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# CAN REFLECTIVE AND EXECUTIVE CONTROL SKILLS BE FOSTERED ONLINE?

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## **Abstract**

*One of the crises facing the professions is the scepticism surrounding the nature of professional knowledge and whether individuals can cope with the increased complexity of society and the changing demands of the workplace. In order to develop these skills students need to be able to reflect on their learning experiences, integrate them with prior knowledge, self-evaluate and develop decision-making and planning processes. The development of reflexivity is presented in the context of an online tertiary unit where students proceed through the cycle of action, reflection, planning and abstract conceptualisation by engaging in a range of collaborative tasks including peer assessment and problem solving.*

## **Keywords**

*Problem solving, self-evaluation, experiential learning, reflection, online*

## **Introduction**

Information and communication technologies have the capacity to support a wide range of learning goals and are now integrated into teaching approaches of many higher educational institutions. Laurillard (2002) for instance suggests that computer-based learning has a major role in promoting quality learning outcomes such as self-directed learning, increased student autonomy and increased productivity and efficiency in higher education.

Through computer facilitated learning, students can access WWW sites, bulletin boards and on-line resources to support their own learning and consequently promote the development of generic research skills, information literacy, retrieval and management of data. However, many students find their experience in tertiary institutions too general or out of context, and cannot transfer these skills into real world contexts, or link them with prior knowledge (Taylor, 1997). The use of information technology within an experiential learning environment can offer learners contextualised support within which to anchor their learning and reflective skills.

## **Development of reflective skills in higher education**

One of the characteristics of being considered professional is having the capacity for self-direction and being able to apply practical strategies and skills in contexts that require them. Professionals have a body of expertise that is developed through experience within communities of practice. Boud, Keogh and Walker (1985) suggest that the capacity for self-direction can be learnt, and propose a continuum whereby the learner progresses from dependence, to independence and then to interdependence (Figure 1). Each of these stages requires learners who are able to reflect on and assess their own skills and capacities.

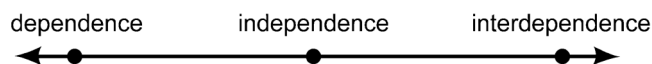


Figure 1: Continuum showing progress from dependent to interdependent learning

It is widely accepted that graduates should not only be technically competent but they should also be skilled in communication and teamwork, have social and global awareness, be self-directed and be prepared for life-long learning. However it is much less clear how these “soft skills” are best developed in undergraduate students in the context of their studies. One recommendation is that pedagogy needs to change from transmissive, didactic approaches towards transformative, student centred approaches (Oliver & McLoughlin, 2001). In the present study, the intention was to provide this pedagogy in the context of a project-based unit of study, involving both individual and group work, located within a Web-based learning environment.

### Theoretical framework: experiential learning and reflective processes

According to several theorists, authentic learning occurs only through reflecting upon personal experiences (Dewey, 1993, Schön, 1995). Reflection is often defined as a process that enables connections between the various elements of an experience, and Dewey refers to reflection on experience as a learning loop that ‘runs back and forth’ between the experience and the relationships being inferred. The concept of the learning loop has gained popularity through the work of Kolb (1984) and his four stage experiential learning model in which learners move through a series of phases involving experience, reflection, generalising/theorising and planning. Therefore, the ideal experiential learner will be able to involve themselves in new experiences without bias, reflect upon experiences from multiple perspectives and integrate their observations into logically sound theories.

The terms ‘reflection’ and ‘reflexivity’ need to be clarified at this point. *Reflection* has a focus on phenomena more divorced from the practitioner, whereas *reflexivity* is reflection based on personal experiences of learning, which fundamentally changes the relationship between the learner and the learning process. The distinction is important as reflection merely changes the outcomes of learning, while reflexivity changes the person and the process. Schön (1995) also makes a similar point by distinguishing between *reflection-in-action* and *reflection-on-action*. Reflection-in-action is tacit and is designed to improve action and performance. Reflection-on-action (reflexivity) is a higher order skill designed to improve self and future practice, and is also referred to as *executive control*.

### Context of the study

The study focussed on development of reflexivity among 95 tertiary undergraduate students studying a final year unit in multimedia development that is part of a degree program in communications. The unit is currently delivered on-line using WebCT software, and is delivered on-campus through a blend of face-to-face instruction and online activity. Skills such as needs analysis, instructional design specifications, storyboards, concept maps, and software integration are developed and applied in the creation of a Web site by small groups of students who work collaboratively as they would in an industry context. The objective of the team project is to promote collaboration skills by focusing on a common task. Learning and assessment processes are integrated throughout the duration of the one semester unit. The assessment consists of team-based work, team problem solving, peer assessment, individual reflective reports, a client mark and individual postings to a weekly online forum. Assessment in the online unit is based on authentic tasks planned for their relevance to workplace settings. Students work in teams to create a product that is offered to clients (peers) for evaluation, and tested for functionality in a real context. Working online enables students to provide multiple forms of peer support through shared tasks, teamwork, collaborative work, and opportunities for feedback and peer review. These supportive processes were intended to develop communication skills while creating an affective climate of support for reflexive skills, problem solving and self-direction processes.

## Theoretical framework: experiential learning

Through the design of problem solving tasks, the project management unit introduced learners to situations and ways of working with others that were experientially based. The processes of learning were emphasised from the outset and students were encouraged to have ownership of the learning, assessment and reflection processes. For Kolb (1984), the actual experiences people go through become the starting points for learning, and this underlying educational approach was reflected in the design of the online environment. In an experiential learning cycle, the learner passes through each of four stages: concrete experience, reflective observation, abstract conceptualisation, and active experimentation. The online design emphasised the links between the experiential learning cycle and the collaborative tools afforded by the technology as follows:

- *Active experimentation*: Students engage in the discussion and resolution of problems through online discussion using multimedia tools to support the display of responses (Herrington & Oliver, 2002; McLoughlin & Luca 2002).
- *Task engagement*: Peers analyse the output of the task, and compare problem-solving approaches through discussion, email and conferencing activity.
- *Reflection*: Individuals analyse and reflect on the learning tasks, group processes and self-development as they test new ideas and perspectives (eg., English & Yazdani, 1999).
- *Formation of abstract concepts*: Utilising peer and tutor feedback, students develop understandings of key course concepts through engagement with new ideas supported via communications networks.

Experiential learning was reinforced in various ways through the course pedagogy, which focussed on both process and content aspects of learning. Students participated in decision-making processes by choosing and defining a topic for their project, creating and managing their own development team and negotiating peer assessment. Through these processes they developed reflective skills, and learnt to control and monitor their own learning.

## Methodology

There were twenty four teams (with four in each team) of student participants in the study. Qualitative approaches were used to collect and analyse data on reflective processes. In the first task students were asked to reflect on the problem-solving processes they had engaged in while solving problems online and then asked to articulate these during face-to-face class discussions. Data was collected from online reflective comments posted to the bulletin board and in the students' reflective journals. These tasks enabled the students to reflect on their own strategies, to identify areas of weaknesses and to conceptualise ways of addressing those weaknesses.

## Student perceptions of peer feedback as support for reflection

Reflexivity was demonstrated by students when they articulated the changes they would make to their solutions in the light of feedback from peers, and how they would use this feedback to improve their design and planning skills. Student comments were recorded at three different stages during the semester. They found the reflective task challenging, and had not previously considered that other student views would influence their own ways of thinking and problem solving. Their responses demonstrate that students believed that peer feedback promoted reflection and further dialogue, thereby improving learning. Table 1 provides examples of student reflective comments and links these comments to implicit learning processes.

Students' reflective comment	Learning process
I learn to see things from a different angle	Conceptual change
I found it helpful to see what others said and how they had different views	Consideration of multiple perspectives
Critical feedback helps me develop my solutions and see my poor points	Self evaluation
You learn how people's positions can vary greatly and you have to be open	A sense of inquiry
Being able to see and hear others' feedback is good for my learning and brings up points that I had not considered	Acting on feedback

Table 1: Reflections on individual conceptual growth

The comments are indicators that reflection was enhanced by peer support and feedback and that participants raised their awareness of other per perspectives and became more aware of their own problem solving strategies. The tasks that fostered reflexive practice were built into the learning environment and also integrated with the assessment tasks as each assignment required students to record their reflections on self, task and others. Table 2 shows the summary of typical responses from individuals based on data collected.

Self	Task	Peer collaboration
Increased knowledge breadth	Capacity to analyse problems	Changed relationships with peers
Development of evaluation skills	Improved planning processes	Evaluating claims
Improved group communication skills	Increased ability to check & monitor progress	Dealing with power relations
Enhanced relationships with colleagues	Enhanced skills in gathering data	Improving participation and negotiation skills
Expansion of personal vision	Increased awareness of whether task goals had been achieved	Becoming more attuned o the needs of others

Table 2: Summary of reflection on self, task and others

## Conclusions

Reflective self awareness was achieved in the online environment by enabling group and individual engagement and feedback through an experiential learning design in a blended learning environment. Learning activities based on the experiential learning cycle helped students develop an awareness of their own learning strategies and problem-solving skills. The technological support afforded by online communication tools and asynchronous conferencing were integral to the development of reflective skills. The offline activities and face-to-face encounters enabled students to comment on the online problem solving and peer feedback, and it was during the offline sessions that reflective processes were enhanced through group discussion scaffolded by the tutor. For practitioners in higher education, a range of methodologies are now available to enable the development of 'soft skills' such as reflection, metacognition and self-monitoring, which are fundamental to the learning process. In the case presented in this study, reflective processes were successfully integrated with assessment tasks and group interaction, and became an active and vital ingredient of the experiential learning cycle.

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