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Virtual Classroom Simulation:

Design and Trial in a Preservice Teacher Education Program

A thesis submitted by

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_____ , 24 August 2010

Simon Skrødal

This document was typeset with the MiKTeX distribution of LaTeX using the LyX document processor.

Til min kjære kone Rikki som alltid er der for meg,

vår sønn Haakon og en liten guttunge som snart kommer til verden...

I love you.

Contents

List of Tables

List of Figures

List of Algorithms

Abstract

"The Virtual Classroom Simulation, Design and Trial in a Preservice Teacher Education Program" (VCS), is trans-disciplinary research study that aimed to design, embed, trial and evaluate a simulation system and its learning outcomes. This document encapsulates the motivation, conceptualisation, theory, development, trials and evaluation behind the study. Expert technology transfer, particularly from areas in education, psychology, social sciences, conceptual modelling, computer science and underlying mixed methods research design, has been instrumental in underpinning the research and development of the VCS.

Prospective education students have preconceived ideas, or mental models, about teaching and learning that are often based on their own experiences as students. The School of Education at the University of Adelaide offers a number of courses that provide insights into both the theory and practice of education. The practicum component provides a valuable, real-life, experience that may improve education students' understanding about teaching, learning and classroom interactions. It may also enable them to better understand and apply effective teaching strategies to enhance student learning outcome. Some research studies, however, suggest that providers of teacher education do not sufficiently stimulate education students to challenge their own preconceptions about teaching and learning.

This study aimed to identify and deconstruct essential attributes of a specific teaching-learning context and reconstruct these in a virtual environment. *It involved the development of an interactive computer simulation training tool to be trialled in a population of education students.* The simulation was projected to be an important enabler of praxis (the nexus between theory, reflection and practice), thus useful in challenging and adjusting education students' mental models about student-teacher interaction.

The VCS and related materials (lecture, trial, surveys and assignment) were

integrated in the first-semester course "Student-Teacher Interaction in the Classroom 1", a compulsory course for students enrolled in the degrees of Bachelor of Teaching (4th year) and Graduate Diploma in Education. Prior to the delivery of an introductory lecture and administration of VCS user trials, student perceptions and views about the teacher, students, task and learning environment were elicited. The VCS and associated activities provided a gauge to understand changes to education students' mental models. *To determine and evaluate the effectiveness of the VCS and related learning, a number of objective measurement techniques and methods were used. In order to complement the quantitative methods utilised, qualitative research methods were used to examine the rich data source obtained through open-ended questions posed to the students.*

Many research studies have positioned the value of mixed-methods. *This study highlights the value of triangulation and the use of exploratory, explanatory and confirmatory models in understanding the interactions between the variables under study.* The research adapted carefully chosen instruments utilised in international studies, and these were re-validated through well established techniques such as confirmatory factory analysis and the Rasch Model. A substantial amount of qualitative data was quantified to add more detail in the structural equation model.

Path analysis of quantitative data suggests that the overall reactions to the VCS system were influenced by participants' comfort with computers. The educational value of the simulation, as perceived by the population, was strongly linked to the overall reaction to the VCS. More than 80% of the population viewed the educational value of the VCS as either high (~62%) or moderate (19%). A further ~70% thought that the VCS delivered an effective means of training. A majority of the participants (~75%) also believed that the VCS generated a valuable learning experience.

The findings are supported and enriched by the analysis of qualitative data, which shows that participants demonstrated a noticeable advancement in their level of thinking and understanding of educational theories induced through VCS interaction. Results from a VCS-related assignment, which made part of the education students' formal assessment in the course, validate these findings.

One cycle of VCS development, course integration, and user trials was implemented in this study. The final outcomes suggest that the VCS added value

to a population in teacher education. Experiences and feedback from the population also introduced a number of areas to consider for future research and development.

The study concludes that more research and development be put into the VCS with the aim of making the system available to all providers of teacher education in Australia. It further highlights the need for quality assurance for any simulation (or objects) developed for learning. The triangulation of research methods highlights the contribution of mixed methods to this pertinent study.

Acknowledgments

It has been said more than a couple of times that a PhD research study can be a daunting and prolix affair. This could not be any further from the truth if you ask me. True, the past few years do feel like a lifetime, but only because they have been filled with so many diverse and rewarding experiences.

A rather important objective of a candidature is to receive a certificate of PhD. Along the way, I have managed to pick up a few others as well. No more than one wedding certificate (thankfully) and no less than two birth certificates are certainly the most precious awards that I will ever receive in my lifetime. A very special thank you is therefore apposite for my wife Rikki, who is such an amazing, inspirational, supportive and loving partner, friend, mother and teacher; you are the best 'better half' that has ever existed in the history of the world.

Of the many certificates that I have received, none would have come to existence had it not been for the man responsible for my returning to Australia in the early beginnings of this millennium (2002, that is, should someone happen to be reading this in future millennia). I certainly have more than just a thing or two to thank my main supervisor Sivakumar 'Siva' Alagumalai for, though I have to be careful not to turn this section into another dissertation. Siva, you have been a constant source of inspiration, wisdom, passion and all the other fabulous adjectives one would find in a dictionary. Thank you for your support and for sharing what it means to be a true academic, a great leader and a compassionate individual. Behind a great man is a great family, so I would like to extend my sincere thanks to the Sivakumar family as well.

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Awards and Publications

Awards

- This research study was supported by the Australian Postgraduate Awards Scheme (APAs).
- The researcher was successful in receiving the Commercialisation Training Scheme (CTS), an award designed to develop the commercialisation skills of up and coming researchers. It covered tuition fees up to the value of $8,500AUD and scholarship payments to the researcher of $12,000AUD in total. The award was put towards a Graduate Certificate in Science and Technology Commercialisation.
- The researcher received a Graduate Certificate in Science and Technology Commercialisation from the Entrepreneurship, Commercialisation and Innovation Centre (ECIC), University of Adelaide, in 2009.

Scholarly book chapters

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Other

- Alagumalai, S., Skrødal, S. and Ben, F. (2009). Funding awarded by the PVC (L&Q), University of Adelaide, to undertake the *Effective Feedback Project*. Poster selected to be presented at the Inaugural Education Expo (May, 2010).

- Ben, F., Skrødal, S., Maniam, V., Alagumalai, S. (2010). Funding awarded by the Faculty of the Professions, University of Adelaide, to undertake a faculty-wide research study on *Blended Learning*; a longitudinal study which involves all 1st year students in the Faculty. A final report will be presented to the Faculty in late 2010.