fourth questions are in regard to the reduction of text and the promotion of imagery respectively, which is linked to both the picture superiority effect and the redundancy effect. The fifth query concerns the overall neatness and visual appeal of the design, referring to the aesthetic-usability effect. The sixth and seventh questions cover the principle of simplicity and the removal of extraneous cognitive load. The eighth question seeks the presence of progressive disclosure, which also concerns the expertise reversal effect. The ninth question evaluates if the typographic semantics invoked are appropriate. The final question pertains to text legibility and clarity.

Presentation on Instructional Design

In a case of leading by example and ensuring the example could lead, a presentation was designed using Microsoft PowerPoint, employing the Visual Communication Principles being explained (see Appendix D). This allowed an opportunity for reflective practice, shedding light on the possible opportunities and barriers that the participants might also meet. The design of the slides was highly visual with the minimum text required to illustrate the points covered. Visual representations and
metaphors were used in a consistent and simple layout with minimal or subtle transitions and embellishment. The content was explained in a practical manner using examples that related to the visual content that was observed in the pre-test lectures.

**Written Handout**

A simple written form of the presentation was produced to act as a reference document or set of study notes for the participants (see Appendix E). It summarised the key aspects of the presentation in an accessible and friendly manner, free of jargon and complicated explanations. While no illustrative graphics are featured in it, the layout and formatting clearly indicate the same sections as in the presentation, highlighting important and concise tips as 'pull-quotes' for quick reference. The provision of these notes is also intended as a modelled example of how a presenter might separate the content of a lecture into the three separate documents that Norman (2005) suggests: the presenter’s slides, the presenter’s notes, and the student handout.

**Computer-Based Workshop**

The practical session following the presentation was to take approximately one hour, where strategic and technical suggestions would be demonstrated that apply to the manipulations that participants were intending to make in their PowerPoint presentations. Putting the theory immediately into practice allowed the participants to pragmatically consider how the principles presented to them might influence their designs, and give them the opportunity to seek clarification or assistance in how they might be administered. While the workshop was not strictly structured around a set of specific lessons, the act of trouble-shooting and addressing individual scenarios within the group allowed a cross-pollination of relevant skills and ideas. To encourage experimentation with certain advanced features was also important if the group showed proficiency with the software and was looking for alternative solutions or short-cuts for visual problems.
Program and Procedures

Pretest-Posttest Structure

A typical case study approach calls for the collection of data over a “sustained period of time” (Cresswell, 2009), therefore a structure that facilitates a repeated opportunity to gather data is required. This study is essentially interested in identifying particular changes in thinking and practice, and if those changes don’t occur, indicating some possible explanations as to why. In describing an intention to detect a causal relationship between the introduction of modified ID concepts and the practices of teachers, a loose form of single-variable experiment has been proposed. As such, the methods involved needed to assess the initial state of affairs, facilitate an agent of change (the variable) and then assess any changes that followed. With the assumption that most academics would, in general, continue to employ (or not employ) visual material in their lecture presentations in much the same way if not exposed to new material regarding CLT or VCP, a control group did not seem warranted in this case.

Selected Research Program

Participant Recruitment Process

To attract participants, a recruitment poster was designed to be both put on noticeboards and in the pigeon-holes of selected staff rooms on a university campus (see Appendix B) early in the teaching semester. A small digital copy of the poster was also made for distribution by email, disseminated to staff via appropriate Heads of School. Again, management was instructed not to treat the study as a staff development course or attempt to coerce staff to participate. The promotional material distributed allowed interested parties to contact me by phone or email to register their interest.

Pre-test Observations

Upon finalising and confirming a group of between four and seven participant lecturers at the beginning of a typical teaching semester, initial observations of a typical lecture presentation from each of them were then to be conducted. In each
lecture, a short statement (see appendix C) was to be read to the audience by the lecturer notifying them of my presence, that the lecture presentation was being observed and that, as the presenter, their voice would be recorded. The lectures would then be conducted as normal while observations regarding the visual nature of the slides used were being made, also noting any external factors contributing to, or inhibiting, the presentation.

These initial lectures were then followed by a 15-minute interview shortly after, regarding the lecturer’s account of the presentation. The questions were designed to discover what particular aspects of the presentation that the lecturer was pleased or displeased with, and what specific aims and purposes that they had intended the slides to serve. They were designed to shed light on the history, thinking and decision making behind the visual aspects of the slides and to discover some of the process used to form them. They also allowed the lecturers to identify the main message of the lecture in summarised form, which helped in assessing the clarity of the intended message.

In terms of recording the lectures, a unidirectional, radio-transmitted, lavalier microphone would be used so as to record the lecturer’s voice and not anything said by the students in the audience. For the interviews and focus group, a more generic omnidirectional microphone would be used with a secondary MPEG recording device as backup.

**Instructional Design Workshop**

At a common time convenient to the participants, a 2-hour slot was to be arranged in a computer laboratory on campus for them to attend the ID presentation, workshop and focus group discussion conducted by myself. Ideally, this was to be conducted during a break in the teaching semester to allow participant availability and time for the content of the workshop to be absorbed and applied. The data gathered in the initial observations informed which particular aspects of the workshop needed emphasis and contributed to the development of relevant worked examples for demonstration. So as to mirror the experiences of the participants, the presentation preceding the workshop was to be constructed using the authoring software they have
also been using (Microsoft PowerPoint). This also helped me as the instructor to pre-
empt any obstacles or opportunities that the software presented in terms of 
facilitating the principles being presented. The presentation explained and 
demonstrated the VCP concerned with clarifying the message of a presentation, 
featuring examples of how they might be used. The presentation was also 
accompanied by a written set of “plain-English” notes provided at the end of the 
session that summarised the main points covered (see Appendix E). The workshop 
itself was to be conducted as a practical support tutorial, addressing specific questions 
and troubleshooting problems related to implementing the principles using the 
authoring software.

Following the workshop, a guided group discussion was to be conducted and 
recorded to gauge the reactions, attitudes and comments that the lecturers may have 
to the material presented. The questions put to the group were designed to allow any 
common affirmations or hesitations regarding the understanding or implementation 
of VCP in their slide designs to emerge.

**Post-test Observations**

In the same manner as the first, a secondary set of lecture observations was then to be 
conducted. These observations were of the lecture presentations that the participants 
delivered after having attended the workshop, and were to be done no sooner that 
one week from the date of the workshop so as to allow some time for the principles 
to be applied. Changes in the treatment of visual material were of particular interest 
in these observations. Accordingly, the proceeding interviews were conducted in the 
same fashion except for the addition of several questions pertaining to the principles 
they sought to apply and how it compared to the first lecture that was observed.

So as to gauge whether the application of these principles extended beyond the 
immediate, a third such lecture observation and interview was to be conducted. The 
timing of this last lecture was to allow at least several weeks to pass since the second 
and would ideally occur towards the end of the teaching semester.
Analysis

Data Obtained

In assessing the design artefacts being used by academics at any point in the study, the visual characteristics of the lecture presentations needed to be recorded, identifying evidence of visual communication principles that assist the efficient use of cognitive capacity. A digital copy of the files being used became important documents to analyse, but not entirely representative of every visual aspect involved in the presentation. While this study is not particularly concerned with the performance or public speaking skills possessed by the participants involved, assessing the presentation slides as they would be shown to its intended audience was quite important. Elements such as the pacing of the slides in the presentation, the relevance of the images to the topic being communicated, changes in visual format or software used (whiteboards, movie files, et cetera), and the use of laser-pointers and props are examples of factors external to the digital files being used that would contribute to (or detract from) the visual material presented.

Bearing in mind that some of the visual qualities evident in a lecturer’s slides could in fact be the result of accident or an external influence, the thinking and actions that contributed to their development would also be important information to collect. The use of a template in the authoring software or the formatting provided by of any of its default settings may, or may not have been, the result of conscious decisions made by the instructors involved. It was entirely possible that the visual material in their presentations was present because of the contributions of secondary authors or because they were sourced from other repositories or resources available to them. Information regarding the process of constructing the slides would shed light on these factors, which would include any prior acquisitions, preparations and modifications made regarding visual material.

With the anticipation that some of the VCP discussed would resonate stronger with lecturers than others, their initial reactions to encountering and attempting to implement them would give an insight as to which aspects of ID may need additional clarification. It was important to identify any hesitations that lecturers may have
about implementing them, whether those hesitations were related to their comprehension of them or their confidence in implementing them.

To detect evidence of VCP in the presentations that lecturers first attempt to employ them in would also be critical. It would be one of the first tangible examples that certain VCP have been successfully adopted. However, as before, uncovering the context and processes behind these occurrences was critical. It was important to determine that if their presence was the result of accident or deliberate decisions and actions. Alternatively, if there was no evidence of additional VCP implementation, it was important to determine if there was an unsuccessful attempt to implement them, a neglect to implement them, or a refusal to implement them. It was possible that the lecturer in question may have tried to put these principles into practice, but couldn’t successfully do so because of either an external or internal interference. Confusion about what a particular principle means or how to apply it, a conflict with other content that is regarded as more important, difficulty with operating the authoring software, or a simple lack of time were all possible reasons for a lack of change.

Should evidence of positive change be witnessed, it would be of interest to discover if these changes were only temporary or if they had a lasting impact on the practice of lecturers. It was a possibility that the added implementation of VCP was simply the result of an immediate response and prompting. Therefore, evidence of these principles being adopted and transferred to practices beyond the immediate was also of importance. There was every chance that any understanding gained by lecturers may have been quickly swallowed up by old habits and routine. Again, to identify if other enabling or inhibiting factors were at play was highly relevant.

**Analysis Techniques**

The recordings of these interviews were later transcribed and coded to search for any emerging themes or patterns. These transcriptions (three interviews per participant plus one for the combined focus group discussion) would form the bulk of the data and subsequently subjected to a largely manual and simple thematic content analysis. The focus of this analysis was to identify the more complex of affective and cognitive threads that emerged from the transcripts as opposed to becoming paralysed with
frequency counts of individual words. The transcripts would then be coded according to the themes identified, pointing to salient quotes from the participants to aid in illustrating the findings of the study. Bearing a certain similarity to grounded theory, analysing the data without a pre-existing coding frame in mind is what has been described as an inductive (as opposed to theoretical) form of thematic analysis (V. Braun & Clarke, 2006). This technique is intended to allow the preconceptions and theoretical interests of the researcher take a back seat and allow the themes that arise to be more data-driven.

Data generated by the observer of the visual aspects of the participants in the Likert scale would provide a small and slightly more quantitative collection of material. With the more complicated extensive models of quantitative data analysis being rather excessive for such a manageable array of datum, the results of the scale would be simply tallied and graphed to show the extent to which the various VCP were present in the various lecture slides involved. These, along with the accompanying field notes, provide a secondary body of illustrative material from which to generate discussion.

Conclusion

The design of this research took a flexible yet responsive approach to gathering and analysing data. It focused on testing a particular hypothesis while allowing unexpected themes or factors to emerge to give the findings a broader context and scope for future investigation. In attempting to capture something of the broader issues involved in assessing an academic’s adoption of VCP in their lecture presentations, the research design naturally sacrifices a more narrow and measured focus. As such, the methods employed have sided with a generally more qualitative investigation in the form of a collective case study. The design also accepts that such an investigation does not permit a completely objective stance from the researcher, acknowledging the existence and influence of various personal attributes and interactions that may contribute to some of the process and findings. In identifying and articulating those factors and limitations, the design of the research retained an acceptable level of rigour and promised a valuable insight from the data produced.
6. Results Regarding Lecturer Use of Principles

Introduction

Structure of this Chapter

The results of this study have been divided into two chapters; the first presents information gathered that directly addresses the research questions at hand, and the second shows some emergent themes that help to paint a more detailed picture of what occurred. In this first chapter, the broader context and circumstances pertaining to the implementation of the research design are described, including the minor adaptations that were needed to enable the project to proceed. Each of the four lecturers who participated in the study are then described as individual case studies, which is followed by an overview of their qualities as a group. Firstly, the three lectures delivered by each participant are described with reference to their various contexts, the observations of their visual qualities and their responses to the subsequent interview questions. These three lectures address the three components of the established aim and scope of the study. The first lecture indicates the extent that participants were already using visual communication principles that support the reduction of cognitive load. The second lecture provides evidence as to the immediate benefits that the workshop may have benefitted the lecturer. Finally, the third lecture illustrates just how much of what was learnt in the workshop is sustained. After describing the findings of the individual participants, the information gathered during the workshop and focus group, as well as a consolidated account of how the participants responded as a cohort, is reported.

Interpreting the Figures and Graphs

The Likert-scale results tabled in this chapter represent the recorded observations of the various lecture presentations involved and include several visual cues. By means of comparison, whenever a result is shaded green, this represents an increase from the
previous corresponding result. A result shaded in red, however, represents a decrease compared to the previous recorded observation. The combination of these results into the two graphs towards the end of this chapter are explained in detail in the corresponding text.

Implementation of Research Procedure

*General Context*

**Recruitment of Participants**

The cogs of an organisation as large as a university tend to turn slowly. As such, several delays and difficulties were encountered in the task of distributing information about the study to potential participants. Official channels such as emailing the various Heads of Schools to request that the recruitment material be relayed to appropriate academics (see Appendix H) proved sluggish with little to no indication as to whether the material arrived at its intended destination or if it was simply ignored. Close to 500 posters and flyers were manually distributed to almost every building on the university campus. They were pinned to staff noticeboards in staff rooms and dealt into any staff mail boxes and pigeon-holes that I was granted access to. The only significant discrimination exercised during these distribution efforts was to exclude those channels belonging to staff from the disciplines of either Design or Education. Communication from a smattering of interested academics eventually trickled in, mostly in the form of telephone messages. However, there was still the process of confirming the actual availability of academics to participate and that they met the descriptions in the research design, all while attempting to ensure a reasonably balanced spread of represented faculties. The small number of respondents thinned quickly, and several qualifiers had to be relaxed in order to secure a feasible number of committed participants. The decision was made that the generic nature of the courses that the participants delivered and the number of students enrolled in them were the least critical qualifiers for participants. These two preferences were included in the research design as an additional measure of ensuring anonymity and could be safely relaxed without revealing the identity of any academics involved. To complicate the situation further, very little of the targeted teaching semester was left
in which to conduct the study, resulting in only one of the initial lectures being observed. Indeed, while the preference was that all three of each participants’ lectures would have belonged to the same course, individual circumstances simply prevented this from being achievable. One of the participants was scheduled to switch to teaching on a trimester basis in the following year and another’s teaching load was to switch from one course to another halfway through the semester. Again, as the core qualifiers for participants were that they were in control of the presentation slides they used, this preference was also relinquished. This of course had an impact on the timing of the intended research program, which will be discussed at a later point. Despite this turbulent beginning, the program pushed forward.

**Delivery of the Workshop**

As described in the previous chapter, the workshop intended to facilitate a 30-minute presentation that both explained and modelled the VCP used to facilitate clarity in a presentation. This was to be followed by an hour of practical tuition and troubleshooting with the participants in terms of applying VCP to their own presentations. A 30-minute guided discussion about applying the principles concluded the whole workshop, bringing it to a total of two hours in length. As such, a computer laboratory with the necessary computers and presentation facilities was booked at a central location on the university campus at a time that suited all of the participants. Shortly before the workshop was scheduled to take place, however, one of the participants informed me that they could no longer attend at that time. With an ominous feeling beginning to niggle at me, I took extra measures to double-check that the other participants could still attend and that all the equipment in the booked lab worked as it should.

On the day, the other participants dutifully arrived at the right time and location, however, the technical aspect of the scenario failed horribly. Unlike the tests I had conducted the day before, the ceiling mounted projector no longer operated (a blown bulb), none of us could log into the computers (a server or network error of some description) and no technical staff could be located to fix either problem. With time ticking, we quickly relocated to another building nearby and set up in a vacant
computer lab with the hope that no other classes were due to use it at the same time. The projector and computers all worked seamlessly and, while a little behind schedule, I composed myself and delivered the presentation as intended. As the practical component of the workshop arrived, several new hurdles presented themselves. Firstly, the lab we were in was populated with Apple Macintosh computers (as opposed to Windows PC), which were largely unfamiliar to the participants. Despite the fact that I managed to reboot them to run Windows as the operating system, the unfamiliarity of the computers (and a minor difference in shortcut keys) proved to be slightly distracting for some of the lecturers. To further complicate matters, the computers we were using were equipped with the very latest version of PowerPoint. This would normally be seen as an advantage, except that all of the participants were used to using much older versions of the software and found the difference in interface a little disorientating. This also generated a subsequent issue in that whatever material they produced in the workshop was unlikely to be editable on the outdated configurations that the participants were sure to return to. These technical issues consumed more of the practical aspects of the workshop than I had desired, however the focus group held afterwards ran as smoothly as could be hoped.

The following accounts describe the circumstances surrounding the lecture presentations of each of the participants and their utilisation of VCP. Please note that the names of the four participants described have been substituted with fictional ones in order to conceal their identity.

Participant 1: Ivan Sinclair

Evidence of Pre-Existing Cognitive Load Reducing Visual Communication Principles

The Setting and Circumstances

Ivan Sinclair was an enthusiastic part-time lecturer in chemical engineering in a regional Australian university, who had the role as both a teacher and a research assistant in the engineering department. He was the first participant to commit to the study.
The first “lecture” of Ivan’s that I observed had far greater resemblance to a tutorial in style and format. It was held in a windowless seminar room with rows of desks and chairs that would accommodate for approximately 25 students. However, only half of that capacity was used, in this case by little more than a dozen engineering students who were in their third year of study. The intimacy created by such a small group allowed the students plenty of opportunity for interaction and involvement. The lecture commenced at a sobering 8am start, covering the topic of particle separation in coal and mineral processing for a total of 2 hours. The room was equipped with a small podium tucked away to one side at the front, with a computer that controlled a ceiling-mounted projector, illuminating the projector screen at the front of the room behind the presenter. The general atmosphere was quite relaxed with Ivan regularly inviting input from, and posing questions to, the students.

Observations of the Presentation’s Visual Qualities

Ivan’s PowerPoint presentation took the form of a very text-heavy and largely monochromatic stream of material, weighing-in at a total of 191 slides. It is important to note though, that only half of these were actually used during the presentation. Ivan regularly skipped past quite a number slides (many being almost completely filled with text), pausing only on those he felt the need to explain. While there was a regular appearance of diagrams featured throughout, they were also typically black and white, a number of which had the appearance of being scanned or photocopied at low quality resolution from other printed sources. Various individual terms were highlighted on most slides via the use of bold, whereas the use of colour was generally quite rare. A universal application of Arial at a large point-size seemed to be the choice of typography, which was consistently used throughout the design, with the exception of any text or labels found within the diagrams and imagery included. Some of the diagrams used were quite heavily labelled and visually busy, while others were fairly simple. A number of slides included large, complex formulae and calculations, giving the initial impression of a jumbled wall of numbers, Greek letters, brackets, braces and parentheses. It is important to note, however, that the language of mathematics is not one I’m fluent in, making it entirely possible that the students around me may not have found the size of such a formula quite as
disorientating as I did. The backgrounds of the slides themselves were flat white and the only other common elements in the layout was the time printed in digital format and the slide number, both in small text at the foot of the screen. As such, there was essentially a very generic and uninspiring aesthetic offered by the projected presentation as a whole. Several slides did, however, feature simple animations of scenarios such as particles passing through a mesh.

In contrast to the otherwise bland appearance of the slides, a video was introduced showing a glass beaker containing a large ball-bearing being filled with sand and then repeatedly bumped to demonstrate the ‘Brazil-Nut Effect’. One other interesting video clip was shown a little later in the presentation featuring a cyclone particle separation machine in action. Ivan also made good use of props by bringing in an actual example of a particle separation mesh for the students to pass around and look at. A couple of other instances of highlighting were noted in Ivan’s use of a laser pointer and the act of physically pointing at parts of the screen with his index finger and motioning to various parts of the slides with similar body language.

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Figure 5-1. Observational Evaluation of First Lecture Presentation by Participant 1
Information Revealed in the Interview

Knowing that the class size and setting would permit it, Ivan had expressed a deliberate intention to provide more opportunity for student interaction, building in periodic intermissions in the form of blank or partially concealed slides to facilitate brainstorming and problem solving sessions. Often, the explanations for the way that the exercises were visually constructed throughout the lecture, were effectively a description of progressive disclosure.

He readily acknowledged that his sides featured far too much textual content, explaining that it was the typical form that the slides first take until he has the opportunity to “cull things out” or find visual equivalents. There were several times when he mentioned that his process for refining the PowerPoint slides was an effort to simplify, or make concise, the material in it. One of the regularly stated aims by Ivan in modifying the presentation was to find video clips or images that would facilitate a more pictorial visualisation of the content instead.

Evidence of the Benefit of the Instructional Design Workshop

Information Revealed in the Focus Group

The workshop seemed to reinforce for Ivan that the amount of text present on the slides he uses for presentations was a significant issue, making several comments about needing to reduce the visual noise and clutter in them. One thing he stated an intention to start doing more of, was to give graphics their own slide rather than trying to make them share a slide with existing text. His solution for the text (which he seemed unwilling to actually remove from the file) was to place them on slides that were hidden during the actual slideshow. Ivan also expressed a preference to employ the principles discussed when constructing new slides and presentations rather than trying to “retrofit” the files he had already constructed.

Observations of the Visual Qualities of the Subsequent Presentation

Ivan’s second lecture was in a similar setting to the first; a small seminar room with under 20 students in attendance. The topic of the 1-hour lecture was ‘Solid Liquid Leaching’ and began with several diagrams that he had drawn by hand on the
blackboard next to the projector screen. Several of the diagrams featured in the projected presentation were quite simple and effective, despite there still being an occasional deficiency in adequate resolution. Ivan had gone to the effort of implementing several instances of progressive disclosure with some of the diagrams he used. One particular example was where he showed three separate steps in leeching a solvent particle, revealing each step on the slide by animating a white rectangle to gradually slide along and reveal the steps that it had concealed. This tactic was also employed to gradually compare three graphs that were side-by-side on the same slide. While there certainly was not as much text featured in the presentation slides as was observed in Ivan’s first lecture, there were several periods where their inclusion was still quite generous. This was particularly the case towards the end of the lecture, when slides containing edge-to-edge blocks of text were quickly skipped over. Judging by the erratic nature of the slide number at the bottom of the slide, Ivan had set several of his slides to be hidden during the presentation. The continued lack of colour in the PowerPoint slides was once more noted, with the rare exception of one or two diagrams and the use of his red laser-pointer. Again, Ivan cleverly employed the use of physical props during the presentation. This time, a visual example of the leeching process was provided when Ivan made a cup of tea in front of the audience, using the analogy to visually and verbally explain the various steps and principles involved.
No | Somewhat | Yes
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Was visual priority used to emphasise critical points? | • | ●
Was there consistency and unity in layout, style and formatting? | • | ●
Were the textual components kept to a minimum? | • | ●
Were informative or expressive visual illustrations used? | • | ●
Was the visual material neat, organised and attractive? | • | ●
Was the material presented concisely and simply? | • | ●
Was visual elaboration and embellishment muted or minimal? | • | ●
Was complex or detailed material progressively disclosed? | • | ●
Was the typography appropriate and relevant? | • | ●
Was the text and imagery readable, legible and clear? | • | ●

Figure 5-2. Observational Evaluation of Second Lecture Presentation by Participant 1

**Information Revealed in the Interview**

Ivan explained that he had not delivered this particular lecture in over 7 years, and that the material retrieved from his previous slides was long overdue to be updated. He addressed several inappropriate slide transitions and set about constructing the examples of progressive disclosure described above. He also implemented several animations to some of the diagrams that were previously static in nature, including fading out parts of a diagram that were no longer being talked about. He confirmed that quite a number of text-heavy slides were hidden from view in the presentation. He also described how he had used white boxes on the slides to hide various material that he wanted to unveil at specific times when he was involving the students in problem-solving activities. There seemed to be a general acknowledgement that many of his efforts were to reduce the amount of distractions or visual noise in the slides so as to keep the students focused on what he was saying.

**Evidence of Longer-Term Transference**

**Observations of the Presentation’s Visual Qualities**

The third of Ivan’s lectures to be observed was part of the same course that the second lecture had been part of. It was also held in the same room as before, with
approximately 20 students in attendance. The title of the lecture was ‘Absorbents, Screens, Absorption’ and went for an hour before converting to a tutorial group. The slide number at the foot of the opening slide read ‘214’, leading me to suspect that it may have been an extension of the same file use in the previous lecture. The slide featured a clear and visible, custom-drawn diagram, utilising an uncharacteristic application of colour to help differentiate the various features within it. The following slides still featured the usual quantities of text, however, the points within them were progressively disclosed rather than shown simultaneously. Again, going by the jumps in slide numbers, quite a few slides (presumably full of text) were withheld from the presentation. With a small number of exceptions, the graphs and diagrams used seemed quite clear and uncluttered - not suffering from the usual affliction of copious labels and visual noise. Where a diagram might have benefitted from an animation of some kind, Ivan used either his laser pointer or hands to indicate the direction or progression of a plotted line or process. While a table of data that was shown was quite visually busy, various forms of highlighting were employed to link it to specific sections of graphs that visualised it. Highlighting was even used in conjunction with progressive disclosure using a ‘wipe’ transition between slides to bring attention to a change in one area of a graph. The occurrence of slides filled with large blocks of text became more common as the lecture progressed, however the use of progressive disclosure to incrementally reveal each point on them was consistently applied. Ivan also stopped several times during the presentation to draw rough graphs and diagrams on the blackboard and to facilitate brief periods of interaction with the students. Overall, the application of style and consistency of layout had improved, with less evidence of margins being broken or stretched to accommodate for additional text. I was left with the impression that he had put in a concerted effort.
Was visual priority used to emphasise critical points?  Yes
Was there consistency and unity in layout, style and formatting?  Yes
Were the textual components kept to a minimum?  Yes
Were informative or expressive visual illustrations used?  Yes
Was the visual material neat, organised and attractive?  Yes
Was the material presented concisely and simply?  Yes
Was visual elaboration and embellishment muted or minimal?  Yes
Was complex or detailed material progressively disclosed?  Yes
Was the typography appropriate and relevant?  Yes
Was the text and imagery readable, legible and clear?  Yes

Figure 5-3. Observational Evaluation of Third Lecture Presentation by Participant 1

Information Revealed in the Interview

It was revealed in the interview that Ivan had not delivered this lecture before and was in fact fairly unfamiliar with the material in it prior to preparing the presentation. A set of slides populated with content was passed onto him from another lecturer and he selected from it the content that he felt was relevant after reading several chapters on the topic first. As such, he seemed to feel that the presentation lacked polish and that there were still quite a few things he wished to improve on it before would be prepared to deliver it again. He explained the effort that he went to in creating the progressive disclosure of shaded zones in some of the graphs, and indicated that there were several diagrams and figures that he had either edited or completely recreated in order to visually simplify them. Several “animations” were also created to illustrate change or progression in various diagrams. His tactic of shifting large blocks of text onto separate slides and switching them off for the presentation was once again employed regularly. The task of removing unnecessary text from the presentation was also extended to editing imported images and graphics to eliminate textual material such as redundant labels. In an amusing anecdote, Ivan also conveyed his heightened awareness of the split-attention effect when he had recently found himself in a position of assessing a string
of presentations by undergraduate students where the effect was demonstrated ad nauseam. Consequently, he had consciously attempted to avoid that situation in his own presentations by reading out any text, word-for-word before embarking upon any verbal elaboration. This, of course, creates a classic case of the redundancy effect. Considering the great effort he had expended in implementing what he had understood from the workshop, I did not have the heart to correct him.

**Participant 2: Margaret Kane**

**Evidence of Pre-Existing Cognitive Load Reducing Visual Communication Principles**

**The Setting and Circumstances**

Margaret Kane was a lecturer in the field of Biomedical Sciences and contributed to the delivery of a variety of large courses in the faculty of the same university as Ivan. The initial lecture that I observed of Margaret’s belonged to a large first-year course and was on the topic of cell structures and functions. While there were approximately 300 students in attendance, the lecture was held in one of the largest halls in the university, allowing a certain portion of the audience to scatter themselves quite thinly around the many vacant and distant spaces available. Margaret delivered the entire lecture behind a podium on the right-hand side of a tall stage with her projected slides filling a very large screen at the back. Atop of the podium was a small multi-media control panel, a computer monitor, keyboard and a ‘visualiser’ (an illuminated projection bed with a mounted over-head camera to capture analogue material such as books, acetate sheets, drawn diagrams or other physical objects). Margaret had two sets of lapel microphones attached (one for the amplification of her voice through the hall’s sound system and the other for producing a recording for the study) and came prepared with her own laser pointer. She read out the notice that I had supplied her with (see Appendix C), and the lecture commenced about 10 minutes past the hour while a number of stragglers continued to arrive and take seats near the entrances they appeared from.
Observations of the Presentation’s Visual Qualities

Margaret’s presentation slides were built using a basic template (immediately recognised as being from an early version of PowerPoint), and remained fairly consistent throughout in style and layout. While the consistency of the template used also helped the legibility and professional appearance of the slides, there was generally an abundance of text. Several slides appeared uncomfortably crowded with material. There was no obvious over-arching point, focus or structure to the presentation in its entirety and the lecture felt very much like an encyclopaedic entry or text-book chapter. The diagrams and images used appeared to be quite professional and uniform and at several points the presence of a copyright notice was evident at the foot of a few of them. There were no animated elements or transitions, however, Margaret did make use of the laser pointer to draw attention to certain sections of some of the key diagrams and bullet-points on the projector screen. There were a number of occasions where the layout was broken to accommodate for an overabundance of content; mainly in the form of reducing the margins or the space between elements.

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Figure 5-4. Observational Evaluation of First Lecture Presentation by Participant 2
Information Revealed in the Interview

It was clear from Margaret’s responses in the interview that followed that she was well aware of some of its problems, especially in regard to the amount of text present in the slide designs. She described how the presentation slides were in fact a modified version of a presentation she had “inherited” from a previous lecturer in the course. Her main focus in modifying them had been to search for illustrations, diagrams and figures that would be suitable replacements for the written material that was present. Most of her images had been sourced from textbooks that were being used in the course and the online teaching resources associated with those publications. While it remained unclear exactly how much of the previous lecturer’s design decisions remained intact, Margaret seemed to generally recognise that there was a need for visual clarity. However, because the file she was producing was also intended to function as a set of notes for the students, she expressed a need to retain a certain amount of text.

Evidence of the Benefit of the Instructional Design Workshop

Information Revealed in the Focus Group

In the focus group that followed the workshop on using VCP, Margaret recounted how she’d heard similar advice before in similar contexts. While she acknowledged that it was certainly good advice and worth following, it was difficult to get into the habit of implementing it consistently. She did, however, agree that it was good to be reminded of these things. She agreed with the others that in the context of an undergraduate lecture, there is a motivation to have the presentation slides also function as lecture notes for the students. However, if the presentation was for a situation such as a research conference where there is no need for notes to be distributed, she felt that implementing some of the principles from the workshop would be easier. At the very least, there seemed to be recognition that both a set of lecture notes and a set of presentation slides required a different implementation or priority of VCP.
Observations of the Visual Qualities of the Subsequent Presentation

Margaret’s second lecture was for a different 1st-year bioscience course and was held in a similar setting to the first, with the exception of there being closer to only 100 students in attendance. The lecture went for 2 hours and a number of the students did not return from the 5-minute break halfway through it. The topic of the lecture was on digestion and metabolism. I recognised one of the first slides of the presentation as one that Margaret had been working on in the workshop, which featured a large photo of an overweight woman slumped sideways on a couch. The same slide also featured a well-placed, simple column-graph comparing the adult obesity levels over several years. The two graphics did not compete with, crowd or overlap each other, and the relationship between them and what was being said was very clear. The grid structure and theme employed was quite consistently applied throughout the majority of the presentation, with an appropriate and inconspicuous choice of typefaces and colour. The inclusion of the university logo along with the name of the school and faculty on every slide was probably a case of redundant or obvious information. Several slides featured fairly succinct graphics, some of which may have been a little on the busy side of the spectrum. On one particularly label-cluttered diagram of the metabolic turnover process was introduced with the sentence, “This looks complicated, but it’s not…” which was probably a cue that something could have been done to simplify it. The amount of content on the slides was quite balanced and uncluttered for most of the first half of the presentation, but slowly regressed into the typical form of lists of bullet points with the occasional picture squeezed in. Despite this, several cases of progressive disclosure were successfully used in the revealing of sets of bullet-points that explained some sort of process or equation. At one point, Margaret switched from the PowerPoint presentation to the visualiser, which showed her drawing a simple diagram of amino acids relationships using blue marker and paper – another good use of progressive disclosure. A slight technical issue arose at one point where Margaret’s laser pointer stopped working. Thinking quickly, she simply switched to using the mouse to move the cursor around on the screen, allowing a similar effect to be achieved. On the whole, it seemed as though the general aesthetic of the slides was quite consistent and
clean. I was left with the impression that there was much more work that Margaret was intending to do to the slides, but only got the time to address part of it. Overall, Margaret’s second lecture was a marked improvement on the first lecture that was observed.

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Figure 5-5. Observational Evaluation of Second Lecture Presentation by Participant 2

Information Revealed in the Interview

It quickly became clear that Margaret was the most pleased with the first part of the lecture and felt that the links she was attempting to make between digestion metabolism and obesity were quite clear, as well as gaining the interest of the students in attendance. An annoyance was expressed regarding the failure of her laser pointer in the latter half of the lecture and hinted that fatigue was a factor in the quality of her delivery at that point as well. She explained that many of her efforts in the re-design process were directed towards removing some of the information that was in the PowerPoint file, particularly the amount of text present. The main principle that she stated focussing on was that of simplicity. She explained how one of the slides she addressed was quite dense in content, which prompted her to divide it into “animations” (although there were no moving elements detected in the slides that I observed). When asked how much of the presentation she found the time to modify, she admitted that she only managed to address the first 3 or 4 slides. Many of the
images that were included in the presentation were digitally supplied with the textbook for the course, which she readily acknowledged are a little beyond her ability to edit in a timely manner. However, she was quick to qualify that a number of the diagrams and illustrations used did have scope for simplification. When asked what she would change if given more time to do so, she suggested that she would have divided up some of the more complicated diagrams, showing and explaining their individual components progressively. The overall impression from the interview was that while there was definitely a positive influence from Margaret in terms of modifying the visual design of the slides, it may have been a visually stronger presentation that the first lecture to begin with anyway.

**Evidence of Longer-Term Transference**

*Observations of the Third Presentation’s Visual Qualities*

The third observed lecture presentation presented by Margaret was for a different course again. This time the audience was a group of approximately 40 fourth-year pharmacology students and the topic of the lecture was parturition and labour. The lecture theatre was a lot more intimate and size-appropriate, with a lower ceiling, tiered, permanent seating and less distance between the front row and the presenter’s bench. Arial was the choice of typeface (a fairly generic and safe choice), with the occasional slide switching deviating in text alignment consistency. A regularly noted issue was that the content (particularly the treatment of text) was quite cramped and lacked sufficient margin clearance and general breathing space. Despite the abundance of text in the PowerPoint slides, Margaret’s use of imagery was quite effective. Holding up a piece of paper with a black circle printed on it, she showed the audience what “10cms dilated” actually meant, which evoked an audible reaction from the students. She also included a 3D (computer generated) animation of the various twists and turns that a baby typically makes while passing through the birth canal while she narrated. This was shortly followed by another film clip that she had sourced online, depicting an actual birth, broken up with regular animated diagrams of the pelvic bone and skull structures. These images also captured the attention of the audience, who had become quite noisy and involved. Many of the slides that followed were simply lists of bullet points with the occasional image, many of which
could have been given its own slide rather than being shoe-horned in on a layout that did not have a dedicated space for it. That said, many of the images, diagrams and graphs that were employed were quite clean and easy to digest.

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Figure 5-6. Observational Evaluation of Third Lecture Presentation by Participant 2

Information Revealed in the Interview

Margaret largely regarded this lecture as a success, with the impression that the students were quite engaged with the subject matter and reacted well to the material presented. Her most immediate concern about the event was simply that she was not equipped with her glasses, making it difficult for her to see the faces of her audience or her own slides. The PowerPoint slides were once again handed-down to her from a previous lecturer in the course, the value in them being that there was some specialist content within it pertaining to pharmacology. She pointed out that while she had taken the previous owner’s lead in regards to the topic-specific content in the slides, a significant amount of the presentation design was “from scratch”. Again, she stated that simplicity was her guiding principle for many of her design decisions, prompting her to cut down the amount of text. The text-heavy nature of the majority of the slides she had been dealing with was one particular aspect that Margaret articulated as a prominent weakness to address, and continue to address.
Participant 3: Mick Phelps

Evidence of Pre-Existing Cognitive Load Reducing Visual Communication Principles

The Setting and Circumstances

Mick Phelps was a senior lecturer in the field of communication and journalism, and was the only participant who was able to offer three lectures for observation that all came from the same course. Unfortunately, he was also possibly the least engaged in the study because of heavy commitments pertaining to a book that he was busy publishing at the time. The course in question was an introduction to communication theory, which involved a large number of students. The theatre that the lectures were held in had a capacity of over 500 and close to half of the seats were filled every time. A long bench, with all of the necessary controls and monitors mounted upon it, stood at the front of the theatre and was dwarfed by the large presentation floor surrounding it. It was overlooked by a rising sea of fixed seats that disappeared into the dim heights of the back rows, and a central stairway evenly divided them all from top to bottom. During his presentations, Mick would regularly climb these stairs and turn to face the projection along with the audience as he spoke. He was always very careful to adjust the sound system to ensure that everyone could hear him clearly before commencing, and was quite explicit throughout the lecture about which parts of the material he wanted them to write down. The students all came equipped with some form of note-taking equipment, ranging from simple writing pads through to touch-screen tablets, laptop computers and recording devices. Some students were even observed taking photos of each slide with their phones.

Observations of the Presentation’s Visual Qualities

The first of Mick’s lectures that I observed was on the topic of social and technological determinism. Mick’s slide designs largely consisted of dense blocks of black text beneath a title at the top in a larger point-size, all on a plain white background. A scattered selection of words and part-sentences were typically displayed in bold throughout the text, which was fairly subtle in contrast. The text
was written in full sentence form and regularly featured author/date references as if it were an academic paper or essay. One slide seemed to have approximately 300 words on it, creating a solid wall of text. There were regular inclusions of photographic imagery, most of which looked to be either stock photography or images from other online sources. The images were not typically accommodated well in the layout, with mild variations made to margin depths and awkward or cramped positioning when combined with text. One image depicted a map, which, because of its poor resolution quality, was almost unreadable, and did not point out or highlight the particular town that the text actually referred to. The size of the text within the paragraphs was possibly a little small at its final projected size, with slightly long line lengths offering an additional interference to readability. Mick read the majority of the text aloud regardless, pausing regularly (sometimes mid-sentence) to inject commentary or explanation.

While the text and layout used in the slides bordered on uninspiring, there were no serious or consistent problems posed to the visual legibility of the material. That said, there was not always a clear visual or conceptual hierarchy present, and the pictures used rarely added significant insight to the point they intended to illustrate. The main exception to this was one of the last slides which featured a centrally aligned, single sentence which seemed to present the main point of the lecture. This appeared to be a deliberate use of contrast to achieve a focal point.
During the interview, Mick preferred to talk at length about the structure of the course as a whole and his convictions about teaching rather than the visual qualities of the slides he had designed. However, what could be drawn from his explanations was that there was a deliberate effort to condense and simplify the content and to define the main theme of the lecture down to a single phrase or “sound bite”. As I had suspected earlier, the slide at the end of the presentation featuring this single phrase in isolation was a conscious use of contrast to draw attention to it as being quite important. Mick explained that his use of photographic imagery was an attempt to provide something visual that could be mentally connected to the concepts that he was presenting. Sometimes the choice of imagery was to draw a connection somehow to another related concept, even if in a quite abstract way. The otherwise colourless nature of the slides seemed to be a decision made to avoid creating distractions for the students. It was interesting to note during the interview, that it did not seem to initially occur to Mick that the text he was displaying qualified as visual material in his presentation. The use of bold in various sections was to indicate to the students the parts that were most note-worthy. Mick went on to explain that he did not provide any notes or handouts for the students in the
course at all. Digital copies of the presentation were also deliberately withheld from students. The only way for students to access the material in the course was to attend the lecture and compose notes for themselves.

Evidence of the Benefit of the Instructional Design Workshop

Information Revealed in the Focus Group

Mick was unfortunately unable to attend the workshop and, as a consequence, was not in the focus group discussions either. A nine-minute video version of the presentation was quickly assembled for him to watch in his own time as a substitute. The video was composed by combining the PowerPoint slide-show used in the workshop with a recording of my voice narrating it. Mick was also supplied with the same written handout that was given to the other participants in the workshop. Shortly after, a time was arranged to meet with Mick to gauge his reception of the material and give him the opportunity to respond to the questions that were put to the others in the group. Again, Mick repeatedly chose to steer the session into the topics of his teaching philosophies and beliefs, as well as the specific content in the lectures he delivered. While he seemed to take issue with several points made in the workshop material, a number of his comments seemed to conflict with these criticisms and revealed several misunderstandings of the principles it was promoting.

The principle that Mick most immediately affiliated with was that of simplicity. However, he offered quite contradictory explanations as to what simplicity practically implied for his presentations. While he readily asserted that an uncluttered message was a desirable outcome, he seemed to object to pursuing this goal in relation to the visual qualities of his slide designs. In one instance, Mick said that he might make the effort to reduce the amount of text on his slides and, in another instance, stated that it was critical for it to be there in order to clarify the message. He was quite critical of the danger of oversimplifying content until it became “sound-bite education”, and yet had specifically stated that his aim was to produce a “sound bite” for the main point of every lecture in an earlier interview. He stated that while it annoyed him to watch an English movie with English subtitles, he did not regard the same scenario in his own presentations as being a case of redundant text. There seemed to be an
assumption that the workshop was advocating that a presentation should only use a single sensory input channel (as in, only the presenter’s voice or only a picture showing). Another conclusion that Mick seemed to reach from the principles in the workshop was that all written material should be converted to a set of notes and then simply read out to the students by the presenter. It eventually surfaced in his explanations that one of the reasons behind presenting the text in full sentence form with references, was to model scholarly practices and to familiarise students with academic formatting and language. While Mick stated several times that he thought the workshop material was full of solid advice that made sense to him, it seemed that he was very unlikely to actively implement very much of it.

Observations of the Visual Qualities of the Subsequent Presentation

The second lecture observed in Mick’s course was on the topic of audience studies and was conducted in the same setting and circumstances as the first. He periodically wandered up and down the stairs, using a remote control to progress steadily through the slides. Meanwhile, the gentle sound of hundreds of scribbling pens and tapping keyboards hissed and rattled along as the other occupants of the room frantically tried to capture whatever they could. Most slides in the presentation were still text-only, and quite a portion of it. There was the occasional addition of imagery, typically in the form of portrait-style photos of the various philosophers and theorists being mentioned. Another slide featured a photograph of a microphone in the foreground with an out-of-focus audience in the background, which was used as a visual metaphor (or pun) for “bringing the audience into focus”. One slide featured a collection of romance novel covers, one of which partially obscured one of the written references. Many of the text-heavy slides did indeed show the exact wording of quotes and where they came from. Again, the use of bold to highlight specific words and phrases was used, accompanied by instructions from Mick to the students to take note of them (and to not take notes if there was no text in bold). To give credit to the treatment of the text, paragraphs were kept fairly short and were separated with an empty line rather than forming a single block of text. Headings, and sometimes subheadings, were also used to break-up the information a little.
Again, while not especially sophisticated, the style and layout of the slides was consistently applied throughout the presentation in the main.

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**Figure 5-8. Observational Evaluation of Second Lecture Presentation by Participant 3**

*Information Revealed in the Interview*

Once more it was difficult to keep Mick on topic. He seemed reluctant to focus on the visual qualities of the slides he presented, choosing to further explain the philosophical significance of the content instead. The photo of the microphone was the first visual aspect that he spoke of, stating that its inclusion was as much for his own personal amusement as it was a tool for the students to remember the phrase that it represented. It was also stated that he edited a numbered-list of points so that they become simple bulleted points instead, thus removing the implication that they were prioritised. He then split the points across multiple slides so as to progressively disclose them. Mick specifically mentioned that these changes were in response to suggestions found in the workshop material. However, he also made it quite clear that he did not remove any of the textual content from the slides at all.
Evidence of Longer-Term Transference

*Observations of the Presentation’s Visual Qualities*

In the true spirit of consistency, the third lecture of Mick’s that was observed closely matched the other two in style, structure, appearance and delivery. It was held in the same theatre and was accompanied by the same soft background hum of busy note-takers. The first slide after the main title slide, however, featured one giant block of text, wrapped in a suffocating manner around a small colour image. Some words within the text were bold, but the difference in weight was still very subtle. There was not generally any opportunity to re-read any of the text, as Mick spoke throughout the lecture without pause. While the space put between text and imagery was either extremely tight or non-existent, the margins of the slide layout were kept at a comfortable depth. Ignoring the number of paragraphs included, they were generally kept at a reasonable length and usually separated by a line-break or subheading.

There was a blue box featured at the bottom of the slides containing the slide number, but was unfortunately cut in half by a misalignment of the projection with the projection screen. Several graphs and diagrams made an appearance, most of which were quite simple and free of unnecessary visual clutter, although they often had to share a slide with blocks of text or other images. The fact that whenever multiple images were used on the same slide they were rarely aligned with each other or uniform in size, left me with the impression that the outer margins of the slide were effectively the only layout mechanisms being used. Even these basic guidelines did not seem to be particularly sacred, as they were sometimes stretched to accommodate very large quantities of text. One particular example sported between 200-300 words. Many of the slides in the presentation were simply blocks of text without any other imagery. On the last slide, the words “Is this true?” were shown in isolation in the centre and was about the only strong example of a focal point in the presentation.
DESIGNING LECTURE PRESENTATIONS USING COGNITIVE LOAD THEORY AND VISUAL COMMUNICATION PRINCIPLES

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**Figure 5-9. Observational Evaluation of Third Lecture Presentation by Participant 3**

**Information Revealed in the Interview**

Apart from attempting to re-deliver sections of the lecture during the interview again, the visual decisions that Mick stated as being consciously made remained largely unchanged; citing a general effort to keep things condensed and uncluttered. Surprisingly, he made mention of using a grid structure and concentrating on the aesthetics and look of the slides, which was not overtly reflected in the observations I had made earlier. He commented that this particular lecture did not have as many images in it as others that he had delivered, but did not feel that this was a particularly significant problem or weakness in the presentation.

**Participant 4: Douglas Scully**

**Evidence of Pre-Existing Cognitive Load Reducing Visual Communication Principles**

**The Setting and Circumstances**

Douglas Scully was a senior lecturer in the area of electrochemistry at the same university as the other participants, and delivered several undergraduate courses involving applied and physical chemistry. The first lecture of Doug’s that was observed belonged to a sizable introductory course in chemistry and was held in one
of the larger (and newer) lecture theatres on campus. The theatre adopted a classic layout of a few dozen rows of fixed-seating, descending to a central floor space at the front, all serviced by a central set of stairs. The main floor featured a bench at one side, equipped with the necessary controls, monitors and media equipment. The space was generally well lit with both natural light and controlled lighting, and the large central projection was bright and sharp. Roughly 200 students attended the lecture, bringing to about half of its maximum capacity, spreading themselves quite evenly throughout the available seating. Doug’s presentation style was quite straight, remaining behind the front bench and speaking directly to the audience, occasionally glancing up to the projection screen to refocus his explanations and direct his laser pointer. The students, while remaining generally fairly quiet throughout the presentation seemed restless or distracted, many moving to exit the theatre a little prematurely towards the end of the lecture.

Observations of the Presentation’s Visual Qualities

The slides used by Doug in the presentation were set to a green and white theme featuring a pale pistachio green band across the top of the slide to accommodate a title, and a forest-green, posterised close-up of a leaf that partially watermarked the background of the rest of the layout. The relevance of the environmental/leafy-green theme was not at all obvious to me. The titles were in rendered in Trebuchet whereas the main text was in Arial, and a comfortable configuration of margins was consistently employed. While this formatting initially gave an impression of consistency and style, the majority of the visual material placed into this theme suffered from several legibility issues, mostly to do with various choices in colour. Several graphs had used yellow for one of the plotted lines, making it almost impossible to detect on the mostly white background. There were instances where a line of text at the bottom of the slide was shown in red or dark blue, right over the top of the green of the leaf image, which was also difficult to read. There was a generous inclusion of text in the main, with the occasional appearance of graphs, diagrams, complicated formulae, and a small set of photos. Apart from the imagery associated with the theme Doug had used, the diagrams and imagery included seemed to be quite relevant and facilitated explanations of how some of the processes
worked. There were some slides, however that presented dense clusters of mathematical equations that were quite a lot to visually digest in one hit. Another curious inclusion was that a green tick was regularly used as the ‘bullet’ for some of the lists of points on the slides. It was not until I closely examined the contents of the lists that I deduced that the ticks were not actually intended to indicate that they were part of a process, to-do list or were marked as true statements.

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*Figure 5-10. Observational Evaluation of First Lecture Presentation by Participant 4*

*Information Revealed in the Interview*

Doug did not voluntarily or openly talk about the visual aspects of the presentation when given the opportunity to during the more open questions that I asked of him in the interview. He did, however, express a motivation to ensure a stronger correlation between what was being shown on the slides and what he was speaking about during the lecture. He explained that the slides were distributed to students electronically as a form of lecture notes and that an automated video recording of the presentation was also made available to them online. It eventually became clear that quite a number of the visual aspects of the presentation slides were not entirely the product of Doug’s decision making process as much as it was a case of convenience and entrustment. The theme that he had used was sourced from a colleague who had offered it to him, and the majority of images came from a pool of supplementary
instructional material that accompanied the textbook being used in the course. Very little thought had apparently been expended in determining if the theme made sense or if the use of green ticks against the bullet points were appropriate. He also expressed the opinion that there was really no point in searching for imagery from sources other than those provided by the textbook publishers, because they were all essentially the same and produced the same effect. It seemed that Doug had limited knowledge or confidence regarding the potential communicative power of visual material, having largely left the process of selecting it in the hands of others.

**Evidence of the Benefit of the Instructional Design Workshop**

*Information Revealed in the Focus Group*

Doug’s input during the discussion after the workshop reiterated the notion that there is a visual and verbal message being transmitted during a presentation and that the text that is shown can interfere with the words that are spoken. He expressed briefly that while this principle made sense to him, it was not something that seemed intuitive while in the process of preparing a lecture. He acknowledged the relevance of building the projected aspect of a presentation so that it takes a primarily visual role and the importance of making it compliment what is being spoken at any given time. He readily agreed with Margaret that these principles would be especially appropriate for research presentations, because it removes the pressure to provide a set of handouts or notes for the audience and grants the presenter the freedom to just speak freely to a small number of diagrams. He also suggested that the principles in the workshop would be most relevant to new academics who were still developing their teaching habits and resources.

*Observations of the Visual Qualities of the Subsequent Presentation*

A small, third-year course on materials chemistry hosted the second lecture of Doug’s that was observed. It was held in a well-worn and fairly small chemistry lecture theatre with an estimated capacity of 70 seats. Only 20 of the seats were filled, all prepared to hear about the topic of dynamic electrochemistry.
Doug’s slides had used a quite neutral theme as compared to the first lecture. A dark grey background was applied throughout, with white text in a sensibly sized employment of Tahoma. Almost all text had a sharp, black, drop-shadow applied to it, providing added contrast to lift it from the dark background. The hierarchy of headings, sub-headings, points and sub-points were all fairly obvious, and the bullets took the form of small green triangles or blue squares that also had drop-shadows. There was no photographic material, animation or other media featured in the many slides that were shown, only a regular inclusion of plain line graphs that were placed on pale yellow boxes and shoe-horned in around the text and equations that dominated the available real estate. Apart from some of the graphs being quite small and low in resolution, all of them were was quite uncluttered and legible. Doug used a laser pointer to indicate the various features of the graphs and diagrams on the slides, which was the only obvious form of visual priority applied to the non-textual material. Overall, as a piece of visual communication, the slide designs were consistent, but were quite monotonous, dry and unstimulating. It seemed fairly apparent that the lecture was simply an exercise in walking through an extended set of technical notes that the students had copies of.

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*Figure 5-11. Observational Evaluation of Second Lecture Presentation by Participant 4*
Information Revealed in the Interview

Doug once again managed to deflect or work around questions regarding the visual attributes of the slides and the principles from the workshop. He instead preferred to talk about his efforts to increase the clarity of what he was saying during the presentation and forming a clear understanding of the material within himself so that he did not have to rest upon the slides so much to prompt him. He was pleased that what he spoke about in this lecture corresponded well with what was displayed on the slides; an aspect he felt was weak in the first lecture I observed. When he was again pressed to articulate what he had visually re-worked for this particular lecture, he vaguely indicated that he addressed the appearance, the colour scheme and the positioning of content so that it was spaced out a little more. He also responded that the principle of simplicity was something that guided some of his decisions. This apparently manifested as an effort to not overwhelm the audience with entire pages filled with equations. As a point of further improvement, Doug felt that some of the diagrams he showed could have been bigger, with the resolution issues in some of them needing to be rectified.

Evidence of Longer-Term Transference

Observations of the Presentation’s Visual Qualities

As the third of Doug’s lectures to be observed was from the same course as the second, it was no surprise to find that the same layout, style and formatting was used for both of them. Upon further scrutiny, it seemed from the slide numbers at the bottom of the layout, that they were also being delivered using the very same file. Again, the only visually illustrative material present was in the form of line graphs and simple diagrams, all of which were fairly consistent. Some of the diagrams, and the labels on them, seemed to be lacking anti-aliasing or smoothing, making them a little harsh on the eyes and difficult to read. Doug frequently used the laser pointer again as a form of highlighting, often when attempting to dissect and unpack large and complex equations. The equations and formulae in question were typically riddled with mathematical symbols and functions that were completely alien to me. This may have contributed to my own interpretation of how busy and overwhelming
the slides often appeared. One diagram featured a zoom-in/close-up of a single section – a good example of establishing a focal point. The rest of the presentation was unfortunately quite mechanical and repetitive, with no significant visual stimulus or crux upon which to relate to or remember.

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Figure 5-12. Observational Evaluation of Third Lecture Presentation by Participant 4

**Information Revealed in the Interview**

Doug seemed to be quite happy with how the lecture played-out, feeling as though he got the main points across well and explained things thoroughly. Again, no mention of the visual aspects of the slides was voluntarily made in Doug’s responses during the interview. Indeed, it seemed that because they were part of the same set of slides from the last lecture observed, the majority of work (applying a theme and repositioning the graphs in it) was regarded as essentially complete, with little more done to it since. The only additional information offered regarding the visual material used, was to reiterate that there was a prescribed textbook for this course as well, which came with a bank of various graphs and imagery for precisely this purpose. Although, from other descriptions of the design process, I also understand that some of the graphs were produced by Doug himself, using various, non-specialised office software.
Group Generalisations

Evidence of Pre-existing Cognitive Load Reducing Visual Communication Principles

Clearly, all of the participants were already using some of the VCP in question to at least some degree. On a typographic level, all of the participants used headers that were distinguished by either a change in point-size, weight, typeface or colour as distinct from that used for bullet points or paragraphs. Several of the participants were using bold as a focal point mechanism to bring attention to key terms, and phrases. While fairly unadventurous and generic, their typeface choices were universally kept neutral and did not overtly or semantically clash with the topics being presented. Although the use of laser pointers was quite common as a way of creating a focal point, very few examples were built into the imagery itself.

Apart from the occasional breach of margins to accommodate for more text, the layouts employed by the lecturers remained fairly consistent throughout their presentations. There were certainly no strange or lurching transitions from one layout to another, and those presentations that belonged to the same course tended to remain visually similar in style and appearance as well. The use of themes, albeit often pre-made and supplied with the software, seemed to be a very common method of achieving this. The themes employed, though, did not typically facilitate the combination of imagery and text together in a defined grid structure, which was what many of them tried to do.

The most notable negative trait found in the participants slide designs was the over-abundance of text. There were very few instances where a single slide did not feature text of some description, and the typical tactic seemed to be that of filling the slide to maximum capacity (and beyond) before considering a separate slide or an alternative way of transmitting the content. It was never the case that when large quantities of text were shown that the presenter ceased talking long enough for the audience to read the material. This left the presenter with two options; to read the text aloud verbatim, or to speak a different set of words over the top of it. Most of the time, presenters chose to do the latter, creating a split-attention effect.
The imagery that was employed by the academics was largely diagrammatic in nature, although the use of photos to depict the appearance of the subjects being discussed was also fairly common. Very few of these images were actually generated by the lecturers themselves, with many of the diagrams and illustrations being sourced from teaching resources purchased by the university. The use of imagery to draw metaphoric parallels with other scenarios, applications or concepts was not quite as common, but was done reasonably well when they were used. Unnecessary clip-art and thematic embellishment was surprisingly almost nonexistent, with lecturers electing to stick with plain text as the content rather than decorate their slides with extraneous cartoons or meaningless pictures. The use of video-clips was noted on one occasion, providing a quite informative, stimulating and memorable illustration.

The deliberate use of progressive disclosure to make complex material more digestible was not strongly employed. Complex equations or diagrams were generally shown in their entirety (often alongside other material as well) and only dissected or unpacked through verbal explanations rather than visual ones.

Legibility and readability was not observed as being a large problem with the visual material being presented, apart from a general overcrowding and lack of space between visual elements. However, there were a number of examples of resolution or pixilation issues with some of the imagery used. This caused particular problems if these images and diagrams were labelled or captioned. Sometimes a poor choice of colour or positioning also interfered with how easily selected text could be read. This problem occasionally extended into some of the visual components of graphs or diagrams.

**Evidence of the Benefit of the Instructional Design Workshop**

In the main, all of the participants seemed to agree that the principles and advice put forward in the workshop were sound, valuable and worth implementing. This can be seen in some of the following responses to the focus group questions:

*I mean, most of the presentation techniques, I mean, it’s good to be reminded of them, because you don’t, you know, and I’ve been to presentation things before*
went “Yeah, that’s right – I’m supposed to do that [laughter from others], and I’m supposed to do that.” And… …it is nice to re-visit those things.

– Margaret, focus group.

…it’s all good, solid advice… …I think they’re highly useful.

– Mick, focus group.

One particular aspect or principle that they all seemed to readily identify with was the principle of simplicity. It was almost invariably the first principle that the participants mentioned when asked about what it was they took onboard from the workshop. However, evidence of the principle being implemented in subsequent presentations was often difficult to detect. A very modest reduction was witnessed in regards to the amount of redundant text on their slides, which seemed to be linked, in most cases, to their desire to still have the PowerPoint file double as a set of notes for the students.

An improvement was noted in the overall tidiness and consistency of organisation in the slide designs, with more attention being paid to alignment and spacing. Breaches of margins were not as common, collision of visual elements improved slightly, and instances of poor legibility and readability generally decreased as well.

Several deliberate endeavours to break-up or progressively disclose dense or complex material were witnessed, using either transitions built into the authoring software or slightly improvised derivatives. Unfortunately, these examples were often overshadowed by being the meat in an otherwise text-saturated slide-sandwich.

Many of the technical issues, such as image resolution and quality, did not change significantly. The participants’ choice of typefaces and colours shifted very little as well. With the exception of being a little more selective about what might make an appropriate bullet for the bullet points, the semantic value of the imagery used also remained fairly constant.

The graph below shows the results of all of the observational ratings of VCP combined and grouped into the three sets of lectures involved. The four columns within each group belong to the four participants respectively from left (Participant
1) to right (Participant 4). The columns have also been coloured to show the proportion of how strongly the presence of each visual attribute was noted. Red representing attributes that scored a ‘No’ on the Likert-scale, and dark green representing ‘Yes’. To tally the results, each step in the Likert-scale (5 in total) was assigned a value from 0 (No) through to 4 (Yes). As such, the possible values available for a lecture observation ranged from 0-40.

**Comparison of Levels of VCP Observed in all Lectures**

![Figure 5-13](image-url)

As the graph shows, the general standard of the lectures before the workshop represent a fairly moderate but passable collection of presentations. There are generally more things going right than wrong, but there is plenty of room for improvement. The second group of lectures show a general improvement after the workshop, with the presence of various VCP becoming more evident. Some of the poorer aspects of the presentation are corrected somewhat, and the middle-ground (yellow) shrinks to make more space for an increase in positive visual attributes. The third set of lectures, however shows a slight slump, where old habits and characteristics return and weaknesses start to resurface.
The following graph shows the collective results of the ten indicators observed in the lectures. The three columns above each indicator label represent the three lectures observed; first lecture on the left through to the third lecture on the right. The bands within each column represent the scores from each participant; participant one at the bottom through to participant four on top. The green bands show where an improvement has occurred and the red represents a decline.

**Comparison of Levels of VCP Observed in all Lectures**

![Figure 5-14. The weighted and tallied results from all observations grouped by VCP indicators.](image)

Clearly, the largest issue discovered with visual aspects of the presentations was the quantity of text found in the slide designs, which improved only slightly after the workshop. With the exception of including more visual illustrations and capitalising on the semantic qualities of typography, all aspects of the slide designs generally showed signs of improvement. However, aspects relating to visual priority the orderly organisation and alignment of visual material tended to decline again. The only aspect that seemed to show a sustained improvement was the visual simplicity of the material being presented.

**The Multiplicity of Purposes Served by the PowerPoint Slides**

An interesting finding that surfaced from the interviews was that not a single participant had created their PowerPoint presentations for the sole purpose of visually accompanying and reinforcing the delivery of their lectures. Three of the participants stated that their PowerPoint files also doubled as a set of lecture notes that were distributed to students, usually before the lecture was delivered. In at least
two of these cases, the lecture notes were quite comprehensive. The following responses reflect the visual impact of this additional purpose:

*Um, this, compared to the other lecture that you sat in on, this is, this group is easier to have a nice presentation put forward, if you like, because the content is not so great in terms of depth of detail that we need to go into. So, that’s easier to have nice slides [laughs]. Um, whereas, the earlier lecture that you came to was the top-level physiology for the, has a lot of content in it. So, I guess you tend to put more on the slides as well because they’re used for notes.*

– Margaret, second lecture.

*And that’s the same struggle I have. That, I think, as we’ve already talked about, my PowerPoint slides are trying to fulfil two purposes: 1) Providing the students, you know, with a PDF of a complete, complete set of notes that’s self explanatory. But then also something I talk to during lectures, which means there’s lots of stuff – words appearing on the slides, which I don’t actually want them to read while I’m speaking, but they’re there because I want them there for the notes. So I guess I’m sort of wrestling with, what do I do about that?*

– Ivan, focus group.

All of them regarded the slides as a pacing mechanism to keep the lecture running on time and to prompt them of material that they did not wish to neglect mentioning. This, of course, was another factor influencing the appearance of the presentation slides:

*Whereas, with lectures, you know, I know this isn’t the ideal world, but sometimes, I might be rocking-up giving a lecture and, in spite of best intentions, I may not have looked at it since I gave it last year. And so I actually, I need all that extra words that clutter on the text, to some of them to remind me, “Oh yeah, I need to make sure I mention this, this and this.”*

– Ivan, focus group.

*I know, I teach seven different courses, and so, trying to remember each little bits from each one is, ah, from week to week, from day to day, hour to hour in some cases, is, is challenging.*

– Doug, focus group.

It almost seemed as though one participant was using the lecture-building process as a means of generating an academic paper.
Um, sometimes I'll just write complete, ah, you know, four thousand word lecture notes and never refer to them again. Um, and that's it expanded as far as it will go in that particular time. So, I can give it to you as a big chunk of information, I can give it to you as a PowerPoint, I can give it to you as a summary, I can give it to you as a couple of paragraphs, I can give it to you as a sound-bite.

– Mick, first lecture.

Design Process and Planning

In terms of preparing for the lecture and building the lecture slides, all of them first made themselves familiar with relevant literature in the field. In the case of two of the lecturers, though, the primary (and perhaps only) literature consulted was a standard textbook that the students had all purchased for the course. Both of the academics who described this in their design process explained that these books came with an extended pool of teaching materials and resources that was available to them as instructors by logging onto the publisher’s websites. These resources, along with a small contribution of other sourced or personal material was used to populate the slide layouts. In the other two cases, the lecturers read more widely, amassing a collection of information that was gradually distilled until an amount that could be explained verbally in the allocated time for the lecture remained. Additional imagery of relevance was then typically crammed in around this text as an afterthought to the design, with more images added or swapped-in as the academics happened to collect them.

As a point that was raised in the literature, the issue surrounding the amount of time needed to produce or modify a PowerPoint presentation became a reoccurring comment made by the participants in relation to the design process. This seemed especially so when faced with the task of implementing VCP.

I think the time thing is the, the main thing. I mean, I’d really love to have a nice-looking presentation. Like, I, I’d really, you know, get enjoyment from that, but, um, sometimes it’s just like, “That’ll do”, you know? “I can’t be bothered fitting that text in nicely – it will have to do”, you know? – Margaret

Probably the time – I would agree. But, ah, while I still teach the, the same courses, um, the, um, the, the effort to, you know, upgrade them, maybe change them, review them, from year to year. Um, you know, all good intents after you’ve finished the, finish a course in one year, but you come back to do, do it the next
year, and you think, “Ah, I should have done that, but didn’t get around to it.” – Doug

Well, except for there’s time, limited time, so, I, I understand the concepts, and give me a, a, you know, give me a day to prepare each one-hour lecture, and you know, I’ll happily make lovely slides. – Ivan

Look, I haven’t got time to make any changes… …if I had to spend an extra half a day, or a, an extra day, it won’t happen… And, if I had time just to do PowerPoints during the week, I’d probably implement them a little bit more… If I had time to do that, then sure, I’d do that, but I’d have to transfer lots of other work into other spaces so that I could do it that way. – Mick

Because of external pressures on the research program and the unfortunate timing and slow start of the recruitment process, a lack of time was also an issue that eroded the opportunities for the participants to respond to the workshop. As shown in the following timeline, while the intention to observe the delivery of the presentations that the participants were being helped with during the workshop occurred as planned, the time available for them to apply the principles to another presentation after that was very tight. As mentioned earlier in the chapter, because several of the lecturers had elected to not run a lecture in the last two weeks of the semester (dedicating that time to revision and assessment tasks), the expected opportunity to observe a third lecture was cut short somewhat.

**Days Between Lecture Observations and Workshop**

![Timeline Diagram](image-url)

Figure 5-15. This timeline shows when each of the lecture observations took place in relation to the workshop. The left side marks the initial lectures observed, and the right side the second and third.
Conclusion

The four participants involved in the study represented a diverse set of disciplines and lecturing styles. They had class sizes varying from 15 through to over 300 and delivered their presentations in a variety of settings, utilising a range of equipment and media. Their combined lecturing experience spanned from middle-level academics who had only been teaching for a short number of years, through to associate professors with many years of teaching experience, addressing every year level of undergraduate study between them. The commonalities identified in this assortment of lecturers regarding their use and adoption of VCP has painted an interesting picture of the commonalities that might be found in many other academics. There was a strong tendency, for example, for the lecturers to include very large quantities of text in their slides, generating a classic case of the redundancy effect and the split-attention effect. There was also a strong resistance from them to scale back the quantity of text, despite being aware of some of the cognitive benefits of doing so. There was a universal affinity with the notion of de-cluttering and simplifying their presentation slides, which seemed to result in an effort to space the content to the slides out a little and conduct a general tidy-up.

There is data here that hints towards some of the reasons behind this apparent attachment to showing the audience large blocks of text without giving them the head-space required to read and understand it. There are also a few clues as to why some of the other principles were not adopted and implemented more enthusiastically. This is not, however, the full amount of data that was gathered. It is not the whole picture of what transpired. There is more of the story to tell.
7. Results Regarding Resistance to Change

Introduction

Structure of this Chapter

In this chapter, a collection of material (initially regarded as largely peripheral) has been organised so as to reveal a secondary set of results pertaining to a resistance to change from the participants. This is shown in several themes concerning the attitudes, beliefs, preconceptions and predispositions amongst the academics involved and are supported by quotes taken from the interview transcripts as which were correlated with observational notes and evaluations.

As explained earlier in Chapter 5 regarding the data analysis techniques employed, a process of allowing thematic outcomes to emerge from the data instead of imposing a set of pre-determined codes was conducted. As a result, a set of four main themes was detected which were used as a categorical set of codes for interpreting the interview transcripts and observational notes. Those themes are and their corresponding sub-themes are described in the following results.

Themes of Secondary Data

The Content-Driven Pedagogy Barrier

The Influence of Textbooks

Of all the lectures observed, about half of them belonged to courses involving textbooks. In most of these cases the textbooks were not only used for the supplementary images and teaching resources that came with them, but were also dictating the topics, contents and sequencing of the lecture material.

…for example the series of lectures this week are a chapter in the text. Right? So, that’s basically divided up into three bits, Um, that chapter in the text, um, and
then I’ve gone through and pulled out the key points that I think are important from the text. Um, and that is what the, the lecture notes/slides consist of.

– Doug, first lecture.

Um, well we do have a set text for the, the book, for the course, and so, we do try to stick, where possible, to using the illustrations that come from the text books, so that the students can then locate the information fairly easily – the relevant parts within the text.

– Margaret, first lecture.

It was the first point of call, and, um, we have changed texts, texts – we changed last year. So, it was in a process of going through “Well I’ll have to swap all of these for the ones that, you know, but you can’t always find an equivalent, so, it’s now a bit of a, a mixture of a couple of different texts, plus some extra, um, ah, figures that have come from, um, like, the PubMed books, sort of, resource online.

– Margaret, first lecture.

These lectures consequently tended to adopt a linear, encyclopaedic tone and structure with no broader, thematic conceptual framework or context. All of the lectures certainly had a title of some description; one that I assume is similar to the title of the textbook chapter it is based on, but many of them lacked any significant landmarks or climax.

**The Absence of a Crux**

Adopting a stream of related of information in this manner often meant that there was no “take-home message” or single, powerful, embracing idea or point in mind when composing the lecture (Brophy, 2000) – it was simply a description of facts or a list of topical components or processes. One of the questions asked of the lecturers after each presentation was “If your students were to take away only one main point from that lecture, what would you hope it to be?” The purpose of this question was to gauge if the most important conceptual material that the lecturer was trying to communicate aligned with the focal points and hierarchies observed in the visual material they used. What it particularly (and unintentionally) revealed was that many of the lectures observed didn’t really have a definable main point. The following responses from the participants demonstrate just how difficult they found this particular question to answer:
Um, I mean it’s going through the, the different structures, so each of them had their main point, but probably, the overall message of the, the last couple of lectures is the complexity of the cell and the way in which they’ve, you know, compartmentalise different functions to different, sort of, structures, if you like… But, um, I mean it is a, a content-heavy course, and so, just, you know, getting that across would not be enough for them to, but they need to, you know, assimilate the details as well. So, there’s actually a lot of messages in there.

– Margaret, first lecture.

Um, I would hope that there’d be more than just one thing. Um, because I know in the past I’ve asked questions about multiple things that were in that lecture…

– Doug, first lecture.

I don’t know that there’s a main point, I mean, because, it’s describing a process, so, it’s the, yeah, um, I couldn’t really put it into saying that there’s a take home message.

– Margaret, second lecture.

I know you always ask that, and it’s difficult to put a main point, I guess, there’s not a single take-home message. But, um, because it’s looking at the process itself rather than a take-home message. So, I always find that question very difficult to answer.

– Margaret, third lecture.

Even in a case where it was stated that there was not a set textbook involved in the course, this question still tended to elicit faltering and unresolved responses:

Yeah, there wasn’t one overall point to those three lectures [referring to a single lecture that ran for 2 hours], they were, I mean, the first two sort of linked together, because it was looking at two different ways of trying to achieve the same goal.

– Ivan, first lecture.

[long pause] Main point of the lecture… I guess, it was a whole lot of background about absorption and, and the… so, it was, yeah – introduction to absorption.

– Ivan, third lecture.

**Dependency on Detail**

In the lectures observed, the participants had demonstrated various levels of loyalty to presenting comprehensive and detailed written content in the most complete and
explicit manner that they could manage in the time available. This was characterised in the slide designs by dense collections of facts and information divided by headings and sub-headings rather than identifying and illustrating overarching conceptual truths or conundrums. It was a tendency that was also described in some of their statements regarding their design process:

*It’s covering the same thing, if you like, but it’s just going into a lot more detail. Like, if I was just giving that lecture to the, the other students, that you visited before, I’d be going into this step-by-step in the, like, so, in the metabolism, what’s happening in that oxidative phosphorylation process, which is, you don’t need to know about it, you just need to know it makes energy. Whereas, in the other lecture, I’d be going “Well, this is how it works. And, this electron gets passed to this co-enzyme and then it goes to this co-enzyme, and then that, you know…*

— Margaret, second lecture.

*I expect that most of what students need to know will be stuff, content, in the lectures. So I’ve always got in the back of my head; one is that I need the content to be there, explicitly enough so that, you know, it makes sense in reasonable isolation. But then, that I’m also, in tension with that, I, I want it to be, um, concise and interactive enough to make a good lecture.*

— Ivan, first lecture.

Once again, the set textbooks for the course are mentioned as being one of the main drivers or justifications for this approach to delivering lectures:

*So, I mean, any general chemistry textbook is the same. Right? That’s the same, I’ve got, maybe, half a dozen of them in there, by different authors – they’re all the same. Um, they start here, they move on to this, this and this, they step through everything. They cover everything basically in exactly the same way. Um, it just goes to show how, um, ah, similar, you know, general chemistry lectures/courses are, across the, across the world, really.*

— Doug, first lecture.

Of the four lecturers involved in the study, there was only one who managed to confidently and immediately articulate the main point of their lectures in every interview. The main point was usually quite thematic, conceptual or philosophical in nature, and yet there was still a concern that there was not enough time to include all of the detail necessary in an hour to properly illustrate this one message:
Because as soon as I get, I get through all of that, “Yes, yes, yes, that’s all fine, that’s ok.” Here’s Habermas and the public sphere, in one slide – that’s it. That’s an entire life’s work in one slide. I’ve simplified that as much as I possibly can. This is a very complex set of ideas.

– Mick, focus group.

The problem that I’ve got, is I’ve got to get a lot of material - I think I’ve said this to you before – a lot of material across within one hour. I’ve got to take a whole series of thinking about one massive issue inside the discipline, condense it down to an hour. So it’s heavily, heavily condensed. But it’s also dense.

– Mick, second lecture.

The combination of a heavy use of textbooks, the lack of a main point in the presentation and a reluctance to shed extraneous detail all seemed to indicate a strong reliance upon content to provide the substance of the participants’ lectures. This predisposition appeared to be habitually, even stubbornly, ingrained in their practices as lecturers.

Pre-existing Pedagogical Assumptions and Attitudes

Teaching to Personal Learning Preferences

As has just been pointed out, there was a strong propensity for the participants to opt for explicitness rather than abstraction when designing their lectures. This was not the only teaching philosophy or practice that surfaced during the study. Some of the beliefs that the participants held about teaching and learning were a little more self-identified in their responses, one example being in regards to individual learning styles:

It’s a lot easier if it’s a visual, rather than a verbal, and it’s a lot easier because there is a lot of information, I think, to recall it and remember it, and, which is probably, I know, it’s a particular learning style which is probably the one that I, I have, but then, pity the poor verbal students. I guess, that, um, which I know the speech pathologists probably do fit into that a lot more, and they do struggle.

– Margaret, first lecture.

I’ve still got my lecture notes from when I was an, ah, undergrad and I consciously, almost, would write things out verbatim. Though not quite, and I, I would eventually after a while, in doing that, I’d get used to the structure of
whoever the lecturer was, what they would do, and so-on. It became dead-easy, and eventually I could just simply read the thing off. Um, but I’m, I’m not typical to most students… I want them to have, to have a, ah, ah, a dense set of knowledge in their head. Not a, by that, I don’t mean impenetrable, I actually mean for them to have a lot of stuff in there, um, because I do.

— Mick, focus group.

In each case, these sorts of comments seemed to show that the lecturers were aware of their own preferences for how they acquire knowledge and that this is what governs the way they design learning situations for others. What they also show, is not only an awareness that there are students in their courses who have a different set of learning preferences, but an open indifference the possibility that their lectures are likely to disadvantage these learners. Further to this, there is an acknowledgement that these preferences extend from their own experiences of being taught, and that these experiences are worth re-creating:

Because I was the same when I was a student. I was just sit in it and go, “It all sounds really interesting”, and occasionally I’d drift off. and you know, I’d either have a look at the colour of the lecture theatre and then I’d come back, and whatever. The only way I would have focused for an hour was to write notes, so I wrote notes. Some people are not like that or whatever.

— Mick, first lecture.

It’s how I worked when I was an undergraduate. Um, um, my job is to actually get them to, is to get that in there, in whatever manner I can. I, it’s, it won’t work for everybody. It might be a completely different process works for that group of people there, but I’m hoping to hit the bulk of them.

— Mick, first lecture.

Low Value of Undergraduate Teaching

A stand-out comment made by the participants after the seminar workshop was that they were particularly interested in transferring these principles to the context of producing presentations for conferences, presenting a academic papers or guest speaking in a similar situation.

I think it’s the difference in doing a, you know, when do a, you research presentation then, it truly is just, it’s a presentation, it’s not some, like, someone’s going to pour over later and, yeah, be examined on.
- Margaret, focus group.

Yep, now that you mention it, I think, what, what I saw today would probably be more appropriate for a research presentation in my area. Because, like you’re saying, I want students to have a complete set of lecture notes. Whereas in a research presentation, where you, you might base it on just a, a graph of data, ah, with a couple of key points under it, or something like that, ah, during a, during a presentation.

- Doug, focus group.

While this was a perfectly practical and feasible suggestion of an additional context that the workshop’s tactics might be applied to, it seemed to offer a surprising insight into the value they placed on their various audiences. There were a number of other comments made that also seemed to carry a slight undertone regarding the value of undergraduate teaching:

And, also, as you say, like, it takes a few years to get your, your time back, and I have been swapped around classes quite a bit. So, you kind of go “Mmm, I’m not going to put in too much effort on this if I’m only going to have it for a year”. Do it once or twice, then what’s the point?

- Margaret, focus group.

It takes a lot of time. It’s a labour of love, you don’t get back that time.

- Ivan, first lecture.

These concerns were not expressed when discussing the prospect of investing VCP in a presentation to their research peers, however. A comparison was apparently being drawn between the value of assisting a large group of novices to join their own field and the value of making an impression upon a small group of specialist in it.

The Keepers of Knowledge

These values seem to suggest something of an academic hierarchy – particularly when placed in the context of several other comments made about the role that the lecturers felt they served and facilitated. In one particular case, this academic hierarchy is one that firmly projects the lecturer as being at the top, leading the way for the others.

I mean, I’m, in some ways, a role model to them.
Now, and this comes back to the question of quotes, what are we relying on for these undergrads? It’s this one – it’s authority.

Um, some people have gone, “Ok, that seems to be important – he’s used that a few times.” I don’t, I haven’t pointed this out to them. And they’ve gone, “Ok, I’ll scribble that down.” Or, I’ll get a, I’ll get an email and say “What was the reference that blah-blah-book…” or whatever.

And unless, I’m doing it, up here, firstly, I’d be a hypocrite, but, what I’m really interested in is, is, what are we, what are we doing here at university? What, one, one of the things we are actually doing is saying, “This is how you accumulate knowledge.”

- Mick, focus group.

As mentioned previously, the lecturer in this case had engineered the course in such a fashion that the only way that students could access the course material was via interactions with the lecturer during class or otherwise - forcing students to attend the lectures and tutorials. While the same lecturer regularly advocated the use of the library and the seminal works of his predecessors, there was an overt impression given that he was just as much a disseminator of knowledge as a facilitator of learning. The way that the tutors in the course were organised, for example, suggested a certain chain of command at work:

Um, and then towards the end, um, and hopefully the tutors are going to do this, because I actually give this lecture to the tutors on Monday morning. Um, very quickly – I take about half an hour and go through the lecture with them. Um, and that starts straight off the PowerPoints, you know, like, in as I print the PowerPoint out and I take it around and we talk in their tute room about it all.

– Mick, third lecture.

Privileges that the students were not afforded (access to the PowerPoint files and notes) were given to the tutors after receiving a shortened version of the lecture themselves. Amongst these comments was also the view that the lecturer is the gatekeeper for the discipline:

At 3000-level, if you do not know how to write an essay, you do not know how to reference, and most importantly, you can’t do some research in order to find out what is true… then we haven’t done our job here, and you do not deserve your degree. In other words, our standards will start to fall.
Keeping Students Attending and Busy

There was a belief vocalised by several lecturers that if they did not engage the students in enough activity, they would not absorb the material being presented and perhaps even disengage from the learning process altogether. As revealed in several earlier quotes from one participant, there were quite a number of simultaneous tasks given to students during the lecture – a scenario certainly entering the territory of cognitive overload. The approach that was becoming quite evident in these comments was that keeping students as busy as possible is what was required to make them concentrate.

Now let’s take the reading part away, and let’s just have the talking part, yeah? How quickly do you start day-dreaming?

– Mick, focus group.

In a slightly milder case, one of the other participants capitalised on the small numbers of students in his course and used the opportunity to inject sessions of interaction, brain-storming and student participation in order to stimulate engagement:

So, unless they’ve actually come to the lecture and, and wrestled with the problem and then seen what happens when I, you know, un-blank it, they won’t actually know what the answer to that problem was unless they’ve come to the lecture.

– Ivan, first lecture.

There was also an assumption from some of the other lecturers that if the information they presented was made available in other forms, the students would opt to use this alternative material rather than attend the lecture itself, which was viewed as a mostly negative outcome:

...it’s a, it’s a way out for students not to attend. I mean, and, it’s a, um, ah, it, it can be a, a crutch for them. Um, if they’re, oh, you know, “Oh, I’ve only got one, one lecture today, it’s between 6 to 7 at night. I’m not going in there if I’ve got like a half-hour commute to uni, to sit through a 1-hour lecture. I’ll just sit at home and download the slides and the, the actual, you know, the, the words that were said. You know, I’ll just have the same benefits as everyone else.” So, um, I
don't, in that regard, ah, I don't, don't like it that way. Um, but for people who work and actually physically can't be there, um, then, certainly it's a benefit.

– Doug, first lecture.

Linking to the earlier inferences that there was a preference for students to be primarily sourcing the information from the lecturers, it would seem that there is a certain level of resentment attached to the absenteeism of their students, or at the very least, a concern that their education is at stake as a result.

This collection of observations of the participants reveal several attitudes and beliefs regarding the general nature of learning and their responsibilities for facilitating this learning in a tertiary educational institution. Deliberately ignoring learning styles other than their own, having a low regard for undergraduate teaching and generally keeping students extremely busy not only presents us with evidence of the participants’ pedagogical approaches, but of just how ingrained and resistant to change some of these practices might be.

**Self-efficacy, Confidence and Ego Defence**

**Pressure as a Performer**

By proposing a reduction in the amount of written text in the participants’ presentations and suggesting that such material be spoken instead, I was inadvertently removing the ability for them to rest heavily on the slides as a mechanism of keeping them on track. It meant that the lecturers had to know the content of the presentation thoroughly and rely more on their knowledge, memory and public speaking skills, placing pressure on them as presenters:

> I mean this all comes back to the better you understand your own material, the better you can talk to just a picture. But if you’re coming at it raw and ready, you need the extra words up there just to give you something to say.

– Ivan, third lecture.

As can be seen in most of the interview transcripts, the lecturers were quite capable of speaking freely and fluently on the various topics covered in their lectures - even when it was on a subject that they had not lectured on before. The prospect of not
having text on the presentation slides seemed to the participants to equate to a more difficult lecture to deliver. To make the task of delivering a lecture an easier one, they all preferred to include written prompts to the slides as opposed to a separate page of notes.

Ivan: Because that’s not going to, that’s not going to be hard to do… as long as, as long as I know that material well enough that I don’t need the text to prompt me, for what I, I need to say, um, yeah.

Interviewer: Well perhaps having a, a copy of the, what you’ve given students, in front of you…

Ivan: Yeah, I mean that gets complicated, and then you’ve got, that’s something I, I think I can do with, with new ones. And, maybe even retro-fit some of my current slides as, couple of pastes put on a next slide, hide that slide during the actual talk, then printing out the notes. So, yeah, that’s, that won’t take too much time.

— Ivan, focus group.

As the above section from the focus group reveals, the suggestion of having a set of lecturer notes in front of them as the prompts (instead of it being integrated with the slides designs) was met with an initial resistance and an expectation that this arrangement would create difficulties. Without an immediately available reason or explanation to justify rejecting this tactic, the response gradually turns around to an admission that executing the idea would not be as problematic or complicated as first thought.

**Insecurities Regarding Authoring Visual Material**

One of the participants in particular consistently avoided talking about the visual aspects of his presentations throughout the interviews and had seemingly designated the bulk of that responsibility to premade or supplied themes and imagery. On two occasions during the focus group, this participant voiced an opinion that the principles discussed were much more applicable to other circumstances or people (as opposed to himself in the specific scenario of designing a set of lecture slides). As quoted earlier, the first of these deflections was in regards to creating research presentations. The second was to new academics who still had the ability to take the advice on board:
Well, also, it'd be probably relevant to new staff members, actually, be coming on in designing their lectures for the first time. Um, like, “I think, I gather, you’re have difficulty actually changing, you know, some of your slides.” So, but for a new staff member, who’s, you know, maybe a bit more malleable, perhaps, this might be a good, er, um, session for them to, er, work out, this is a good way.

— Doug, focus group.

While this tendency to shy away from creating or manipulating visual material was not as overt in the other participants, there was visual evidence to suggest that this may have been the case with several of them. Two of the participants had designs that were intended to be “minimal”, both producing slides that were essentially black text on a white background, in a default or common typeface, and using a grid-structure no more explicit than a default margin around the edge. Yes, they were minimal, but the level of polish and sophistication they demonstrated suggested they were better described as “plain” rather than having the more refined trait of being “simple”.

Territorial and Ego Defence

Another participant responded with a frequently dismissive and generally threatened attitude as the study progressed. This participant was the only academic who did not take part in the focus group, responding to the focus group questions in a later interview, which was when most of these attitudes revealed themselves. The workshop material that he was provided with (or possibly even my own presence) seemed to evoke quite a defensive stance, which firstly took the form of defending his own discipline, and by extension, his own practices:

Um, there’s a fine balance between, ah, um, making things simple, and making things too simple. Um, I’m not sure, in a words-based course like Communication, that turning everything into a picture was the wisest thing possible.

— Mick, focus group.

In the same vein, this comment was then followed by an assertion that the principles promoted in the workshop material should remain within the discipline it came from:
Ahh, I think, I think if you were a designer, and you took on the notion of, ah, font types and so-on, that’s crit… I think, critically important, for a visual communication person and a designer. I think it’s far less so for other people. So, you get yourselves… It’s obvious to me, in your PowerPoint, that you’re coming from a set of discourses. A very, a very specific set of discourses, which is fair enough. Um, I’m not sure that’d be applicable everywhere.

— Mick, focus group.

This then developed into several efforts to project his authority in his field. Firstly, he offered criticisms of the video version of the workshop presentation, which was produced for him as a substitute for the actual workshop that he did not attend.

Um, I’m also a sound person as well, [laughs]. So, what I heard in the presentation, was the presentation being read. Read very well, but I heard it being read. Um, and, I also had to turn the sound right up, which I found rather ironic, because, here’s someone teaching me how to actually present material visually, and the sound, in fact, was a real problem.

— Mick, focus group.

Then, he makes the effort to impart some of his knowledge regarding quality communication and the principle of simplicity, using various images from around his office as illustrations.

I know, exactly. I know. But, but, what you’re saying in terms of the visual is equally applicable to the, the audio part of communication as well.

Ah, I, I’ve got no problem at all, about implementing simplicity. Simplicity, to my mind, is a complex thing. Ok? How… actually, there’s a, there’s a piece of simplicity over there for you, and that you would understand very well. See that piece of paper there? On the left hand side?

Does that make any sense to you?

I could probably rave on for a while. [laughs]

I guess what you’re, guess what I’m doing is what a typical person like me would do, is I’m looking underneath the principles. And thinking, “Hmm, is this true?” which is the mark of the critical thinker.

— Mick, focus group.

In every interview conducted with this particular participant, an effort on his part was made to re-deliver parts of the lecture or to point out aspects of the theoretical
content that he believed would be relevant to me or the research I was conducting. So much so, that the transcripts of his responses accounted for nearly half of the entire contributions of all four participants combined. The size of the transcript of his responses to the focus group questions alone more than doubled that of the actual focus group, which documented the interactions of four people. It seems unlikely that he did not understand the purposes behind the observations of his lectures, however he seemed convinced that I was keenly interested in having a private tutorial on each topic he presented. At one point towards the end of an interview, he even decided to take over the role of the interviewer in order to ask questions regarding the rigour of some of the research and theories that underpinned the study I was conducting.

There seemed to be several inaccuracies in Mick’s understanding of the principles in the way that he described them. There seemed to be misinterpretations of what the principles implied and how they were intended to facilitate clarity. For example:

So, yes, I actually quite love simplicity. That doesn’t mean that everything disappears.

— Mick, focus group.

Initially, I suspected that it may have been a problem with the way the principles had been explained or presented. However, because these descriptions were often incompatible with other comments he had made, it seemed more likely that these were criticisms by way of a deliberate exaggeration or by taking them out of context. For example, a justification for keeping the text in his presentations was that he felt he was able to understand more from the handout I had provided to him than from the video presentation of the workshop:

So, so, um, what, I was well aware, when I was watching the PowerPoint slide, not of your visuals – they were distracting, but of having just read this information. And, you were saying, I think at one point, that it’s much easier to get information across through a, er, er, you know, though pictures and so-on, and they’re not going to take it in through reading and so-on. But the problem for me was, when you said that was, well, I read the stuff first… But I, but I’d read the written for… and, and I’d got, to be honest, I got most of the information that you’re trying to tell me from the written form.
At several other points during the interviews with him, though, he had explicitly stated that the text that he put on his slides were only for him as the presenter, and that he deliberately refused to give his students any written material in any other form. In the above quote, he also decides to ignore the fact that the written material was not actually part of the presentation, but a separate supplement to it. In another example, he draws the assumption that the workshop was advocating that only a person’s voice or a single image should be used in a lecture presentation in isolation. He expresses this conclusion in an explanation of how many sources of information or tasks he thought should be involved in a presentation.

So, no, I would want a combination of things… Not single factors, but multiple factors coming together… …all of those multiple factors interacting. So, on principle, a, a, a single set of messages, probably, for me. I think there, I think there are, a, a point where those multiple factors become overwhelming, but I don’t think you can reduce it back to a single one. You go, “Three, four, five, what… oohh, I’ve lost…”, yeah? One? – I’m bored shitless. And I keep going like that. So I day-dream – I go off somewhere else. Um, two – I don’t find that a problem. Three, is probably the maximum I can take… So, on that principle, I’m not just going to put a picture up.

– Mick, focus group.

Looking at the structure of his presentations, however, he had designed a situation whereby the students were simultaneously looking at photos, looking at him, reading text, listening to his voice (while he constantly shifted around the full length and breadth of the lecture theatre), searching for and writing-down the text in bold, and being asked to think about the rhetorical questions he posed and try to understand the complex ideas being presented. This was clearly more elements than he was advocating. With the assumption that he believed he was following his own advice, this conflict suggests that he either did not understand the full dynamics at play in his lecture presentations, or he simply did not want to admit them (and then have to address them). In either case, the pre-emptive and possibly premature timing of some of his responses and the regular reminders of his expertise on the matter suggested that there was a certain lack of openness to the concepts being proposed.
Me: What preparation went into putting that together then?
Mick: [laughs] A PhD in Communication at the Uni - that’s one. A, a, I guess 13 years of thinking about it – that’s ah, that’s two.

– Mick, focus group

With the presence of such defensive behaviour, as passive as much of it was, one might reasonably assume that he somehow felt threatened.

Dictatorial Management and Lack of Autonomous Authorship

Another theme that occasionally emerged regarding confidence and affect were sentiments of being subject to an autocratic or oppressive system of institutional management. In some ways this theme is connected to the prescriptive influence of set textbooks often seemed to have in a course. Where it was particularly evident, was in feelings that were expressed by some of the participants regarding either not having complete control over the contents of their lectures or needing to submit to organisational mandates. There following snippet of discussion regarding the priorities of the university at large would appear to contain a certain level of resentment of having to tow the party line:

Margaret: And, I think apart from the personal thing of you feeling better about it, there’s no…
Ivan: …the university doesn’t reward, you for putting extra effort into, preparing presentations.
Margaret: No, no. Yeah
Doug: On the contrary, it takes away from doing research.
Ivan: That’s right, that’s what the university does reward, yeah.

– Margaret, Ivan & Doug, focus group

Extending the theme of the undervaluing of undergraduate teaching, this criticism seems to infer a belief that the organisation they belong to doesn’t really value good teaching either, and has far greater priorities that it want academics to address.

In one case, a participant at several times during the interviews expressed a reluctance to modify or take control of the content in case it didn’t align with a previous lecturers content, or what the school had officially sanctioned. The following comment was made in regard to a lecture where the participant had deviated from
the content in the slides she’d had passed onto her, in which she highlighted an issue regarding the acceptance of infant formulas over breastfeeding amongst pharmacists that she believed needing addressing. It is as though there is a fear that she may have overstepped her jurisdiction somehow:

*Ah, it’s probably more reflecting my own prejudices rather than, and, um, opinions rather than what they should be getting from the lecture…*

*I, I don’t like to, to preach and, like, put my own personal opinions across…*

— Margaret, third lecture.

Based on her extended explanations of this inclusion, the truth of the matter was that her decision to add this material was based on “eye-opening” findings from exam results and feedback from previous students, and was backed up by a national strategy she had discovered that was also trying to address the issue. This apparent lack of autonomy over the material that some of the participants taught from, tended to seep through in their responses in subtle ways. For example, when speaking about priorities of content, the language used would occasionally change from “I” and “my” to “we” and “our”, signifying an external or at least collective decision. Other less subtle indications of pedagogical decisions being imposed upon the lecturers included objections to requirements upon the dissemination of lecture material. The following comment was one made in regards to an automated system used to video-record lecture presentations and make them available for students to access online:

*I have to say, I don’t, I don’t really approve of Lectopia, um, because a lot of, not that I have any say either one way or the other, but, ah, um, but it’s a, it’s a way out for students not to attend.*

— Doug, first lecture.

It seemed in some cases that even in simply implementing the reasonably superficial visual changes being advocated in the workshop to the presented material, that the changes were being made because of external expectations rather than intrinsic motivations:

*I mean, I had to go, when I looked at it this afternoon and went, “Oh shit, there’s little boxes on there [laughs], Chris won’t like that – I’ll have to change those.” [laughs]*
Pressure and influences on the practice of the lecturers were not only coming from management, they were also coming from those they lectured.

**Submission to Student Expectations**

External forces upon the way that the participants structured their lectures and disseminated the content within them also seemed to include the students. Many of the academics were acutely aware of what students preferred and expected from a course. In many cases, this pressure would be related to material that the students would be later tested on in exams which, by extension, included the accuracy and comprehensiveness of any written material distributed to them by the lecturers:

> Margaret: Yes, I’ve tried to tell the students a different… that, I’d actually be doing them a favour if I didn’t give them the notes. [laughs] But…
> Ivan: They don’t respond to that, do they? Nah, no. [laughs]
> Margaret: No, no, I wouldn’t be able to actually cope with the grief of actually doing it. Yeah, one of the other lecturers in the school actually left off some arrows on diagrams that she’d presented and put them on in the lecture. The amount of grief she has had, about that, all they had to do was put the arrows on in the notes— that was it. You know, the diagram’s there in the textbook as well, but, um, you know, and then it gets, it’s, is it really worth while?
> Ivan: Mmm, It won’t be tolerated if you ask something on the exam that wasn’t printed in the notes, or whatever. [laughs]

— Margaret & Ivan, focus group

The demands of students, or at least the power of their possible complaints, reached into the very formatting of this material, and how it impacted upon their own resources:

> The trouble with the hand-out bit below is students complain if you give them notes with too many blank pages. So, if some of your slides don’t have any notes, then they end up with printing out these files of huge, amounts of blank space and they complain about their printing fees.

— Ivan, focus group.

As already pointed out, not all of the participants bowed to these pressures:
I refuse to put these PowerPoint slides up on Blackboard for them, in this course, because I quite literally want them to be in the lecture listening to all that extraneous stuff that’s not there.

— Mick, focus group.

Others, however, seemed to be constantly cognisant of the possibility of upsetting their students, possibly willing to abandon using mildly controversial material to avoid having to deal with a student complaint. The following reflection was in regards to showing a reasonably graphic video of the birthing process:

Margaret: Ah, I was probably pleased how they reacted to the video – that no-one freaked-out and had any negative, sort of, reactions to it, which, it’s a possibility that that could happen. Um, so…
Interviewer: Like someone throwing-up or something, or… [laughs]
Margaret: Yeah, or, or, even objecting to, you know, me showing it.
Interviewer: Yeah, right.
Margaret: That may come later. [laughs]

— Margaret, third lecture.

This selection of comments and observations regarding the more affective aspects of the participants draws attention to the influence of their sense of self-confidence, self-esteem, self-importance and self-perceived abilities. The study seemed to trigger, or at least highlight, several pre-existing pressures, insecurities and defences that the participants held. These feelings appeared to be held deeply, directing many of their decisions and actions, posing as a significant factor in whether they were prepared to adopt any new teaching practices. These issues were well beyond the scope of a study such as this to properly address and instead posed as an affective barrier and a resistance to change.

**Overcoming Technological Inadequacies**

**The Time Required to Operate and Master the Tools**

The economy of time in preparing a digital presentation had not been a factor that I had fully considered in this study until I found myself assembling the presentation for the seminar/workshop myself. PowerPoint is not normally my program of choice when it comes to constructing digital presentations and I was brutally reminded of
why, when I attempted to push the program past some of its creative limitations. While my efforts were concentrated on teaching design principles by demonstrating them, far too many hours were spent trying to make it a reality, particularly considering that I tend to count myself amongst the more technically inclined of my academy. Needless to say, the task was no easier for the study’s participants. This was especially so in the context of the technical difficulties explained in the previous chapter regarding the delivery of the workshop.

I agree with the goal, I think the goal, looking at my notes with a fresh set of eyes, I can see “Yeah these really are overly cluttered”. So I agree with the goal, I’m still trying to think, how do I adapt the technology to suit the purposes without creating a huge amount of extra work

– Ivan, focus group.

And, it, it, I mean, as a, as a goal, having your dedicated presentation and notes, I think, it would be a really good way to go. It’s just whether that’s going to be realistic in terms of time management.

– Margaret, focus group

Indeed, when one of the participants had explained that they had spent in excess of 10 hours preparing the slides for a single lecture presentation, the majority of this time seems to be tied to operating the authoring tools involved:

So, thinking, you know, “What diagrams am I going to scan in? What diagrams do I want to make myself because I don’t like the ones in the book?” you know, “How am I going to animate it?” and stuff like that. So, probably about, probably more of it’s spent wrestling with PowerPoint.

– Ivan, third lecture.

This was not the first time that technical issues and frustrations with using PowerPoint were verbalised during the study. Some of them were features that the programs claims to support, such as embedding video content:

I usually keep them separate now because I found there’s, you run into problems, you know, with the PowerPoint will look for it in a certain directory and it won’t be there. Or, or the whole PowerPoint presentation freezes. So, yeah, with a few, a few experiences like that, I usually actually just, you know, minimise the PowerPoint and play the video in the background. Just works better.
In possibly the most accentuated example of a participants’ inability to effectively achieve the desired result from the technological tools involved, the employ of inappropriate authoring software to generate imagery was noted:

Um, like, I had made those images in the, the draw, ah, function in Word, and copy and pasted from there into PowerPoint. Um, so, something’s gone awry in the, ah, in the whole process. I just prefer to draw things in the Word package rather than the, in PowerPoint. I’ve got to, I guess they’re exactly the same, so, it doesn’t really matter. But, um, but to use that rather than a drawing package itself, um, it’s just what I’m comfortable with. It’s what I know how to use.

— Doug, second lecture.

It is interesting to note in this comment, that the re are a couple of assumptions made here. One is that most software effectively produces the same result, regardless of its primary and intended purpose. The other is that while there might be more appropriate software available, the effort involved in learning how to use it does not compete with the convenience of being able to produce inferior results quickly with more familiar tools.

In what could be seen as an extension of the affective barriers described earlier, the practical implications involved in the study required a sacrifice of old habits and preferences. The prospect of needing to expend time and effort on mastering new skills and tools was not one that many of the participants welcomed, adding another contributor to the theme of resisting change.

Conclusion

The flexibility of the research design allowed for a range of peripheral issues to arise. Curiously, many of these issues have indicated a series of affective barriers, creating a more complete picture of what actually occurred in the study. This secondary body of results describe several attitudes, preconceptions and anxieties that had a hand in steering (or blocking) the adoption of the visual tactics that were offered in the workshop. What it has illustrated is that there is a raft of other factors, both internal and external to the instructor that have an immediate impact on how instructional
artefacts are both structured and the visual aesthetic they assume. Internally, there are inhibitions regarding the creation or editing of visual material, the tools used to do so, the faith they have in their own presentation skills, and the prospect of needing to change old habits. Externally, the employ of set textbooks, the mandates of the organisation they work for, and the expectations of the students are all forces to be regarded as well. With a more complete account of the situation, more informed conclusions and discussions can be made to explain the apparently restrained effects that the instructional design workshop had on the visual design of the participants’ presentations.
8. Discussion

Introduction

Structure of this Chapter

In this chapter, the combined results and outcomes of the study are reviewed, synthesised and discussed as a coherent whole. Firstly, the significance and meanings that can be drawn from the first body of results will be discussed, followed by the second body of results. A brief literature review is then conducted on matters pertaining to resistance to change to help contextualise the material that emerged in the secondary results. From both sets of results and the additional readings, several connections, implications and possibilities are discussed in a final conclusion addressing the aim and scope of the research at large.

Meaning of the Primary Results

Pre-Existing and Adopted Uses of VCP

While there was certainly evidence to show that the lecturers involved in the study were already using VCP to a certain extent, the interviews suggest that this was not completely the result of conscious decisions made by the lecturers themselves. Dual authorship in the form of files handed on from other lecturers had a part to play, as well as the formats offered by the authoring software and the nature of the content.

The Text-Superiority Predisposition

One of the most obvious commonalities in the lecture presentations was the sheer volume of text that was featured in them. It is interesting to note, that while there was often an effort to include the occasional image, the images were typically compressed around the existing text rather than given their own delegated space. It may well have been the case that the lecturers concerned were at least partially aware
of the dominating or focus-drawing effects of imagery. However, the imagery did not seem to be an initial consideration in the design process, resulting in the visual material playing second-fiddle to the text whenever they were included. All of the academics started with a hefty body of text in the design process for producing the presentation slides; referring to textbooks, reading academic material on the topic and even generating sizable amounts of written material themselves. This text was then typically reduced, reworded, truncated and sometimes abbreviated in order to fit it onto the slides, but very rarely (if at all) was the text omitted or abandoned. The academics had intended that these collections of text would be the mechanism for articulating the content for their courses; content that would contribute to both the lecture presentation and any other study material presented to students. However, they had somehow assumed that all vehicles of dissemination should take the same visual form and presentation. It was as though they had forgotten that presentation slides were not the same as study notes and that a lecture was not the same as a reading recital. As priorities go, text was coming first, and staying first throughout the entire design process. This left little room for visual communication principles to operate apart from the positioning and typeface of the text. The effect this had on the presentation was that the lecture often became an exercise in pacing-through and reviewing the notes for the course rather than discussing the topic at hand in an interesting, engaging or simply different manner. It is not unusual for literature regarding PowerPoint presentations to describe scenarios where a presenter simply progresses through slide after slide of textual content to the audience. Gunderman (2010) describes the occurrence as a misuse of PowerPoint by incompetent presenters, others simply describe it as a boredom-inducing experience for students (Apperson, Laws, & Scepansky, 2008; Mann & Robinson, 2009). It would seem that few, if any, authors have explicitly linked it to an ineffective implementation of visual communication principles.

The dual roles that the slides were serving for the participants created a problem. Asking the academics to reduce the amount of text on the slides was in direct conflict with their efforts to have them double as written study material for the students. To remove or condense the textual content on the slides equated to reducing the
comprehensiveness and integrity of the student’s notes rather than simplifying the visual component of the presentation. So, while the participants all agreed with the notion of simplifying their slides, this conflict of purposes meant that none of them could bring themselves to do so in any substantial form. Although transferring the text to a separate text document for distribution to the students would have been a quick and easy solution, the participants either did not arrive at this solution, did not consider it to be a valid solution, or did not consider it to be quick and easy.

It is interesting to note that when creating a new PowerPoint presentation, the default template, and almost every other PowerPoint template for that matter, essentially presents a slide with a text box in the middle, where a flashing cursor eagerly awaits for you to enter your text. Just as Tufté (2003; 2006) has frequently asserted, the software may in fact be partly responsible for encouraging instructors to design their presentations around an existing body of text rather than a collection of supporting pictorial or diagrammatic material. It could also be that the software manufacturer is simply responding to the way that presenters habitually design their slides. It is conceivable that the software developers at Microsoft are fully aware that presenters typically fill their slides with copious amounts of text and have simply facilitated this tendency in the design of the program. Certainly, Norman (2002b) would argue that if a user is incorrectly using a design, then it is the design that needs to change, not necessarily the user. It may be the case that the users of these programs have simply grown accustomed to the software’s shortcomings and have persisted to work around them without any obvious or convenient alternatives to turn to. There are certainly cases in other industries where poor quality software has been the norm for so long that users have simply become used to finding work-around strategies to cope with them instead of demanding a better product (C. W. Johnson, 2006).

Without venturing too far into some of the arguments concerning technological determinism in education (Oliver, 2011), the cyclic and co-dependent relationship between technology and technician is an interesting one. It harkens back to the basic premise of much of McLuhan’s (1964) theories on media: ‘we shape our tools and our tools thereafter shape us’. Whether it is a case of our practices shaping the
software, the software shaping our practice, or both, the shaping taking place is by no means the most beneficial in this situation and calls for an intervention.

**Inherent and Deliberate Progressive Disclosure**

As it would have been a physically unrealistic challenge for any of the participants to fit the entire contents of their lecture presentations on a single slide, they were effectively forced to spread the material out over a series of slides. This, of course, is a form of progressive disclosure. However, because the majority of their slides were typically filled to capacity with material, this base-level presence of progressive disclosure would seem to be the result of the inherent physical restrictions of the technology as opposed to the deliberate narrative intentions of the instructor. This is a question that might only be answered if such restrictions were lifted, but given that none of the participants attempted to (or expressed a desire to) use only a single slide for their presentations, one might conclude that it is more a case of the former, or at least a mix of both. Two of the participants mentioned that they regarded the number of slides in their presentation as a good guide for how long they were likely to present for. This suggests that there is an expectation that each slide will take a similar amount of time to present or, as was often the case, read through. If this is so, this might also suggest that progressive disclosure was not an initial primary consideration when dividing the content into separate slides. Again, this draws us back to the matter of the author versus the authoring tools, except in this case it would seem that the tools are limiting poor visual communication rather than perpetuating it. In a broader comparison resembling semiotics, a tool such as an authoring program would seem to present similar limitations and dictations to a set of presentation slides as the construct of language presents for our speech (Stewart, 1986).

**Simplicity, Unity and Aesthetics Through Limited Visual Literacy**

As might be reasonable to expect, with all of the participants hailing from disciplines that are not explicitly tied to image-making or graphic design, the visual vocabulary used in their presentations was reasonably limited. There was a strong tendency to stick to text only, and when doing so, their choice of typeface and layout was left very
much to the generic defaults offered by the authoring software. This lack of experimentation or adventurous visual decision-making effectively contributed to a form of design simplicity. For these academics, it may have been the case that achieving simplicity in their designs was merely a matter of avoiding any “artistic” intervention and sticking to the “safe” options instead. While not a particularly fertile ground for the development of aesthetically sophisticated visual communication, it allowed any inherent visual merit attributed to the templates being used to remain intact. The templates, in most every instance, possess a grid structure which, according to the assertions of Bokil (Bokil, 2009), facilitate the organisation of space, management of content and cohesiveness of style. Given that a substantial component of a template of this nature is the grid dictating the layout of the visual elements destined to populate it, it seems fitting that there are arguments that the grid is a key vehicle for automation in a design (Vanderdonckt & Gillo, 1994).

Of course, allowing the default settings of any authoring software to dictate the design of a publication is no guarantee of anything except perhaps consistency. Perhaps as a consequence, one of the VCP observed as being most prevalent in the presentation slides was the close cousin of consistency; unity. Determining how much of this unity was a result of going with the flow of the authoring software as opposed to deliberately trying to visually tie sequential material together is difficult. It could simply be, as all of the participants indicated, that a simple lack of time was a significant factor.

**The Effects of Time Constraints**

Just as a limited budget might dictate the form and finish of a project, so too might a lack of time. It is not a new discovery that those who make a career in higher education are typically very time-poor and have difficulty scheduling adequate preparation time for teaching (Bryson, 2004), particularly as a first-time lecturer (Barkhuizen, 2002). All of the participants expressed a concern that there was not generally room amongst their other academic duties to spend an adequate amount of time preparing for their lectures. There was also an expressed sentiment that such time was not generally regarded as a high priority by the university when compared
to as other tasks such as research activity. With this in mind, it might be expected that academics regard almost any convenient shortcut to be a viable one in terms of preparing lecture slides. Templates, automatic formatting, default settings, textbook materials and existing resources developed by colleagues would consequently be all quite attractive means of accelerating or bypassing the process. Indeed, several participants mentioned the inconvenience of not being able to reuse their own resources when they were assigned to different courses than ones they had already prepared for and delivered. In which case, if lecturers do not have (or make) time to create presentation slides, the visual form such material takes becomes rather irrelevant. The VCP present in the presentation slides is as much the result of what an academic has not removed or altered as it is a result of what an academic has chosen to include. Other than the mental effort required to employ the VCP promoted by the workshop, the time required to produce a set of lecture slides using them was not substantially more demanding than what most academics were already doing. However, asking them to conduct a complete overhaul on an existing set of presentation slides was. Without adequate time to properly develop instructional material, the task of completely redeveloping such material may suffer an even worse fate still.

Summary

To tie together the discussions surrounding these initial findings, while quite a number of VCP were evident in the presentation slides both before and after the ID workshop, it seems likely that there were just as many external influences responsible for them as the authors themselves. An over-dominance of text spawned from the lecturer’s design process was readily facilitated and encouraged by the design of the authoring software. The practical limitations of the software also channelled a certain degree of progressive disclosure into the presentation design. In defaulting to the templates built into the software, the unity, simplicity and aesthetics that those layouts facilitated seeped through. As far as the significance that this has in relation to the theoretical underpinnings of VCP and CLT, it has arguably little bearing. Suffice to say that while there was evidence of an increased understanding of these principles, this particular group of lecturers seemed to allow the authoring tools to do a large
portion of the shaping, trusting that the developers of these tools had a more effective command of ID principles than they did themselves. The lecturers sat in the designer’s cockpit, but principally deferred to the autopilot.

Meaning of the Secondary Results

Resistance to Change

Pedagogical and Affective Barriers

The secondary body of results reveal threads of pedagogical and instructional theories that the participants have arrived at through intuition or otherwise and were unwilling to depart from. An aspect of the research design that had not been fully considered during initiation was that while it was dealing with a group of teaching professionals, it was not necessarily dealing with professional teachers. As intelligent and knowledgeable in a field as most academics are, being an exceptional, or even qualified instructor is not always an essential criterion for their tenure (Z. Chen & Stephen Ferris, 1999; Crittenden, 1997). As collated by Raths (2001), novice teachers bring with them a raft of pedagogical misconceptions and misinterpretations that are difficult to shift and impact upon the effectiveness of training in educational practices. Never-the-less, all novice teachers are eventually faced with a teaching load and they must find ways to deliver, employing methods based on whatever limited teaching training or experience they possess. These naïve beliefs and practices is what surfaced through the course of the study, generating several pedagogical and affective firewalls and filters that help to explain the fairly unremarkable impact of the workshop.

Content-Driven Pedagogy

The most notable weakness in the presentations that were observed was the strong dependency that most of the participants had on the quantity of content within them. There seemed to be an underlying assumption that the quantity of content within a lecture presentation was synonymous with the quality or value of the lecture. While content quantity definitely has the potential to effect presentation quality, the relationship is in fact inversed at some point – a point that all of the participants had
certainly passed. Beyond this point, the greater the amount of content presented in the slides, the less effective the lecture was likely to be.

One of the major signs taken to indicate the participants’ dependency on content, was that many of the lectures failed to have a main point or crux. This resulted in a kind of monotonous wasteland of sub-headings and paragraphs; a thick marsh of information with no recognisable landmarks or final destination. Beyond falling under a broad topical title and being delivered in the same block of time, there was often no underlying or overarching principle or message that tied the material together. The lack of semantic structure in the presentations again reflects a novice-like deficiency in the participants’ awareness of the underlying psychology of learning and instruction. It was almost as though the participants did not think it was possible for their students to take hold of an overarching concept or structure and transfer it or apply it to other situations and material. The safest way forward for them was to spell everything out for the students in painstaking detail instead, fearful that if they did not, they would be held accountable for not being thorough or informative enough. This was particularly so when the content was included in exams at the end of the course. The devil, it seemed, was in the detail.

**Superficial Change Required Foundational Change**

The assumption that the more content contained within the presentation, the better-off the students would be, might explain the difficulty that a number of the participants had in trying to reconcile the density of their content. I was not just asking the participants to abandon the hard work that they had invested in the slides they already have, I was asking them to change what they thought learning was. Tinkering with such deeply held notions evoked a level of tension (or at least expected tension) within one of the participants that Vaillant (1992) would describe the resulting behaviour as a strong ego defence. After all, nobody wants to hear it implied that their attitudes are possibly misguided or that their understanding of a matter (in which they have made a career from) is in some way faulty.

It is a possibility that the participants involved saw the entire exercise as a largely utilitarian one that would improve their skills in mastering the tools involved in
producing a presentation rather than an opportunity to have the pedagogical assumptions that drive their designs challenged. If the participants really did feel that they were simply engaged in a ‘How to use PowerPoint’ staff development session, they may well have regarded the contents of the workshop as purely technical rather than communicative in nature. While the notion that a more developed sense of aesthetic organisation will still make a person a better teacher could be argued, it could never hope to compensate for a lack of sound educational theory. The participants’ naivety as educators effectively masked the true utility of the ID principles presented to them.

The principles being presented were not so much being used to develop a replacement set of lecture presentation slides; they were being used to medicate the slides they already had. Because their existing slides contained quite extensive conflicts with the principles that were promoted in the workshop, the act of trying to apply them became an almost impossible task without starting from scratch. Conducting a complete redesign of a presentation rather than modifying an existing presentation was a suggestion made or implied several times by the participants. Aligning with the model of instructional design promoted in the workshop required a large amount of change - particularly in such a short amount of time. As a consequence, the principles involved were only partially adopted. The change needed to come from within the participants, and it had to be applied from the very beginning of the design process.

The Habitual – Confidence Link

Although the study was not particularly concerned with the performance skills of the participants or their talents and abilities as a presenter, by asking them to remove text from their slides, pressure was subsequently put on this aspect of the lecture delivery. By removing what several of them openly described as a prompt or crutch, the need for them to be knowledgeable and fluent in the lecture content became more pressing. As such, the likelihood of the presenter feeling more nervous and vulnerable was increased, particularly if the lecturer had developed a long-standing habit of relying on their slides for this support. This provides us with another possible reason
for why there was such a resistance to removing text from the slides. The slides were very much playing the part of the presenter’s notes; their palm cards; their scripts; their fail-safe. In an interesting twist, Menzel and Carrell’s study correlating preparation time to public speaking performance (Menzel & Carrell, 1994) indicates that time spent preparing visual aids is the strongest contributing factor in a successful presentation, with the preparation of presenter’s notes positively contributing to thought content. High speech-anxiety, however, has a negative impact upon the type and quality of speech preparation time. It could stand to reason then, that if the speaker is confident with (and accepts) the VCP used in preparing their slides and reserves the bulk of the text for their presenter’s notes, they will deliver a better presentation.

Instead, time spent adding text to the slides seemed to be a more favoured way of feeling confident during the lecture as opposed to becoming more familiar with, or simply rehearsing, the lecture’s contents. Given that many of the lectures did not have a main point (other than a topic or title) upon which to keep returning, the prospect of memorising an hour of facts is possibly why the lecturers did not take this approach. To a large degree, if the raw content being used to populate the presentation were of limited pedagogical value to begin with, any amount of aesthetic modification would also have had a limited ability to improve the quality of learning it enabled. As the old saying goes – you can’t make a silk purse from a sow’s ear.

**Technological Inhibitions**

The workshop was primarily focused on the decisions that govern how the visual material for a lecture presentation is designed and arranged rather than the technical skills surrounding the production process. It was not concerned with the sum of the underlying skills and ability of the lecturers, but how they are used. Never-the-less, the technological aspect still proved to be a stumbling block. So much so, that it seemed very few of them were willing to surrender the results of their previous efforts using the authoring software, despite any known flaws with structure or content. It was as though the quality of the final product was second priority to the investment of time required to produce it. Perhaps, to surrender and abandon all of the hard
work that went into producing a set of slides is also an act of surrendering to the authoring software itself, or an admission that one’s own technological proficiencies are less than what is required. To not attempt a complete reconstruction is perhaps an even greater indication of defeat.

Undervaluing of Undergraduate Teaching

As mentioned earlier, the participants were not generally of the opinion that the university at large would regard developing polished lecture slides as a high priority. It seems possible, however, that they harboured and perpetuated some of these attitudes themselves to some degree. Several comments made by the participants revealed an apparent disregard of the importance of undergraduate teaching, coupled with a noted tendency to allow text books and reading lists to disseminate the bulk of the course content rather than their face-to-face efforts. Comments on workload priorities were accompanied by complaints regarding how much work is often involved in implementing many teaching strategies and how their workloads did not normally leave space for such a large investment of time. One particular discussion seemed to flag the value that the participants placed on undergraduate teaching revealing the opinion that the principles offered in the workshop would be most useful to academics when presenting at a research conference instead. On one hand, transferring the application of VCP to a different context without being prompted is a possible indication that those participants had grasped the potential impact of these principles on a deeper level. On the other hand, one could be forgiven for concluding that they did not truly regard the presentation of an undergraduate lecture as being a particularly worthy activity in which to invest such skills when compared to a presentation to academics positioned in their own level of expertise or higher. Somehow, the time spent constructing a lecture for an audience of hundreds of students and reused for several cohorts for several years, did not equate to the same time spent on a one-off presentation to a select number of research peers. Their clarity or repute as a researcher in their field was apparently much more critical to them than their roles as tertiary teachers. Apparently, they were of the opinion that there is a significant difference between the two roles. It is, of course, entirely possible that more is being read into those remarks than were actually there, however, it still
raises an interesting question about the perceived impact of a professional presentation in an educational context.

Explanatory Literature

While it was not the specific aim of the study to explore the attitudes, insecurities or pedagogical beliefs held by academics engaged in teaching, it seems that the strength and prevalence of such discourses require our attention. Where did these affective barriers and pedagogical assumptions come from, and why were they so stubbornly resistant to modification?

Resistance to Change

People often teach as they were taught or in a manner that supports their preferred learning style (Cruickshank, Jenkins, & Metcalf, 1999). This can be seen reflected in the participant responses that inferred that the students who had the same learning style as them would be the most advantaged in their lectures. McCrickerd (2012) suggests that the reason many academics choose to take the less taxing option of sticking to the familiar is because of a tendency for them to regard teaching as a descriptor of talent and because universities do not typically reward risk-taking. Tagg (2012) is convinced that the problem resides at a more systemic level within the university, where the process of implementing large scale changes excludes the involvement of the faculty members it affects, frequently triggering oppositional and defensive responses. In a similar manner, Hull (2010) asserts that there is a set of insecurities linked to Maslow’s hierarchy of needs (Maslow, 1943) that are often triggered when management instigates change. Conversely, Duffy and Roebler (G. Duffy & Roebler, 1986) contend that it has less to do with having ownership of the change, and more to do with the fact that teachers tend to combine and rationalise new educational training with their existing understanding rather than replace it.

Resistance to Training

In a study of academic discourses surrounding staff development initiatives in a university in South Africa, Quinn (2012) identified several themes relating to their resistance to such training. While these findings were based on a situation where the
academics were compelled or required to engage in professional development (as opposed to volunteering), the categories of discourse that Quinn identifies bear remarkable similarities to those in this study. She names four overarching discourses in total – disciplinary, student deficit, skills and performativity. The disciplinary discourses revealed that some academics considered themselves to be ‘good’ teachers already because they had attained a PhD on the subject or by simply being in a researching role and generating knowledge in their field. It also included a contrasting viewpoint held by some academics that being a good researcher is a likely indication of poor teaching skills. Further to this, Quinn reports a common opinion amongst academics that the institution at large did not place a high value on the task of undergraduate teaching. This opinion was identified as contributing to a staff attitude that training in teaching and learning was a waste of time as it was time taken away from research activities. Conducting staff development sessions that were not catered to a particular disciplinary context was also viewed as an undesirable situation by academic staff. This also extended into a critical view of the expertise or background of those conducting the staff development. If the facilitator of the training was expert in the field, the academic staff being trained might view this person as either a necessity or an imposition.

**Depth of Conceptual Abstraction**

To comment on the nature of the material the participants presented and the complexity or depth of the concepts therein, the Structure of the Observed Learning Outcomes (SOLO) Taxonomy (Biggs & Collis, 1982; Biggs & Tang, 2011) should be of assistance. Biggs categorises the progressively complex nature of learning into several qualities of understanding for the purpose of establishing appropriate learning outcomes. These outcomes are then used to assess student work and design curriculum in terms of conceptual quality rather than fractional quantity. The content in the presentations by the participants was driven by a uni-structural or multi-structural mindset, reflected by a small number of discernible aspects of the topic or a fragmented collection of loosely related material. Given that this scenario involved tertiary-level teaching, a more relational mindset would have been warranted, which would have worked towards the creation of instructional material
that facilitates an integrated and conceptually coherent presentation. The level of abstraction of the content being dealt with by the academics seemed to directly influence the construction of the visual aids used in the lecture and therefore could easily impede the effectiveness and extensiveness of the visual communication principles being implemented.

Integration of findings

Lecturer meta-cognition and the affective barrier

The sophistication of the hierarchies of knowledge and hierarchies of principles held by the participants was a presumption I held early on, and was one that was proven to be fairly unreliable. As far as the process of turning data into information, information into knowledge, knowledge into understanding and understanding into wisdom, many of these lectures were still very much suspended in the realm of information and knowledge. The management and focus upon the content of the course, whether it be a lack of expertise or overconfidence, was getting in the way of the communicative need of the course. It seemed that in order to fully observe the effects of the instructional design theory being transferred, the pedagogical impediments involved need to be dealt with in advance or, at the very least, simultaneously.

These beliefs have elements of sound educational theory and practice in them, however there are also elements that are not. Many of these misconceptions about what constitutes quality teaching are the sorts of things that also resist the principles underpinning quality instructional design. Without a solid understanding of learning theory, the effectiveness of instructional design training is significantly hindered. A priority must be established to rectify any pedagogical misconceptions that pose as an interference or contradiction before attempting to improve the visual form in which any instructional material manifests. An opportunity needs to be given for the instructors to formalise the pedagogy that they are intuitively achieving soundly but are unable to explain.
It was not that the design curriculum offered to the participants was inappropriate, it simply didn’t address the barriers that stood between the participants and the principles that the curriculum promoted. The fundamental truths featured in the workshop simply didn’t make it through the firewall of educational misconceptions and habits that were present or the ego-defensive response to challenge. The design principles involved were idealistically treated and presented as being largely value-free. That is, they are each isolated and innocuous guidelines that promised a similar result every time, regardless of the material that they are applied to. Instead, it was discovered that they confronted many of the beliefs that the participants held about learning and challenged much of what they had been practising as teachers up until that point. I had adopted a set of quite rational assumptions about the academics involved in the study. I assumed they would be task-oriented, open to alternative pedagogical possibilities and solutions, and constructing their teaching philosophies around maximising student performance. This combination of clashing assumptions and expectations from both angles contributed to participants displaying an affective, and at times defensive, resistance to the changes implicated by the workshop.

The underlying social psychology of lecturer activity and the sorts of pressures that they are allowing to interfere with the educative process is something that can be speculated upon in a study of its own. This study did not intend to unravel the various insecurities and beliefs of the lecturer – it was a study of the design of instructional materials. In any case, it is clearly apparent that several lecturer attributes are at play that can either facilitate or resist good instructional design practice.

Implications for Future Study

Pedagogical Implications for Staff Development

Universities, while often populated by teaching professionals rather than professional teachers, generally offer a suite of staff development courses that concentrate on improving the pedagogical, investigative, administrative or technological aspects of an academic’s responsibilities. Unfortunately, courses on lecture delivery can sometimes fall into the last of these categories and be given a title such as ‘How to use
PowerPoint’. Authors such as Kopyc (2007) assert that academics need more of this training and exposure to teaching technologies to (if nothing else) simply keep up with their students. As can be seen from this study, this approach is probably not the most effective way of addressing poor lecture design. This investigation set about improving what could be viewed as very superficial and inconsequential aspects of a lecture, and yet a strong affective firewall stopped these improvements from being applied. The answers to these problems obviously extend beyond showing lecturers how to make their slides look good. If they have not undergone some variety of training that addresses some of the pedagogical naivety and debunks some of the disciplinary traditions that are perpetuated in tertiary education, there is no platform upon which VCP can be effectively implemented.

If a next step can be inferred at this point, it would seem that an investigation should be conducted into what form of pedagogical foundation might be laid before attempting to properly adopt theoretical and practical aspects of VCP. A foundation that could not only bridge the theoretical disconnect between instructional practice and visual transmission, but how it might be laid so as to avoid provoking an insulating affective response. Which particular misconceptions regarding teaching practice and adult education are the most erosive and pervasive in this kind of training? How extensive must such a reconstructive education be in order for VCP and ID training can gain traction? Is this issue isolated to a certain kind of educational institution? Is it one that is more pronounced in particular disciplines? Is one’s age or the length of one’s academic career a significant factor?

Limitations of the Study

While the observational and interview data that was collected had depth, it was never the less a small number of participants. As case studies, each of them represented highly unique circumstances in regards to the visual material they were presenting, and yet there were quite a few commonalities found in the way they were managing it. It must be kept in mind when reviewing the results of this study that the workshop was not the only variable at play here. The presentations, while delivered by the same lecturers, were not entirely authored by the same lecturers in every case,
and were not all from the same courses either. Several qualifiers in the recruitment process had to be relaxed, placing more weight on the depth of the qualitative data gathered, which in this case yielded some very interesting results.

It should also be recognised that I was the sole observer of the twelve lectures concerned; the evaluation of them rested entirely with one person. Having been involved in numerous team-teaching scenarios and industry teams in my career, I can vouch for the likely outcome that another designer acting in my stead would have produced a different (although hopefully similar) set of observational data. This is not to succumb to the notion that the evaluation of visual material has strong elements of subjectivity, or that beauty is simply in the eye of the beholder. Rather, the visual material in question has been consumed and reported upon through my own lenses, trained by a specific course of education, refined by a specific train of thought and influenced (even if subconsciously) by a specific set of inclinations and preferences. To this end, I refer to the epistemological, ontological and philosophical standpoints upon which it is based.

On one hand, the strength of the generalisations that can be drawn from a collective case study such as this is somewhat bounded. With such a lean crew of participants, there is room for debate over how typical they are of an institution of thousands, let alone an entire occupation. With more participants, more questions, more time and more resources, a more thorough picture would most definitely be the result. However on the other hand, to dismiss the study as unreliable or trivial would be a mistake, as there are clearly signs of deeper issues at work. While the participants were few, their responses and their instructional artefacts were not entirely unshared with others. Many of the presentation slides were hand-me-downs or the product of multiple authors and the comments that were made sometimes recounted the attitudes and opinions of peers and colleagues. Each case study was unique in many ways, however the commonalities are difficult to ignore.
Conclusions

In Response to the Aim of the Study

This study set out to explore how university lecturers might harness and internalise some of the fundamental truths of visual communication in order to increase the clarity of the instructional artefacts they use in a lecture. It sought to observe the degree to which they may already be doing this, how readily their understanding and use of visual communications might be expanded, and how permanent such changes might be. The results presented in this thesis demonstrate that it is certainly within the capacity of lecturers to grasp and employ VCP in the construction of their presentation slides. Despite the influence of several counteractive preferences and secondary purposes attached to their slide designs, the lecturers were also largely willing to accept the value of the principles and adjust their practices accordingly. Evidence of the principles being put into practice was observed and, while some of these efforts waned, evidence of retention was also detected. In short, the impact that the visual communication principles had was positive. However, they were also quite muted.

In Response to the Results of the Study

As discussed in this chapter, the two sets of results that surfaced in this study help to explain the unremarkable nature of the primary data. Several barriers, which were mechanical, habitual and affective in nature severely crippled the potential for the principles presented in the instructional design workshop to be employed. The inclinations and limitations of the authoring software, the multiplicity of document purpose and distribution, the availability of time, and the participants’ resistance to change were all certainly factors in either facilitating or inhibiting the application of those principles. Perhaps most importantly were the obstacles encountered within the lecturers themselves that present the greatest challenge. A strong content-driven pedagogy affording a limited level of cognitive abstraction in the material that the lecturers typically presented was a major hurdle. A general feeling of institutional oppression and the poor prioritisation of undergraduate teaching dictated some of
their efforts. The inhibitions and insecurities sparked by ego-defence and performance pressure offered further resistance to changing their practices.

This study has shown that academic staff development efforts - even seemingly superficial and technical ones regarding the appearance of PowerPoint slides – are subject to a complex set of external and internal barriers that must be unravelled first. It suggests that a set of fundamental truths in instructional design, however powerful when in full effect, must be escorted by the pedagogical truths that underpin them. Without this foundation, all advice on the design and formation of instructional artefacts is open to ambush by intuition and personal preference.
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Appendices

Appendix A – Interview and Focus Group Schedules

Post-Lecture Semi-Structured Interview:

All Lectures:

- How do you feel the lecture presentation went?
- Was there anything about it that you were particularly pleased or displeased with?
- If your students were to take away only one main point from that lecture, what would you hope it to be?
- How clearly do you feel this point came across to them?
- When putting together the PowerPoint presentation that you used, what specific purposes did you intend for it to serve in your lecture?
- What kind of planning did you undertake when preparing this PowerPoint?

Second and Third Lectures Only:

- How do you feel this presentation compares to the last one/s we talked about?
- What particular principles did you concentrate on implementing when designing the PowerPoint for this presentation?

Workshop Guided Discussion Questions:

- What sort of principles presented in the seminar presentation earlier made the most sense to you? Why?
- How confident do you feel putting some of those principles into action?
- In what way do you think these principles will change the way you put together a lecture presentation in the future?
Appendix B – Recruitment Poster Design

Participants are needed for a study in Instructional Design.

If you are a lecturer for a large course at the University of Newcastle and would like to work with a professional graphic designer in making the university a better place, one PowerPoint slide at a time, then you can help!

Call 4921 7967 or email chris.lawrence@newcastle.edu.au by October 11th, 2010 for more details.

HREC App. No: H-2010-1204

You’re not even reading this, are you?
Appendix C – Lecture Announcement

"Please be advised that my delivery of this lecture will be included in a study conducted on Instructional Design by Chris Lawrence (who will be taking notes in the front row here). Only my voice will be recorded through the lapel mic that I’m wearing - no-one else during this lecture will be recorded in any way or form."
Appendix D – Screen-Shots of the Workshop Presentation
Appendix E – Workshop Notes Hand-Out

[See following 6-page insert]
Thinking about thinking

In order for us to put together a presentation that our audience will learn the most from, we first have to consider our capacity to consider things! Our brains can only take in so much at a time. Too much information can make us confused, panicked, or at the very least, distracted from the important bits. Too little information and we get bored, impatient, or, once again, distracted from the important bits.

It’s quite essential that our audience gets the core point of our message, otherwise the time and effort we spend preparing a presentation will have been largely wasted. So, in order to make the important concepts in our message the most accessible, there are a couple of things we can do:

- Shift aside anything that isn’t quite as important
- Make the most important stuff more obvious

Clearing some space

It probably seems a bit much to ask that you abandon some of your content, particularly when you only have such a limited amount of time to say everything you need to say. However, it’s not quite as brutal a process as you might think, and you may not necessarily have to get rid of a great deal of content at all. It often simply comes down to taking such material and either spacing it out a little, or delivering it in a different form. Here are some common examples:

- Written words can be converted into spoken words.

Don’t read-out blocks of text. It’s usually easier for people to just listen to your voice than it is for them to both listen and read at the same time. Diagrams, pictures, charts, figures and maps can also often be explained orally rather than with text.

- If it’s a secondary point, put it on a secondary slide.

Incedental, supplementary or explanatory content can be very useful for expanding upon a concept, but it is best to refrain from crowding the stage and drowning-out the main character in your story.
To be Clear… — An Instructional Design Workshop

Less is more! If there's a simpler way of showing it, do it that way.

The group of people you're talking to will have some level of expertise. It's likely that it will not be the same as your own, but even a complete novice will have some sort of general knowledge you can usually count on. Try to find out what stage they're at so that you can focus more on the things they don't already know. Some examples might be to not label the X & Y axis if it's quite obvious to the group, or, not to add 'mm' if they're used to it only ever being measured in millimetres. Removing guidelines from tables of figures that clearly line-up as it is, and shortening terms to initials or symbols are also methods of reducing unnecessary explanations. It's a proven distraction to include something that your audience is extremely familiar with (and have grown used to ignoring) in necessary explanations. It's a proven distraction to include something that your audience is extremely familiar with (and have grown used to ignoring) in necessary explanations.

If there's a simpler way of showing it, do it that way. Less is more!

Making things stand out

The most basic method of making something obvious is to employ the use of contrast - that is, making something stand out and be different from the rest of it's surroundings. Some examples of this might be:

- Make it slightly bigger or bolder than the rest.
- Change the colour of it.
- Add an arrow, highlighting or some movement.
- Grey, dim or fade everything else out.
- Isolate it completely - don't be afraid of empty space!
- Pictures generally dominate visually over text.

Hand-held laser-pointers are great for drawing attention to things, so long as you're not simply adding more noise to an already busy slide. It is also worth noting that if you decide to change the colour of something, or add a colour to highlight something, that it still needs to be legible and work well with the rest of your theme. Remember also: If you emphasise everything - you emphasise nothing.

Speaking with pictures

You've probably heard it said that our body language tends to communicate a lot more to people than our mouths do, and that "actions speak louder than words". This is also true with a formal presentation. The imagery you choose to use will usually overpower the words you are using at the same time.

Even tiny things like embellishments and fonts will communicate something to your audience - sometimes even a message that you didn't intend for them to receive. For example, if you have decided to use a ticked square as the 'bullet' for all of your points in a presentation, the thoughts that enter an audience member's head could be:

"Ok, there's a column of ticked tick-boxes, so this must be a list of things that the presenter has either done or expects me to do. Wait, none of these points seem to be things that can actually be done! So, if they can't be actioned, what does this person want me to do about it? Perhaps those tick-boxes aren't really indicating any sort of process or to-do list at all. I guess they could just be bullet points. But why make them into tick-boxes? Surely, I'm missing something. The guy next to me doesn't seem to be drawing any boxes, so maybe I'm reading too much into it. Mental note: Ignore all tick-boxes like that for the rest of the lecture."

Of course, during this brief state of confusion, they have not been concentrating at all on your careful explanation of the non-actionable bullet-points that you've put up in front of them.

You'll be pleased to know that there's also a good use for imagery in your presentation. In fact, a really good photo or diagram can sometimes say so much more than we could ever hope to put into words. Try to come up with, or be on the search for, images (or animations) like this that illustrate your point well. You never know, it may just be the one thing that sticks in the heads of your audience for a long time after.

Making things look good

Ok, now that you've managed to boil it down to the core message and have prioritised all of the most crucial information, it's time to do some polishing. As superficial as that sounds, this is actually quite an important step. People's first impressions and perceptions can have a profound effect on how, or even if, they will engage with something. If the information you're presenting looks like it will be hard to understand, the viewer is less likely to feel that they will grasp it. If it looks ugly, they aren't likely to want to embrace it. If it looks boring they'll be tempted to find something more interesting to think about or look at.

Of course, this means that the opposite is also true. If you have an attractive, interesting and easy-to-follow set of visuals, people will stay attentive, make more effort to understand it and ultimately recall a lot more of it.

However, as hinted at earlier, it would be a mistake to simply add things because they're nice or interesting - they must be directly contributing to the task of illustrating or clarifying your key points. We often go to great lengths to choose our words well - it should be doubly so for the visuals we use. Every decision we make about the way things look needs to be deliberate and justified. Here are a few tactics you can use:

- Pictures generally dominate visually over text.
- If it's complicated, try to divide it up.
- Remove any information that is "a given".
- If you emphasise everything - you emphasise nothing.
• Be consistent, with pretty-much everything.

This is why themes and templates tend to work quite well. Use only one or two typefaces and always in the same manner, conform the content to a grid structure with the same margins on every slide, stick to a set palette of colours, have all your images in the same style or even by the same artist, etc.

• Line things up.

Never just ‘plonk’ something onto your slide. This is where your margins and grid structure becomes handy - make some rules and stick to them ferociously!

• Stay away from decorative, fancy fonts and “word art”.

They’re fun to play with, but often hard to read. It takes a lot of skill to be successfully tricky with typography, so only include any creative experiments you may have done after you’ve tested it on a few people first.

• Look for ways to simplify things.

De-clutter, condense, reduce. Remove any bits of visual noise you think could be a slight distraction. If a pie-chart looks cleaner than a bar graph and yet does the same job - use the pie-chart. If you’re stuck with using only one way to graph the data, try to remove visual information or labels that you don’t intend to talk about and keep only the essential gridlines (making them fairly faint at that).

• Don’t squish, stretch, skew or distort things.

This goes for photos, text, diagrams, logos - anything! If there’s not enough room for something, make space for it. Crop photos to the size you need rather than stretching them. Re-word a bullet point to make it fit rather than squishing the whole line of type.

• Make sure your images have enough resolution.

If a photo or illustration is looking a bit pixelated or blurry, re-scan it or find a better version. Scanned text can be replaced with typed text.

Sometimes it’s difficult to make the overall theme of your presentation communicate the exact feel you want and still appear professional. It’s often a good move to examine any pre-made themes at hand to see if there might be one that you can modify or simplify. As a general rule, try to stick to something basic, simple and subtle - it’s the content that needs to be the star of the show here!

A few tips on type

If you must use written text in your presentation, it’s important that it not only be legible - it must also be appropriate. Fonts are essentially the clothes that we put on our words. In the same way that our appearance can say a lot about who we are, a font will give your words a certain mood or character as well.

For example, using the font ‘Comic Sans’ for a lecture entitled “Suicide Trends in Rural Australia” is the equivalent of wearing a chicken-suit to a funeral. It would not matter how serious or sincere your condolences were, the others attending the funeral would be interpreting your every word almost exclusively via your inappropriate attire. If this leaves you unsure about which font to use, there’s nothing wrong with playing it safe and sticking to the classics like Helvetica or Garamond.

Some other general tips:

• Avoid using all-caps in mid-sentence.

This tends to say “I’m angry and shouting!” rather than “This is a key point”. Use bold, italics or a subtle colour change instead.

• Let the text breathe.

Text almost always looks most comfortable when given some personal space. Don’t box it in or butt it up against other objects or the edge of the screen. Avoid placing text over an already busy background as well.

• Try to stick to a ‘font family’.

While some font combinations look great, a ‘font family’ is designed to go together and is a safe choice if you’re looking for a little flexibility. For example: Futura Medium + Futura Condensed Extrabold + Futura Light. Using too many fonts can make your design look like a ransom note!

You might conclude so far that it’s possibly best not to have any text on your slides at all. While that may be a helpful guideline to work to, it’s not easily achievable for a lot of disciplines. However, it’s important to note that even the best set of lecture notes rarely doubles as a good set of PowerPoint slides, and vice versa.
If you wish for your audience to invest their mental efforts by reading text, (which certainly has its merits) then it is probably better for you to either be silent while they read it, or provide a separate text for them to go through when you are not otherwise trying to hold their attention.

**To sum up**

While you are presenting, you are effectively speaking two languages at once; one that is heard and another that is seen (I am, of course, assuming that you are not delivering your presentations using sign-language, or, that you are a compulsive mime-artist). It stands to reason then, that every decision you make about the visual aspects of your presentation will either add to, or detract from, your message.

So, use these principles and strategies to make sure that you’re always saying what you want to say and that you’re not talking over the top of yourself.
Appendix F – Workshop Script (Video Version)

In this presentation, we will be covering a number of strategies and principles for bringing clarity to the visual elements of your presentations.

Before we dive into things though, we first need to consider how it is we consider things.

As clever as the human brain is, it only has a limited capacity for processing information at any given point.

Too much of it and we get confused, anxious, frustrated or at the very least, we miss the important bits.

If there’s too little information, we can become bored, start daydreaming, get frustrated or at the very least - miss the important bits.

It’s quite important that people understand the crux of our message, otherwise our efforts are largely wasted. There are a couple of things we can do about this though. We can:

Shift aside anything that isn’t quite as important

Make the most important stuff more obvious

Let’s talk first about clearing a bit of space.

While it might seem at first to be a daunting prospect to take away any of your content, it’s not quite as brutal a process as you might think. The easiest tactic is simply to take whatever words are in written form and speak them instead. It’s generally easier for people to just listen to your voice than it is for them to read and listen at the same time.

If you effectively have a secondary or incidental point included, shift it onto a separate slide. Avoid crowding a slide with multiple visuals - most people are only able look at them one at a time. This also allows you to decide which one you want them to see first.

If you have something that is intrinsically complicated, chop it up and let it come together gradually. A complicated formula or diagram is much easier to understand if you put it together in front of them rather than dumping the whole lot out there and then trying to unpack it with verbal explanations.

If there information that is a given or is far too basic to need pointing out, get rid of it. While your audience may not have the same level of expertise as yourself and require a few things to be spelt out for them, there will be a knowledge base of some sort sitting there that you can generally count on. Pointing out the obvious will only serve as a distraction, and this applies to visual material as well. Work
out what it is they already know well and then you’ll know what it is you can toss out.

The most basic method of making something stand out is use contrast – making something look notably different from everything else. A classic scenario of trying to stand out is found in the Yellow Pages directory. If you look up the architects section, you’ll see they do it quite well and with often quite small adds. Head over to the Solicitor’s section though, and you’ll see that many of them spend thousands buying up whole pages and then decide to fill it with an essay about themselves. Of course, once you have a page of 10pt type it ends up looking like, well, the rest of the phone book!

Here are a few ways of pointing things out. You can make it bold or large. Change the colour of it (as long as it still works with your theme and is readable) Add some kind of indicator or arrow. If you need it more obvious still, you can use some sort of movement. One that doesn’t get used enough is fading out the competition. In fact you can even isolate the thing completely if you like – don’t be scared of empty spaces. Pictures tend to dominate over text, so using an appropriate symbol can also do the job. A word of warning though, if you emphasise everything – you emphasise nothing!

As you’ve probably already noticed, pictures speak to us. A picture is worth a thousand words, but we need to know which words it is they are saying before we use them.

Each of these seemingly insignificant symbols are ones that I’ve seen used as bullet points in presentations. But each of them are actually are saying something completely different and are not as benign and interchangeable as you might think. The first says…

Here is an example of how such little things can have a direct effect on what we do with information and instructions. If you found either of these at the bottom of a form, while the wording reads the same, the visuals alongside them alter your response to them.

Don’t be put-off from using images though! Always be on the hunt for or trying to come up with a visual way of illustrating your message. While it might take more time than typing, it will take less time for you to explain and less time for people to mentally digest.

Now to make things look pretty. That might sound a little superficial or unnecessary, but it’s actually a quite critical step in the process of presenting. If you’ve ever been on a first date – you’ll know exactly what I mean!

For example, which of these would you prefer to click on if making an online purchase? If something difficult or ugly, people will feel like they’re not going to
enjoy it much and that it might not be worth the effort. First impressions are incredibly important and can make or break any learning experience.

One common tactic is to simply be consistent – with pretty much everything. Use the same fonts in the same fashion and even go to the length on making your photos or diagrams look to be in the same style and format. Make a grid stricture to line everything up with and stick to using the same margins and layout for your presentation. Visual changes will draw the viewer’s attention, and if the was no purpose in doing so it will simply serve as a distraction.

Stay away from decorative fancy fonts and “word art”. They’re fun to play with, but often hard to read. Don’t include any typographic experiments unless you’re sure they’ll work and have tested them on a few people first.

Look for ways to simplify things. In this example, the lines have been removed from this table and the days have been abbreviated which has removed quite a lot of visual clutter from it and made it easier and nicer to look at. Other do’s and don’ts include never squish, stretch or distort things (especially pictures), and make sure your images have enough resolution and are not blurry or pixelated.

Here are a few tips on using fonts.

Fonts are essentially the clothes that we put on our words, and if you dress them up wrong, they won’t be properly received. For example, if your presentation is titled, ‘Suicide Trends in Rural Australia’ and you decide to dress it in ‘Comic Sans’, you have essentially done the equivalent of going to a funeral in a chicken suit. And matter how serious or sincere your condolences were, the others attending the funeral would be interpreting your every word almost exclusively via your inappropriate attire. If this leaves you unsure about which font to use, there’s nothing wrong with playing it safe and sticking to the classics like Helvetica or Garamond.

A few other pointers are to avoid using all-caps mid-sentence, this tends to say I’m angry and shouting rather than this is a key word. Also, give your text a good amount of breathing space. Don’t box it in or butt it up against the edge of the slide or other objects.

While you are presenting, you are effectively speaking two languages at once; one that is heard and another that is seen. It stands to reason then, that every decision you make about the visual aspects of your presentation will either add to, or detract from, your message. So, use these principles and strategies to make sure that you’re always saying what you want to say and that you’re not talking over the top of yourself.
Appendix G – Lecture Slides Evaluation Form

Instructional Design Study Observation

<table>
<thead>
<tr>
<th>Question</th>
<th>N</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Was visual priority used to emphasise critical points?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was there consistency and unity in layout, style and formatting?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were the textual components kept to a minimum?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were informative or expressive visual illustrations used?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was the visual material neat, organised and attractive?</td>
<td></td>
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<tr>
<td>Was the material presented concisely and simply?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was visual elaboration and embellishment muted or minimal?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was complex or detailed material progressively disclosed?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was the typography appropriate and relevant?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was the text and imagery readable, legible and clear?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:

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Appendix H – Recruitment Emails to Heads of School

To: [HoS email address]
From: [My email address]
Subject: Research Project: Designing Better Lecture Presentations

To the Head of School - [Name of School],

[HoS Title and Name],

I am a researcher conducting a study in the area of Instructional Design as part of my Master of Education program at the University of Newcastle, and seek your assistance in locating suitable volunteer participants from amongst the staff within your school. Should any individual academics come to mind as an interested and eligible candidate, I would be very grateful if you were to forward the attached information to them.

The study will involve an observation of the PowerPoint slides used in 3 of the participants’ lectures throughout the next six months with the focus being on the presence of specific design principles. The participants will also be interviewed after each lecture. Participating lectures will also attend a practical workshop explaining the particular design principles concerned, with the aim to improve visual presentation using PowerPoint.

To conduct this study, 4-6 participants are required from across the university, representing a variety of Faculties, and need to meet the following criterion:

• Lecturing in a course of approximately 100 students or more in both this semester and the next (need not be the same course).

Further details of the study can be found in the attached email banner and Information Statement.

Suggested wording for the email you send to staff has also been attached.

Thank you in advance for your time and assistance.

Kind regards,

Chris Lawrence
Lecturer in Visual Communication Design
[My contact details]

[4 Attachments: EmailToStaff.rtf, RecruitBanner.jpg, InfoStatement.pdf, ConsentForm.pdf]
Suggested format of the email you send to eligible academic staff in your school:

To: [My email address]
From: [HoS email address]
Bcc: [Email addresses of all eligible candidates within your school]
Subject: Research Project: Designing Better Lecture Presentations

This email has been sent to academic staff who are believed to be delivering lectures in large courses (approximately 100 students or more) and delivering those lectures using digital presentations.

Dear Colleagues,

You are invited to participate in the research project 'Designing Better Lecture Presentations' which is being conducted by Chris Lawrence from the School of Education at the University of Newcastle. Your participation is entirely voluntary.

The research is part of Chris Lawrence's studies at the University of Newcastle, supervised by Dr Jill Scevak and Dr Robert Cantwell from the School of Education.

Please find attached the Information Statement for the Research Project outlining further detail about the project. If you would like further information please contact Dr Jill Scevak on [Phone number] or by email or Mr Chris Lawrence on [Phone number].

If you would like to participate, create an email, attach your consent form and send it to [My email address].