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Renata Phelps
Southern Cross University

Allan Ellis
Southern Cross University

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Helping Students to Help Themselves: Case Studies from a Metacognitive Approach to Computer Learning and Teaching

Renata Phelps

Lecturer

School of Education

Southern Cross University

PO Box 157, Lismore 2480, Australia

rphelps@scu.edu.au

Allan Ellis

Associate Professor

School of Social and Workplace Development

Southern Cross University

PO Box 157, Lismore 2480, Australia

aellis@scu.edu.au

Abstract

End-user training in the use of computer software and hardware has become a significant area of professional development in a range of educational, organisational and community contexts. However, technology is developing at such a rapid rate that, if an individual undertakes training in how to use a particular piece of software, that knowledge is likely to be inadequate or out-of-date in a very short period of time. Training contexts that emphasise the centrality of the 'trainer' or teacher inevitably foster learner dependency. Although such learning contexts may be 'comfortable' and 'familiar' for some students they do not accord with the learning patterns of many 'capable' computer users. Computer education, which fosters learner independence, holds greater potential for developing life-long, capable computer users in rapidly evolving technology contexts. Three case studies are presented which illustrate the potential of a metacognitive approach to computer learning in 'helping students to help themselves'.

Introduction

'Within many vocations, technology is changing at such a rate that one's occupational preparation can become obsolete in a matter of years. One of the specific implications of such rapid technological developments is the heightening of the need for learning throughout life' [1]. This statement is no more relevant than in the context of computer education and training. End-user training in the use of computer software and hardware has become a significant area of professional development in a range of educational, organisational and community contexts. Yet, technology is developing at such a rapid rate that, if an individual undertakes training in how to use a particular piece of software, that knowledge and skill set is likely to be inadequate or out-of-date in a very short period of time. This rate of change, which can often be measured in terms of months not years, particularly for individual software products and hardware components, places immense strain on everyone involved with technology and can produce adverse cognitive, affective and motivational consequences [2]. Relevant professional development

programs for computing require more than skills training. They require a focus on attitudes, values and beliefs that develop confidence for ongoing learning. Learning to use computers involves learning to adapt to change, to be flexible, intuitive and above all persistent. Learning through independent hands-on experience and regular practice is vital. Learners who know how to be self-directed and independent will be more successful than those dependent on structured routines or guidelines [3, 4]. Successful computer learning thus requires learning approaches closer to those implicit in the contemporary adult education literature.

The research described in this paper addresses two of the conference's key questions, namely that *'tutors' culture leads them to expect to teach; why should they change that role?'*; and that *'learners' culture leads them to expect to be taught; why should they have to work more?'* The first of these two questions is answered through the argument above. Technology is developing so quickly that it makes no sense for teachers to try to hold on to a central directive role in 'training'. The direction of computer learning cannot rest solely in the hands of teachers for purely pragmatic reasons. The pace of change itself makes such a centrality impractical and certainly not cost effective.

It is from just this basis, a perceived necessity to emancipate computer learners from a reliance on the role of the tutor, that this research arose. This presentation reports on an action research project which has been focusing on developing teaching approaches which foster 'capable' computer users [5-7]. It will be demonstrated that while *some* students certainly do 'expect to be taught' and do find the transition to a more active role in the learning process difficult, for others this is a liberating experience. It will also be argued that an approach to computer learning which is experiential, exploratory, reflective and directed *by* learners is an approach which comes naturally to many, particularly once they are given 'permission' and flexibility to legitimise their already innate learning modes.

The research discussed in this presentation focussed upon the development and delivery of a computer unit offered as a core to pre-service teacher education

students in both the Bachelor of Education (Primary) and Diploma of Education (Secondary) degrees at Southern Cross University, NSW, Australia. The conference presentation of this paper will present a series of case studies, drawn from the action research undertaking, to illustrate how a metacognitive approach to computer learning can 'help students to help themselves'.

The Metacognitive Approach

The term 'metacognition' refers to knowledge concerning one's own cognitive processes and products or anything related to them [8]. Informed by the literature surrounding metacognition and metalearning [9-11] and Ertmer and Newby's [12] notion of 'expert learners', this research has entailed the development and refinement of a metacognitive approach to computer education. The resultant model will be demonstrated in the presentation. In the context of the research, metacognitive teaching approaches were defined as those which assist the student to become more aware of their current attitudes towards computers (metacognitive knowledge) and their past and current learning approaches with regard computer skills (metacognitive experience and strategies).

Theory surrounding aspects of metacognition, and its relevance to computer use, was shared with students. The Unit provided a range of prompts for learners to relate prior experiences to new learning tasks through active processes of inquiry and reflection. Student were required to keep a journal which documented their reflections, although the journal task remained quite open and flexible, allowing students the opportunity to demonstrate their experiences and understandings in multiple and varied ways. The students were thus provided with maximum flexibility in the content and assessment and were encouraged to 'experiment' with a range of learning approaches, including self-directed and small group approaches.

To illustrate how this research can enhance understanding of the two conference questions, three contrasting case studies will be presented. These case studies tell us quite a lot about the two conference questions, particularly in the computer learning context. Firstly, not all students necessarily prefer to be taught in a teacher directed context. Many students assume, and come to prefer, self-directed computer learning approaches. These students are inevitably the 'capable' ones. Many aspects of this research support the notion that the flexible learning context is confronting and surprising for many students and does require changes in expectation. However for many students, being given the support structures and frameworks, and more importantly, the validation to learn independently, can be an empowering and liberating experience. Some students will inevitably be

confronted by non-teacher directed learning. However, wrapping such an approach in a metacognitive framework can assist students to engage in both cognitive self-appraisal and cognitive self-management [13]. In this framework computer teaching fosters independent and capable computer users and 'helps students to help themselves'.

References

1. Candy, P., G. Crebert, and J. O'Leary, Developing Lifelong Learners through Undergraduate Education. 1994, Canberra: Australian Government Publishing Service.
2. Rozell, E.J. and W.L. Gardner, Computer friend or foe? The influence of optimistic versus pessimistic attributional styles and gender on user reactions and performance, in Attribution Theory: An Organizational Perspective, M.J. Martinko, Editor. 1995, St Lucie Press: Delray Beach, Florida. p. 125-145.
3. Ropp, M.M., Exploring individual characteristics associated with learning to use computers and their use as pedagogical tools in preservice teacher preparation, in Department of Counseling, Educational Psychology and Special Education. 1997, Michigan State University.
4. Ropp, M.M. A new approach to supporting reflective, self-regulated computer learning. in Society for Information Technology and Teacher Education 98. 1998.
5. Phelps, R., Mapping the Complexity of Computer Learning: Journeying Beyond Teaching for Computer Competence to Facilitating Computer Capability. 2002, Southern Cross University: Lismore.
6. Phelps, R. Capability versus competency in information technology education: Challenging the learning context for lifelong technological literacy. in Eighth International Literacy & Education Research Network Conference on Learning. 2001. Spetses, Greece.
7. Phelps, R., A. Ellis, and S. Hase. The role of metacognitive and reflective learning processes in developing capable computer users. in Meeting at the Crossroads: Proceedings of the Australian Society for Computers in Learning in Tertiary Education (ASCILITE). 2001. Melbourne: University of Melbourne.
8. Flavell, J.H., Metacognitive aspects of problem solving, in The Nature of Intelligence, L.B. Resnick, Editor. 1976, Erlbaum: Hillsdale, NJ. p. 231-235.
9. Biggs, J., The role of metalearning in study processes. British Journal of Educational Psychology, 1985. 55: p. 185-212.
10. Bandura, A., Cultivating competence, self-efficacy and intrinsic interest through proximal self-motivation. Journal of Personality and Social Psychology, 1981. 41(3): p. 586-598.
11. Zimmerman, B.J., S. Bonner, and R. Kovach, Developing Self-regulated Learners: Beyond Achievement to Self-efficacy. 1996, Washington, DC: American Psychological Association.
12. Ertmer, P.A. and T.J. Newby, The expert learner: Strategic, self-regulated and reflective. Instructional Science, 1996. 24: p. 1-24.
13. Paris, S.G. and P. Winograd, How metacognition can promote academic learning and instruction, in Dimensions of Thinking and Cognitive Instruction, B. Jones and L. Idol, Editors. 1990, Lawrence Erlbaum: Hillsdale, NJ. p. 15-51.