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## Dedication

To Djamel Chatteur for a journey filled with laughter and love.

To my daughter Kate for giving me joy in life.

In the memory of Ian Trout, Australian gaming developer and true friend.

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## **Confidentiality**

The pattern writers and the laboratory experiment participants have been given pseudonyms.

## **Approval of the Human Ethics Committee**

The Human Ethics Committee of the University of Sydney granted approval for this research study, Reference number 10-2007/10073, granted 1st October 2007.

## **Statement of Originality**

This thesis is my original work, and has not been submitted in whole or in part, for a degree at this or any other university. Nor does it contain, to the best of my knowledge and belief any material published by another person, except as acknowledged in the text. I acknowledge the editorial assistance and proofreading by Dr Andy Dong and Dr Jennifer Gamble.

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## Abstract

This research addresses the need to make explicit the relation between pedagogy and the user interface, information architecture and content layout of e-learning courseware through design patterns. To do so, this research conceptualises a new type of design pattern called a 'design for pedagogy pattern', which explicitly shows the relationships between pedagogic strategies associated with the design elements featuring in e-learning courseware and those associated with the general and abstract ways of thinking about education including the social and the educational context of the learning, the preferred teaching practices of the instructors, and the tactics for engaging students. By creating representative design for pedagogy patterns for e-learning, the aim of the research is to understand how design for pedagogy patterns modify the design process for e-learning courseware.

A design for pedagogy pattern structure was produced by adapting the structure and content of design patterns to include pedagogical theories and teaching practices. Two learning theories, experiential learning and constructivism, were chosen as representative pedagogical theories to demonstrate the inclusion of pedagogy into design for pedagogy patterns. A method for writing design for pedagogy patterns was created based around a 'pattern pack', which helped pattern writers to identify the implementation of pedagogy in sample e-learning courseware so that their patterns of use could be embedded into design for pedagogy patterns.

Eight design for pedagogy patterns were created using the 'pattern pack'. These patterns were evaluated by pattern experts. The highest ranked pattern was evaluated to determine its effect on the design process compared to a published a non-pedagogically-based pattern. Designers and design educators were videotaped using the two patterns, and their design process was subjected to content analysis to determine the differences in the use of pedagogy in the design process. The designers and design educators were also interviewed to determine how design for pedagogy patterns modified their design process as compared to a standard design pattern.

The content analysis results show a statistically significant increase in pedagogical awareness when using the design for pedagogy pattern over the standard design pattern. The interview results indicate that the designers preferred the design for pedagogy pattern over the standard design pattern, commenting that it provided more scaffolding. The results also show that designers with differing levels of experience enact the pattern differently when it is put into use. A qualitative comparison between a representative design for pedagogy pattern and

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a standard design pattern was performed, which identified differences in ways of conceptualising e-learning courseware.

The main contributions of this research are:

- 1) The creation of a theory and method for embedding pedagogical theories into design patterns.
- 2) The use of the theory and method to produce design for pedagogy patterns.
- 3) The comparison of a standard design pattern and a design for pedagogy pattern to determine their effects on the design process.
- 4) Confirmation that the use of the design for pedagogy pattern allows designers to incorporate theories on teaching and learning into the design of e-learning courseware, thus facilitating a pedagogically-driven design process.



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