

**Multiliteracies for academic purposes: A metafunctional
exploration of intersemiosis and multimodality in university
textbook and computer-based learning resources in science**

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in fulfilment of the requirements for the degree of
Doctor of Education

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AUTHOR'S DECLARATION

This is to certify that:

- I. this thesis comprises only my original work towards the Degree of Doctor of Education.
- II. due acknowledgement has been made in the text to all other material used
- III. the thesis is less than 50,000 words in length, exclusive of tables, maps, bibliographies, appendices and footnotes.
- IV. no part of this work has been used for the award of another degree.
- V. this thesis meets the *University of Sydney's Human Research Ethics Committee (HREC) requirements for the conduct of research.*

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ABSTRACT

This thesis is situated in the research field of systemic functional linguistics (SFL) in education and within a professional context of multiliteracies for academic purposes. The overall aim of the research is to provide a metafunctional account of multimodal and multisemiotic meaning-making in print and electronic learning materials in first year science at university. The educational motivation for the study is to provide insights for teachers and educational designers to assist them in the development of students' multiliteracies, particularly in the context of online learning environments.

The corpus comprises online and CD-ROM learning resources in biology, physics and chemistry and textbooks in physics and biology, which are typical of those used in undergraduate science courses in Australia. Two underlying themes of the research are to compare the different affordances of textbook and screen formats and the disciplinary variation found in these formats.

The two stage research design consisted of a multimodal content analysis, followed by a SF-based multimodal discourse analysis of a selection of the texts. In the page and screen formats of these pedagogical texts, the analyses show that through the mechanisms of intersemiosis, ideationally, language and image are reconstrued as disciplinary knowledge. This knowledge is characterised by a high level of technicality in image and verbiage, by taxonomic relations across semiotic resources and by interdependence among elements in the image, caption, label and main text. Interpersonally, pedagogical roles of reader/learner/viewer/ and writer/teacher/designer are enacted differently to some extent across formats through the different types of activities on the page and screen but the source of authority and truth remains with the teacher/designer, regardless of format. Roles

are thus minimally negotiable, despite the claims of interactivity in the screen texts. Textually, the organisation of meaning across text and image in both formats is reflected in the layout, which is determined by the underlying design grid and in the use of graphic design resources of colour, font, salience and juxtaposition. Finally, through the resources of grammatical metaphor and the reconstrual of images as abstract, both forms of semiosis work together to shift meanings from congruence to abstraction, into the specialised realm of science.

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