2006

I can u can: six strategies for building teachers' ICT confidence and capability through metacognitive discussion and reflection: experiences from Technology Together

Renata Phelps
Southern Cross University

Anne Graham
Southern Cross University

Sharon Brennan
St Augustine's Primary School, Coffs Harbour

Carolyn Carrigan
Mary Help of Christians Primary School, Sawtell

Publication details

Phelps, R, Graham, A, Brennan, S & Carrigan, C 2006, 'I can u can: six strategies for building teachers' ICT confidence and capability through metacognitive discussion and reflection: experiences from Technology Together', paper presented at the Australian Council for Computers in Education Conference (ACEC), Cairns, Qld, 2-4 October.

Accepted for the Australian Computers in education conference (ACEC) 2006
Cairns, Qld, October 2-4, 2006
http://www.acec2006.info

I Can U Can: Six strategies for building teachers' ICT confidence and capability through metacognitive discussion and reflection: Experiences from Technology Together

Renata Phelps and Anne Graham
Centre for Children and Young People
Southern Cross University

Sharon Brennan
St Augustine's Primary School, Coffs Harbour

Carolyn Carrigan
Mary Help of Christians Primary, Sawtell

Abstract

When people are prompted to think about their values, beliefs and their past experiences they will often start to recognise factors that impact on their learning and this recognition can bring key insights into how they can help themselves to change. It can assist them to realise the strengths and limitations of various learning strategies and change their perspectives and behaviours. Computer learners can also be prompted to see that becoming a proficient computer using teacher is more about their attitudes and learning strategies than it is about having some 'magic' personal quality or set of skills. Technology Together, the ICT professional development approach that forms the basis of this paper, employs a metacognitive approach to teacher learning and fosters discussion and reflection within the whole school community. This paper describes and provides evaluative feedback on six strategies that can be implemented within a whole-school context. The paper provides evidence of the value of such strategies in building school cultures that are supportive of teachers' ongoing learning.

INTRODUCTION

Teacher professional development for ICT integration is complex and is influenced by an interplay of personal factors pertaining to teachers and cultural factors pertaining to schools. Simplistic approaches such as increases in hardware provision or training in specific skills, software or hardware are rarely successful in themselves in challenging or transforming teaching practice. As has been emphasised in a number of other papers (Phelps, Graham & Kerr, 2004; Phelps, Graham & Thornton, 2006), including another presented at this conference (Phelps, Graham, Watts & O'Brien, 2006), computer learning involves changes in attitudes, values and beliefs that develop confidence for ongoing learning. It involves learning to adapt to change, to be flexible, intuitive and above all persistent. In short, it requires the fostering of teachers who know how to be self-directed and independent in their computer learning (Melczarek, 2000), rather than those dependent on structured routines or guidelines. But it also requires the building of supportive school cultures which encourage teachers to continually learn and experiment with new technologies and changes in pedagogy.

Reflection might be defined as a mental process in which one thinks about things by going back over them. Reflectivity involves mental reaction to perceived issues and inconsistencies and a willingness to challenge personally held values, beliefs and assumptions. Since the early work of Schön (1983), reflection has been embraced as an important component of adult and professional education. Reflection plays a central role in action learning and action research (Carr & Kemmis, 1990) and the related approach of experiential learning (Boud, Keogh & Walker, 1985; Kolb, 1984), whereby knowledge is created by the transformation of experience through observation and reflection.

Reflection can take many forms in teaching and learning. It can be an individual or group activity; it can be formative, cumulative or summative; verbal or written; shared or introspective; assessed or non-assessed (Phelps, 2005).

A number of recent teacher professional development initiatives, including some focused on ICT, have emphasised the importance of systematic reflection (for example, Coutts, Drinkwater & Simpson, 2001; Eham, Bonk & Yamagata-Lynch, 2005; Ferdig, 1998; Fokias, 1999; Ross, Johnson & Ertmer, 2002). However few papers document tangible ways in which schools can facilitate rigorous discussion and reflection by the whole school community.

In this paper we draw on experiences gained within the first cycle of an action research project that is currently developing an approach to teacher professional development in ICT. Known as *Technology Together*, this approach is founded on a metacognitive approach to computer learning (Phelps, Graham & Kerr, 2004). The paper looks specifically at six strategies which were trialed by schools involved in the process to facilitate systematic and considered discussion and reflection by teachers within the whole-school environment.

WHAT IS THE METACOGNITIVE APPROACH?

'Metacognition' refers to knowledge concerning one's own cognitive processes, and the active monitoring and regulation of these processes in the pursuit of goals (Flavell, 1976). It involves both self-appraisal (reflection about what you know and how you think) and cognitive self-management (the ability to plan and implement appropriate strategies and to monitor, adjust and 'trouble shoot' performance) (Jones & Idol, 1990; Paris & Winograd, 1990). The benefits of metacognitive teaching approaches lie in their ability to transfer responsibility for monitoring learning from teachers to learners and in promoting positive self-perceptions, affect and motivation (Paris & Winograd, 1990). Metacognition is a key element of learner self regulation, where students activate and sustain thoughts, behaviours and affects which support the attainment of their goals (Schunk & Zimmerman, 1994). Reflection is key to this development of 'expert learners' (Ertmer & Newby, 1996). To summarise, metacognitive approaches entail supporting learners to be aware of the knowledge and skills they do or do not possess, and to use appropriate strategies to actively implement or acquire them. In contexts of rapid change and unfamiliar content domains, such as are inevitable with technology, this understanding of 'how' to learn provides distinct advantages (Ropp, 1997). It is these distinctions and definitions that underpin *Technology Together*.

WHAT IS *TECHNOLOGY TOGETHER*?

Technology Together is a collaborative research and development initiative of the Catholic Education Office, Lismore Diocese and Southern Cross University. The project has received funding for 2004-2007 from the Australian Research Council (ARC). The research aims to:

- determine the effectiveness of the metacognitive approach in supporting teachers' professional development in ICT in a whole-school context;
- develop and refine practical approaches to schools' implementation of the approach;
- understand the role of school executive in influencing teachers' approaches to computer use;
- enhance understanding of the nexus between school culture and ICT integration;
- produce research-based and tested professional development facilitation resources that can support schools' approaches to teacher professional development in ICT.

In a practical sense, the project aims to: increase teachers' confidence in using computers; increase teachers' integration of ICT in their teaching; support teachers to implement curriculum and scope and sequence documents; diversify teachers' ideas and knowledge about how they might integrate ICT and increase teacher dialogue within the whole-school context regarding ICT.

Technology Together and the metacognitive approach have a clear focus on experiential learning, encouraging teachers to implement initiatives in their classrooms, thus resulting in immediate learning outcomes for students. *Technology Together* provides strategies to support individual teachers and whole schools in a goal-setting process whereby everyone involved identifies and focuses on *initiatives* that are most relevant to their own needs. *Technology Together* then supports schools to implement a range of strategies for supporting teachers throughout the year; strategies which are consistent with the metacognitive approach, and which build supportive school cultures through reflection and discussion.

The *Technology Together* logo represents the approach and philosophy of the process. The motto 'I can, U can' represents the strong focus on building teachers' confidence with ICT integration. The logo also represents the collaborative and supportive underpinnings of *Technology Together*, with teachers working together to build a stronger school culture for learning.

As an action research project Cycle 1 (2005) of *Technology Together* involved seven schools (six primary and one secondary) in planning, implementing and evaluating initiatives and refining various metacognitive strategies. Cycle 2 (2006) is involving a further nine schools (eight primary and one secondary) in implementing and refining these further. Data in this paper are drawn from the final reports from the seven schools involved in 2005. More information about the research methods employed and the *Technology Together* process itself are presented elsewhere (Phelps, Graham, Watts & O'Brien, 2006).

METACOGNITION IN THE *TECHNOLOGY TOGETHER* PROCESS

Technology Together provides mentors and facilitators with information and guidance (grounded in prior research) about the factors that impact on teachers' learning in relation to ICT; factors such as attribution, help seeking, cognitive playfulness, problem solving, volition etc (for further details see Phelps, forthcoming 2006). It provides suggestions and strategies as to how these ideas might inform their approaches to supporting teachers' learning and how they might engage teachers in reflecting on, and discussing, these factors and their learning strategies themselves.

This paper will focus specifically on six strategies for facilitating and supporting whole-school reflection and discussion that were trialed in *Technology Together* schools in 2005. The six strategies are:

- Embedding discussion in staff meetings
- Reflection sheets and scaffolds
- Reflective journals
- Visual displays and graffiti boards
- Informal discussions; and
- Video reflecting

STRATEGY 1 - EMBEDDING DISCUSSION IN STAFF MEETINGS

Most of the schools involved in *Technology Together* in 2005 had previously included occasional segments on technology related issues in their staff meeting. *Technology Together*, however, prompted them to be more focused, structured and regular in allocating time for staff to reflect on the ICT-related activities and learning that they had been involved in since the last meeting. In some schools,

staff meeting time was used for reflective journaling (discussed below), while in other schools verbal discussion was employed. Allocation of regular time was seen as important in:

- emphasising that *Technology Together* (and hence ICT learning) was important and valued by the school;
- ensuring that *Technology Together* (and hence ICT learning) remained at the forefront of teachers' attention;
- keeping up momentum in teachers learning; and
- providing an opportunity for showcasing and celebrating teachers' achievements.

As one participating school reported, 'providing a regular *Technology Together* time slot at staff meetings was an effective strategy in engaging teachers in the process. As first item on the meeting agenda each week, *Technology Together* was seen as valued by the executive and as having an important profile in our school'. As another school recounted:

> Initially we used staff meetings to attempt to incite passion and commitment for the project by brainstorming a list of potential ICT applications to our mentees. Similarly, we originally made an effort in an early staff meeting to highlight the importance of metacognitive reflection when using computers so that staff could note changes in their use of technology and to see how much more capable they had become (*Technology Together* Mentor, 2005).

Staff meetings were thus an important opportunity for motivating and engaging staff, building whole-school dialogue, sharing and celebrating and for supporting culture change. Keeping a strong focus on supporting not only skill development, but values, attitudes, motivations, confidence and learning strategies was important. As one teacher reflected,

> Individuals felt comfortable to share either their successes, their failures or their ideas. No staff member was reluctant to contribute and these sessions usually sparked excited conversation. These discussion sessions were very valuable and were obviously seen as non threatening because many of the staff would often preface a question with "I know this is probably a stupid question but…" (*Technology Together* Mentor, 2005).

There were, however, issues with staff meeting discussions. In one school, staff were reluctant to comment in the bigger whole-school group, however 'in the smaller group and with a more relaxed atmosphere on the planning day, talk flowed easily'.

While it was acknowledged as difficult to devote significant amounts of time on a regular basis, 2005 participating schools strongly recommended that *Technology Together* be give a permanent place on the staff meeting agenda and that any time, no matter how small, could be valuably used. With this in mind, resources produced for 2006 schools included ideas on how they could embed elements of the metacognitive framework in staff meetings, whether it be 2, 5, 10, 15 or 20 minutes of time.

STRATEGY 2 - REFLECTION SHEETS AND SCAFFOLDS

Another strategy used to engage teachers in reflection was the use of sheets or scaffolds that prompted them to document their experiences at not only a descriptive but a reflective and analytical level. Two such approaches which were used by 2005 schools included:

- **A guided reflection scaffold**, whereby teachers were prompted to reflect on an experience they had with ICT, noting down what they did, what happened, what they learnt from the experience and what they would try next time.
- **A PMI scaffold,** whereby teachers reflected about the positives, minuses and interesting points about a learning experience they had with ICT.

A reflective scaffold had been developed at the beginning of the *Technology Together* process and some schools chose to embrace this approach. As one school describes:

> These sheets were on a table in the staff room and staff were asked to fill them out whenever they tried something new... Sheets were also handed out at staff meetings on an irregular basis (*Technology Together* Mentor, 2005).

This strategy was more successful in some schools than others. In some circumstances a significant number of school staff engaged in considered and thoughtful reflection using the prompts. In other schools, however, the strategy was not embraced consistently; 'Staff meetings were used to fill in reflection forms. However, it was easy for teachers to avoid filling these in. Some teachers have only filled in one form for the whole year, yet others have many'. One school in particular strongly linked this reflection process to ongoing goal setting and strategy use and found it a positive experience in that it was 'a short, manageable task that involved only voluntary sharing amongst group members. It was pleasing to note that staff was willing to share and discuss ideas'.

STRATEGY 3 - REFLECTIVE JOURNALS

Initially, as researchers, we had concerns about the willingness of schools to adopt a journaling approach to facilitate reflection. However many of the schools involved in 2005, particularly those where teachers had been involved in previous ICT learning experiences based on journaling (Phelps, Graham & Kerr, 2004) were very keen and supportive of teachers trialing the approach. Several schools tried both structured and unstructured approaches to whole-school reflective journaling, with varying outcomes. Initially many schools chose to provide each teacher with a blank exercise book, however one school incorporated the reflective scaffolds described above into a booklet format with a page allocated for each week of term, including both free-form space and the scaffold as prompts. In the case of this school, journals were handed out at the beginning of each staff meeting and collected up at the end. This strategy proved highly successful in this school, as indicated in the following quote:

> Providing teachers with a weekly journal encouraged accountability and 'stickability'. In order to fill in each week's page, teachers felt obliged to keep trying. Also, Companion Mentors collected the journals at each session which diminished potential for avoidance tactics by teachers (*Technology Together* Mentor, 2005).

In later terms, several other schools began adopting this approach, however in one school the unstructured blank exercise book was preferred, although this was probably used more to jot down directions and steps rather than to engage in deeper levels of metacognitive reflection.

The benefits of journaling were felt to relate to the ability to see progression over time and for teachers to take an individualised approach to their learning.

> Using a journaling approach where teachers were able to reflect on their knowledge, skills and capabilities was an extremely valuable approach. This enabled the teachers to do things that they wanted to do as well as being able to start at their own level-not be overwhelmed or even under challenged by a set agenda (*Technology Together* Mentor, 2005).

Of course, the journaling process was not immediately embraced by all teachers and school culture and leadership played an important role in their successful integration:

> (There was) some initial resistance, particularly in relation to owning up to things they can't do. Now teachers are MUCH more comfortable with this because they realise that no one is being judgmental. They have realised that the journal works to support their learning (*Technology Together* Mentor, 2005).

Some *Technology Together* facilitators reported that 'Getting them to talk or write is always a challenge and there is a need to support them to identify that they do have something worth sharing'.

In 2006 the structured journal format has been refined and strengthened further such that each week teachers are also provided with some light and accessible content based on the metacognitive framework. This format is currently being evaluated by the nine 2006 participating schools.

STRATEGY 4 - VISUAL DISPLAYS AND GRAFFITI BOARDS

A fourth strategy that schools trialed to facilitate reflection and discussion within the whole-school environment was to create visual displays, sometimes pinned up on the staffroom notice board or near a high use area such as a staff room computer, photocopier or sink (one school even included some in toilet cubicles!). Displays ranged from the sharing of a quote or a list of tips for exploratory learning strategies, to both structured and unstructured graffiti and problem-solving boards:

> Staff identified a problem that they had encountered and had to find the positive aspect or opportunity that the problem may present. Staff was then encouraged to add their own comments to the graffiti wall which they did. A number of problems were solved in this way. This was a useful reflection tool because it was generally affirming, produced healthy discussion, promoted collegiality as staff assisted others with problems they may have been responsible for solving and it promoted sharing of the reflections at the conclusion of the staff meeting time (*Technology Together* Mentor, 2005).

For another school an ICT Graffiti Board gave staff an outlet to vent their frustrations, ask questions and share successes and useful websites. It also heightened whole school awareness of what was happening with ICT in other classrooms and stage groups.

STRATEGY 5 - INFORMAL DISCUSSIONS

Informal discussions between mentors/facilitators/executive and teachers, or between teachers themselves were also an important way to facilitate engagement in the metacognitive process. Much happens in the corridors of a school, and in the staff room over a cup of tea. In *Technology Together* the key is to explicitly acknowledge and encourage this discussion… and try and make it more metacognitively informed.

Almost all schools involved in 2005 reported that *Technology Together* increased informal discussions within the school focused on ICT. 'There was a lot of incidental, informal discussion and support throughout the year. Often this was not necessarily with a mentor but with peers. The majority of these discussions were between colleagues on the same grade'. As another school reported:

> Staffroom conversations started to take on a whole different context. It was not unusual to walk in to hear people talking about podcasting, iPods, and a whole range of topics around ICT. This conversation was energetic and positive. Previously any suggestion of technology would have been met with doom and gloom (*Technology Together* Mentor, 2005).

While informal discussions were seen as important for both sharing 'ah ha moments' and 'more frustrating episodes'. They were also seen as a disadvantage in that they did not capture these moments to record as evidence of a shift in thinking, or to retrospectively celebrate success.

STRATEGY 6 - VIDEO REFLECTING

Finally, and a little unexpectedly, one school decided to document their learning through the *Technology Together* process by creating a website, which included videoed reflections by volunteer teachers. In contrast to the other discussion and reflection strategies, this was used in a summative sense for teachers to reflect on their overall achievements across three terms. Excerpts from these videos will be used in presenting this paper.

CONCLUSION

Acknowledging the complex environment within which any ICT teacher professional development occurs, it is critical to build communities of confident, capable and supportive teachers who personally embrace change and learning. As argued by Hughes and Zachariah (2001, p.2), 'Perhaps the single most important thing a school leader can do is foster professional interaction and reflective dialogue where members are given opportunities to refine beliefs and skills about teaching and learning'. Our experiences in *Technology Together* would certainly support this claim; however we would add that having a theoretical foundation to inform and provide substance to discussion and reflection and some very tangible and explicit strategies by which to implement and sustain it, are critical. In *Technology Together* the metacognitive approach provides such a foundation and the six strategies described in this paper provide practical suggestions for schools to implement. While the six strategies will continue to be refined, there is much that schools more broadly can learn from our experiences. Embedding a belief that 'I can U can' within a school culture and community, and growing and sustaining it through reflection and discussion can be a powerful means of supporting teachers' ICT integration.

ACKNOWLEDGEMENTS

Technology Together has been collaboratively developed, trialed and refined by a collaborative team of committed teachers and we would like to acknowledge the invaluable contribution of all the *Technology Together* schools.

REFERENCES

Boud, D., Keogh, R., & Walker, D. (1985). *Reflection: Turning Experience into Learning*. London: Kogan Page.

Carr, W., & Kemmis, S. (1990). *Becoming Critical: Education, Knowledge and Action Research*. Geelong: Deakin University.

Coutts, N., Drinkwater, R., & Simpson, M. (2001). Using information and communication technology in learning and teaching: A framework for reflection, planning and evaluation in school development. *Teacher Development, 5*(2), 225-239.

Eham, L., Bonk, C., & Yamagata-Lynch, L. (2005). A model of teacher professional development to support technology integration. *AACE Journal, 13*(3), 251-270.

Ertmer, P. A., & Newby, T. J. (1996). The expert learner: Strategic, self-regulated and reflective. *Instructional Science, 24*, 1-24.

Ferdig, R. (1998). *Teaching a teacher about technology: A narrative approach.* Paper presented at the Society for Information Technology and Teacher Education 1998. http://ott.educ.msu.edu/tec/R&D/SITE98/site98ferdig.htm

Flavell, J. H. (1976). Metacognitive aspects of problem solving. In L. B. Resnick (Ed.), *The Nature of Intelligence* (pp. 231-235). Hillsdale, NJ: Erlbaum.

Fokias, F. (1999). Achieving clarity: Principle to practice: The difference reflection makes in implementing a policy for information technology in a primary school. *Journal of Information Technology for Teacher Education, 8*(1), 13-24. http://www.triangle.co.uk/pdf/validate.asp?j=jit&vol=8&issue=1&year=1999&article=ff

Hughes, M., & Zachariah, S. (2001). An investigation into the relationship between effective administrative leadership styles and the use of technology. *International Electronic Journal for Leadership in Learning, 5*(5). http://www.ucalgary.ca/~iejll/volume5/hughes.html

Jones, B., & Idol, L. (1990). Introduction. In B. Jones & L. Idol (Eds.), *Dimensions of Thinking and Cognitive Instruction* (pp. 1-13). Hillsdale, NJ.: Lawrence Erlbaum.

Kolb, D. A. (1984). *Experiential Learning: Experience as the Course of Learning and Development*. Englewood Cliffs: Prentice Hall.

Melczarek, R. J. (2000, 6-9 July). *Technology education for teachers: A more self-directed approach.* Paper presented at the ACEC2000: Learning Technologies, Teaching and the Future of Schools, Carlton Crest Hotel, Melbourne. http://www.cegv.vic.edu.au/acec2000/paper_ref/p-chandler/paper26/index.htm

Paris, S. G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B. Jones & L. Idol (Eds.), *Dimensions of Thinking and Cognitive Instruction* (pp. 15-51). Hillsdale, NJ.: Lawrence Erlbaum.

Phelps, R. (2005). The potential of reflection in studying complexity 'in action'. *Complicity: An International Journal of Complexity and Education, 2*(1), 37-54.

Phelps, R. (forthcoming 2006). The metacognitive approach to computer education: Making explicit the learning journey. *AACE Journal (International forum on Information Technology in Education).* http://www.aace.org/pubs/aacej/

Phelps, R., Graham, A., & Kerr, B. (2004). Teachers and ICT: Exploring a metacognitive approach to professional development. *Australian Journal of Educational Technology, 20*(1), 49-68.

Phelps, R., Graham, A., & Thornton, P. (2006). *Technology Together:* Getting whole schools involved with ICT through a metacognitive approach. *The Australian Educational Leader, 28*(1), 22-24.

Phelps, R., Graham, A., Watts, L., & O'Brien, A. (2006, 2-4 October). *Technology Together: Supporting whole-schools to become capable learning communities.* Paper presented at the Australian Computers in Education Conference (ACEC) 2006, Cairns.

Ropp, M. M. (1997). *Exploring individual characteristics associated with learning to use computers and their use as pedagogical tools in preservice teacher preparation.* Unpublished PhD, Michigan State University. http://www.educ.msu.edu/homepages/ropp/Dissertation/PrelimPages.html

Ross, E., Johnson, T., & Ertmer, P. (2002). *Technology integration and innovative teaching through collaboration, reflection and modelling: Research results from implementation of a staff development model*. Available: http://www.edci.purdue.edu/ertmer/docs/AECT02.pdf.

Schön, D. (1983). *The Reflective Practitioner*. New York: Basic Books.

Schunk, D., & Zimmerman, B. J. (Eds.). (1994). *Self-regulation of Learning and Performance: Issues and Educational Applications*. Hillsdale, NJ: Lawrence Erlbaum.