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Automating the Measurement of Critical Thinking in Discussion Forums

A thesis presented in partial fulfilment of the requirements for the
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Abstract

Critical thinking is seen as an essential skill for survival in the 21st century and those involved in education agree that encouraging students to think critically is an essential requirement of the educational system. There is considerable debate among educationalists concerning the most effective way to encourage the development of critical thinking skills and little agreement on the best way to measure evidence of critical thinking.

This study examines what is meant by the term critical thinking and investigates some of the tools that have been used to measure evidence of critical thinking. The study concentrates on the measurement of critical thinking among discussion forum participants and describes the development and testing of a tool designed to automate the process of measuring critical thinking.

Since the study involved the design, development and testing of a computerised tool, an action research approach was adopted. Action research gained popularity among information systems developers around the mid 1990s. It is seen as a methodology that encourages the generation of scientific knowledge by allowing the researcher to modify intentionally a real setting and carefully evaluate the results.

The study describes the development of an automated text classification system that uses content analysis to classify discussion forum transcripts using critical thinking models developed by Garrison, Anderson, & Archer (2000), Henri (1992) and Perkins & Murphy (2006). The findings from the study suggest that automated tools have the potential to assist in the measurement of critical thinking abilities and are worthy of further investigation.

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Ethics Committee Approval Statement

Ethical approval for this project was obtained from the Massey University Human Ethics Committee and the Eastern Institute of Technology, Hawke's Bay Research and Ethics Committee.

A copy of the Massey University Human Ethics Committee approval document is provided in Appendix A.

A copy of the Eastern Institute of Technology, Hawke's Bay Research and Ethics Committee approval document is provided in Appendix B.

List of Publications

Book Chapters

- Corich, S., Kinshuk., & Jeffrey, L. M. (2007). The use of discussion forums in learning communities. In R. Luppigini (Ed.), *Learning communities in online education* (pp. 87 - 108). Charlotte, NC: Information Age Publishing.
- Corich, S., Kinshuk., & Jeffrey, L. M. (2010). Automating the measurement of critical thinking for individuals participating in discussion forums. In D. Ifenthaler, P. Isaias, J. M. Spector, Kinshuk, & D. G. Sampson (Eds.), *Multiple perspectives on problem solving in the digital age* (pp. 143 - 158). New York: Springer.

Refereed Journals

- Corich, S., Kinshuk., & Hunt, L. M. (2004). Assessing discussion forum participation: In search of quality. *International Journal of Instructional Technology and Distance Learning*, 1(12), 3 -12.
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- Corich, S. (2009). Using an automated tool to measure evidence of critical thinking of individuals in discussion forums. In S. Mann & M. Verhaart (Eds.) *Proceedings of the 22nd Annual Conference of the National Advisory Committee on Computing Qualifications*, pp. 59 - 64, July 4 - 8. Auckland, New Zealand. Retrieved from <http://hyperdisc.unitec.ac.nz/naccq09/proceedings/pdfs/15-21.pdf>.
- Corich, S., Kinshuk., & Hunt, L. M. (2004). *Using discussion forums to support collaboration*, Paper presented at the Third Pan Commonwealth Forum on Open Learning, 4 - 8 July. Dunedin, New Zealand. Retrieved from http://www.col.org/pcf3/Papers/PDFs/Corich_SStephen.pdf

- Corich, S., Kinshuk., & Hunt, L. M . (2006). *Measuring critical thinking within discussion forums using a computerised content analysis tool*. Proceedings of Fifth International Conference on Networked Learning 2006, 5 - 7 May. Lancaster University, England. Retrieved from <http://www.networkedlearningconference.org.uk/past/nlc2006/abstracts/pdfs/P07%20Corich.pdf>
- Corich, S., Kinshuk., & Jeffrey, L. M. (2007). *Changing focus from group to individual: Using an automated tool to measure evidence of critical thinking in discussion forums*. Paper presented at the IADIS International Conference CELDA, December 7 – 9. Portugal. Retrieved from http://www.iadis.net/dl/final_uploads/200714L022.pdf
- Corich, S., Kinshuk., & Jeffrey, L. M. (2009). *Automating the measurement of critical thinking for individuals participating in discussion forums*. Paper presented at the IADIS International CELDA Conference, November 20 – 22. Rome, Italy.

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