

UNIVERSITY OF NEWCASTLE

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What connection(s) would an analysis of science teacher writing (scientific language constructs, demands and implications) demonstrate between teacher language, student language, and student performance?

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DEDICATION

This PhD is dedicated to my family.

To Paul my husband and to my children Jehan Rhys Stephen and Kayla-Amani Robbi.

To my dad Robbie and to my mum Kathleen.

To my sisters Kerry and Krystal.

Kerry, you left suddenly, before the end, but I still remember what you said to me privately all those years ago when, when we were children. Those words meant the world to me then and they still do now.

Those words are why I did not give up.

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STATEMENT OF ORIGINALITY

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by any other person, except where due reference has been made in the text. I give consent to the final version of my thesis being made available worldwide when deposited in the University's Digital Repository subject to the provision of the Copyright Act of 1968.

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My parents, Robbie and Kathleen have always demanded the best from myself and my sisters. They have lead by example, always giving and doing their utmost, sacrificially for us and for others. My parents are both educators – my dad, Robbie is a retired head of Mathematics and my mum, Kathleen is a retired primary school principal. From visiting them at work, watching them teach, witnessing them bringing their students home in their hearts, I developed a love/hate/love relationship with schooling and education. From my father I developed a fascination with the world from a scientific viewpoint and a love for mathematics. My mother very deliberately placed within me a love for the written word and beautiful expression. My passions are an intriguing combination of their passions and for this I am grateful. As a child they nicknamed me Doctor Karina Richardson. I know they were thinking of a different kind of 'doctor', but the epithet was meant to inspire, challenge and encourage me - and it did. Because of them I never knew I could be limited by race or gender until the rest of the world tried its utmost to "put me in my place". By then however my sense of self, so engrained, though challenged was never defeated and for this I will remain ever grateful to my dad and mum.

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RESEARCH QUESTION

What connection(s) would an analysis of science teacher writing (scientific language constructs, demands and implications) demonstrate between teacher language, student language, and student performance?

More specifically:

- 1. What features characterise the language of science assessment tasks?
- 2. What features characterise the language of student responses to science assessment tasks?
- 3. What interactions exist between teacher assessment and student response language that might contribute to the differences in student outcomes?

ABSTRACT

The aim of the study is to ascertain the important linguistic associations between the language constructs of teacher designed assessment tasks and the language constructs of the student responses to these tasks. The data sample being utilised was generated from the SIPA (Systematic Implications of Pedagogy and Achievement) study conducted between 2004 and 2007 by the University of Newcastle, NSW, Australia.

Computer software (Wordsmith tools 6.0) is the instrument that has been utilised to explore the large corpus of data for descriptive linguistic features such as frequencies and distribution of words (technical and semi-technical) and word use in context (concordances). The investigation of a noteworthy portion of the data has been accomplished using a modified Hallidayan 'Systemic Functional Linguistic' analytical framework, the intent being the classification of the words generated by the Corpus Linguistics software instrument according to traditional grammatical descriptors of the word (parts of speech); the syntactic behaviour of words; the semantic operation of words; the morphological function of words and the meaning of words in context. A Language Complexity Model was developed for the study from the two descriptive viewpoints. This model was designed to analyse the text in a way that was specific to elucidating the features and challenges of scientific writing and the degrees to which these occurred in the samples. The model broke Language Complexity down into four components, namely Discourse-expression, Precision, Technicity and Elaboration. Statistical analyses involving the literacy related prior achievement of the students; the performance of the students on the standards referenced School Certificate examination and SIPA 'Teacher Practice (Language)', data obtained from classroom observations data from the teachers were conducted to determine associations with the Complexity of the language used in the teacher tasks examined and the corresponding students' responses to those tasks. Where possible inferences were made regarding whether or not Language Complexity in teacher writing could be a predictor of student performance. The results of the study will hopefully provide insight into the association between the novices' high or low achievement on scientific tasks and the scientific language used in the design of the task, by those with mastery and hopefully inform teaching practice in the future.