Using self regulated learning to manage the discomfort of becoming fluent with information technology

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The technologically complex and changing world of the twenty first century requires teachers who are both knowledgeable and skilled in using information technology in their pedagogical practices. The changing nature of information technology means that teachers need to be flexible in how they use information technology in their teaching, adaptable to the changes in technological developments, problem solvers in unfamiliar circumstances, and continuing learners throughout their professional life. These ideas are encapsulated in the concept of fluency with information technology, or FITness (Committee on Information Technology Literacy, 1999).

This research study, in progress, uses an interpretive, qualitative methodological approach to investigate the influence of self regulated learning on the development of fluency with information technology in pre-service teacher education students. This will provide opportunities for a better understanding of the phenomenon of self regulated learning as an influence within the context of learning FITness, and will assist our understanding of the connections between instruction (using self regulated learning) and outcomes (FITness).

Keywords: fluency with information technology, FITness, self regulated learning, qualitative research.

Introduction

The rapidly changing nature of information technology (IT) development and the increasingly complex contexts in which education operates means that teachers must become, not merely competent at using computers, but fluent with IT. Fluency with IT (FITness) requires the development of such personal characteristics as self reliance and commitment to ongoing learning about IT, creativity and adaptability in approaching new technologies and their uses, the ability to conceptualise IT principles and processes, motivation to sustain learning, and the ability to monitor ones own thinking and learning strategies (Committee on Information Technology Literacy, 1999). These characteristics are also inherent in self regulated learning (SRL) (Zimmerman, 2001).

The purpose of this paper is to describe a research study in progress that seeks to understand how curriculum structures and instructional processes may assist pre-service teacher education students to become lifelong, self regulated learners who strive to overcome their initial discomfort and develop fluency with IT.

Background to the study

The concept of "FITness" is relatively recent. It includes traditional notions of computer competence as well as adaptable, problem solving, future oriented learning capabilities. These also reflect the characteristics necessary for lifelong learning (Candy et al., 1994). While there has been much rhetoric on the need for pre-service teachers to develop IT skills and utilise IT in their pedagogical practice, there has been little research on the nature of their developing FITness. This type of research is especially sparse in the context of pre-service teacher preparation in Australia.

There is abundant research on the influence of self regulated learning on academic performance (Elias & Loomis, 2000; Pajares, 1996). Winne and Stockley (1998) suggest that computer technologies may assist learners' development of self regulated learning. There is, however, a dearth of research on the influence of self regulated learning on computer fluency development. This may be because traditional notions of computer literacy have focussed on the finite, competency approach rather than on the concept of fluency with its inherent future oriented, lifelong learning needs.

Winne and Perry's (2000) analysis of quantitative measures of SRL found that most previous research in the field considered SRL as an aptitude, stable within an individual across different settings. This has contributed to our understanding of how various features of SRL work. However, researchers now recognise that more research needs to be undertaken in exploring SRL as an event developing in real contexts over time (Perry, 2002), and how the nature of those contexts influence learners' cognition and motivation (Anderman & Anderman, 2000; Pintrich, 1994). We anticipate that this study will contribute to this field by investigating one way of endeavouring to assist pre-service teachers in Australia to become capable, fluent and lifelong learners and users of information technology for their professional practice.

Figure 1 illustrates the inter-relationships of concepts underpinning this research, that is, of self regulated learning, lifelong learning and FITness capabilities on teaching professional practice.
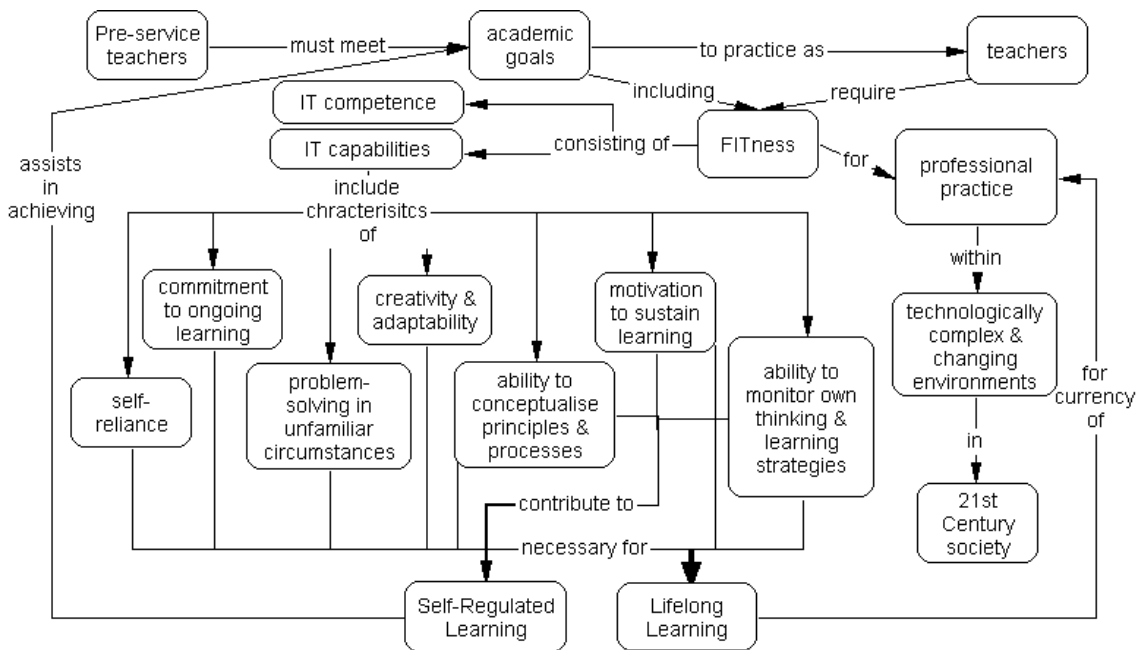

Figure 1: Relationship of self regulated learning and FITness to teaching practice

The research study

This study seeks understand the influence of self regulated learning on learning FITness; and identify factors which influence the development of self regulated learning and FITness in pre-service teachers. This study uses an interpretive, qualitative approach because it seeks to understand, from the student's experience, how self regulated learning strategies assist learners to develop fluency with information technology. Data collection methods include semi-structured interviews and collection of student assignments in which self regulated learning strategies and/or FITness components are embedded.

Context

The context for this study is the subject "Information Technology for Learning", undertaken by students in their first or second year of the Bachelor of Teaching degree at the University of Wollongong. This subject had been offered using lectures and laboratory tutorial practice, with standard computer hardware

and software found in New South Wales schools. Lectures provide opportunities for students to learn about the principles and practice of the use of IT in schools, and then consolidate this learning with their skill practice in the computer laboratory tutorials. In 2004, changes to the design of the subject and teaching approach have been made to incorporate the notions of self regulated learning and fluency in IT.

Curriculum re-design and teaching approach

Being a capable IT user requires students to become future oriented, autonomous learners and problem solvers in unfamiliar IT contexts. Self regulated learners are able to manage their own learning. It is appropriate, therefore, that students learn IT capabilities through curriculum embedded self regulated learning strategies. Garcia and Pintrich's (1994) model of self regulated learning provides a framework that was used to guide the learning activities within the IT curriculum.

In 2004, the curriculum design of the "Information Technology in Learning" subject was revised to ensure that it incorporated opportunities to utilise self regulated learning strategies and develop capabilities necessary for FITness. A self regulated learning strategy of goal setting, strategic planning and self monitoring was introduced by providing students with a checklist of questions to guide their attention when approaching each assignment. Similarly, a design matrix for web site creation provided a cognitive organisational strategy for student learning. A concept mapping activity was included to introduce students to another cognitive organisational strategy to enhance their learning skill repertoire.

Students developed the knowledge and skill component of FITness by using current software and hardware to create IT resources and design IT supported lessons. The assessment tasks provided opportunities to develop FITness capabilities as students adapt their multimedia design to a hypertext medium; work in small groups to analyse educational software; collaborate on the re-design of a lesson provided by a local teacher; conceptualise how IT may be integrated into their teacher roles; and think about their future professional development as technology changes.

The curriculum focus on self reliance in learning was reinforced by the approach of the academic teaching team members. Instead of simply providing answers to students' questions about using the technology, academic staff were advised to provide support in ways that helped students to learn for themselves. Rather than give the solution to a student question, staff would re-phrase the question to help clarify the key components of the student's difficulty, and then ask questions of the student in order for the student to ultimately identify the problem solution. This process reinforced the self regulated aspect of focussed questioning for learning. Eventually students would learn to refine their questions and seek their own answers. Student generated solutions are more likely to result in meaningful learning and builds confidence, than having the solution provided for them.

Data collection and analysis

Fifteen students volunteered from the group of 140 enrolled in "Information Technology for Learning" in 2004. They gave permission for the researchers to collect their assignments for analysis after their results were finalised, and agreed to be interviewed at the beginning and end of semester. Interview questions addressed primary knowledge and strategy constructs of self regulated learning identified by Garcia and Pintrich (1994), such as self schema, goal orientation, cognitive and metacognitive strategies, and resource management. Questions were also asked about FITness concepts, such as skills development, problem solving, adaptability and future learning. Different types of questions were asked to prompt description of actions taken by participants, expressions of their values and opinions, emotional responses and sensations about the relevant issues from participants' experience, as recommended by Patton (2002). Teaching staff were also interviewed in order to explore their perspectives on aspects of the curriculum which helped or hindered student learning. Interviews were audio recorded and are in the process of being transcribed for analysis. Students also provided electronic copies of their assignment work for the subject. The concepts of FITness as operationalised in the subject design will be developed into a framework for analysing the students' assignment work. Thus, learners' achievement of certain learning outcomes will also be used as a measure of FITness. Data analysis will commence in 2005.

Conclusion

The researchers hope that this research study may lead to a better understanding of how instructional processes, especially those using self regulated learning, may assist educators to prepare students to move beyond their initial discomfort to a position of confidence and self reliance, especially in relation to becoming fluent with information technology.

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