Teacher education students' use of concept maps as cognitive tools within assessment

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**Recommended Citation**  
Neville, Victoria; Bennett, Sue; and Lockyer, Lori, "Teacher education students' use of concept maps as cognitive tools within assessment" (2009). *Faculty of Science, Medicine and Health - Papers: part A*. 2338.  

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Abstract
Poster that was presented at the HERDSA 2009 Conference.

Disciplines
Medicine and Health Sciences | Social and Behavioral Sciences

Publication Details

This conference paper is available at Research Online: https://ro.uow.edu.au/smhpapers/2338
Introduction
Students enrolled in a first year teacher education subject about using information and communication technologies (ICT) in teaching were required, for an assessment task, to construct a concept map that illustrated their knowledge of how ICT could be used in teaching. Students were instructed in using Smart Ideasâ® concept mapping software which is available in many schools.

A concept map is a cognitive organisational tool to help learners clarify their knowledge and make that knowledge explicit through the structural arrangement and linking of concepts and their relationships to generate meaningful propositions (Novak & Gowin, 1984, 2008). Learners’ use of cognitive learning tools, such as a concept map, is influenced by their “approach to learning”, either a deep approach or a surface approach to learning (Entwistle, 1998).

Method
This study sought to identify: 1 - the structural features of participants’ concept maps as demonstration of their knowledge of how to use ICT in teaching; 2 - participants’ approach to learning as revealed through map content word choice. Accuracy of participants’ knowledge was not assessed. Two different methods for analysing the concept maps of the twelve study participants were utilised. Method 1 analysed structural features of each participant’s map using Novak and Gowin’s (1984) structural scoring system. This method is appropriate for an analysis of structure rather than content accuracy. Method 2 analysed how the use of words on each map conveyed participants’ “approach to learning”.

Findings
All participants were able to use Smart Ideasâ® concept mapping software to construct their concept maps. However, their maps generally reflected few of the structural features necessary to convey meaning. The maps included concepts and hierarchical organisation, but concepts were often combined, poorly organised and embedded in a hierarchically shallow structure. In addition, none of...
the maps included valid cross-links or propositions of any kind.

Only half of the participants’ maps demonstrated some evidence of a deep approach to learning through the use of novel words and ideas, explanations, and examples. Surface learning was demonstrated by eight participants’ maps through direct duplication or minimal paraphrasing of lecture notes.

Conclusions
Analysis suggests that explicit instruction in how to construct concept maps, not merely in how to use the software, is essential for this assessment strategy to be effective. When students develop a good grasp of the structural features of a concept map and its relevance to enhancing their cognition and, consequently, their learning, then they may feel encouraged to adopt a deep approach to learning.

References