# The implementation of authentic activities for learning – A case study

David Baccarini,

Department of Construction Management, Curtin University of Technology


David Baccarini
Department of Construction Management,
Faculty of the Built Environment Art and Design,
Curtin University of Technology,
Perth,
Western Australia, WA 6854
**Telephone** : +61(0) 8 9266 7357,
**Facsimile**: +61(0) 8 9266 2711,
**E-mail**: d.baccarini@curtin.edu.au

David is Senior Lecturer in Project Management at Curtin University of Technology. He formulated the Master of Project Management program at Curtin, which was the first post-graduate university program in Western Australia. David is the Course Coordinator for this learning program and lectures in project management, cost management, procurement management and risk management. David has undertaken numerous training and consultancy assignments in project management and risk management. In 2002 David received Curtin University's Innovative Teaching Practice Award.

# The implementation of authentic activities for learning – A case study

## Abstract

*The situated cognition theory of learning advocates that students should engage in the same types of activities in which expert practitioners in the various disciplines engage. Situated cognition promotes the use of authentic activities for learning and understanding. This paper reports the findings of a case study for implementing and evaluating authentic activities for learning in an undergraduate construction degree program. A key finding is that authentic activities should be introduced early and developed and applied progressively throughout the program in order to maximise effective learning outcomes. Students appreciated the value of learning through authentic activities, particularly the integration of different disciplines and areas of knowledge. However, students initially struggled with the ambiguity of problems to be solved and the range of possible acceptable solutions*

**Keywords** : *construction management, authentic activities, situated cognition*

## Introduction

Traditionally, universities have detached knowing and doing (Resnick 1987). The emphasis in universities has been on the application of concepts and facts in an abstract and decontextualised form (Herrington and Oliver 2000). When learning and context are separated, knowledge is seen by learners as the final product of education rather than a tool to be used dynamically to solve problems (Herrington and Oliver 2000). Learners are, in essence, removed from real communities of practice and are taught in what can easily become unauthentic contexts (Stein et al. 2001). It is assumed that knowledge is a self-sufficient substance, independent of the situations in which it is learned and used, so that teaching methods often attempt to impart abstracted concepts as fixed, independent entities that can be explored in textbook exercises (Brown et al. 1989).

In contrast, situated cognition advocates that learning and doing are inseparable (Hendricks 2001). The idea is that knowledge and skills are learnt in contexts that reflect the way they will be useful in real life (Brown et al. 1989). Situated learning is context-embedded (i.e. situations structure cognition), informal and intuitive (Hendricks 2001). Situated cognitionists believe that students should engage in the same types of activities in which expert practitioners in the various disciplines engage (Brown et al. 1989).

## Authentic Activities

Situated cognition promotes the use of authentic activities for learning and understanding (Brown et al. 1989). The focus of situation cognition is on obtaining problem-solving strategies in authentic activities that can be applied to solve problems

encountered in everyday situations (Hendricks 2001). Brown et al. (1989, p.4), in their seminal work on situated cognition, describe authentic activities as "*the ordinary practices of the culture*". The activities of a domain (e.g. construction) are framed by its culture, whose meaning is socially constructed through present and past members (Brown et al. 1989). Authentic activities allow learners to access the standpoint that enables practitioners to act meaningfully and purposefully (Brown et al. 1989).

Authentic activities need to be personally meaningful and relevant to students as well as relevant to the discipline (Tochon 2000). Authentic learning experiences are achievable in regular classroom settings (Gordon 1998a). In classroom-based teaching and learning, authenticity is often gauged by the degree to which student activities are similar to those undertaken by practising communities in the 'outside' world beyond the learning instruction (Stein et al. 2001).

## Research Method

*Action Research*

This research is based on the application of action research using a case study. Action research involves the identification of planned action, which is implemented and then submitted to observation and reflection (Burns 2000). Action research aims at solving a specific problem within a program, organisation or community (Paton 1990). The problem to be researched was the lack of 'real-world' problems within the curriculum of an undergraduate construction degree program. Action research is a means of injecting innovatory approaches to teaching and learning (Burns 2000). The research sought, through action research, to investigate the application of situated learning through authentic activities. There is no intention to generalise beyond the specific settings (Patton 1990).

Burns (2000) sets out the stages of action research. The early stages revolve around the planning for action research:

- The identification of a general idea, in this case how students could be exposed to 'real-life' problems using authentic activities as an effective teaching and learning strategy.
- A literature review on situation cognition and authentic activities to find out what could be learned from other studies
- The research approach is planned, e.g. resources, teaching method, allocation of tasks.

A previous paper reported the results of the *planning* for authentic activities for this case study (Baccarini, 2003).

Consequent stages of action research deal with the implementation of the action plan (Burns, 2000):

- A large range of evaluation techniques are available to monitor and record results of the implementation process. The techniques used for this research were:
  - o The author maintained a reflective journal to facilitate the recording and understanding of the outcomes of the application of authentic activities. The

reflections were derived from interaction and observation of students' activities and discussion with academic staff involved in the management of the authentic activities.

o The reflective journal and literature review provided the basis for semi-structured interviews with two focus groups – students and academic staff - held at the completion of the authentic activities.

- Interpretation and evaluation of the outcomes. This is was undertaken by means of writing a case study (Burns, 2000)

*Case Study*

This paper reports the results of action research using a case study of *implementation* and *evaluation* of outcomes in using authentic activities for learning.

The Department of Construction Management at Curtin University of Technology in Perth, Western Australia, runs a four-year Bachelor of Applied Science (Construction Management & Economics) degree program. The unit Building Industry Application 441 is run in the first semester of the fourth year. The objectives of this unit are:

- Integrate existing knowledge/skills/competencies.
- Supplement existing knowledge/skills/competencies.
- Apply existing knowledge/skills/competencies.
- Interact with the community.
- Apply problem based learning to the capstone project.

The unit consisted of 18 fourth-year students. The action research was conducted within the normal program of instruction during Semester 1, 2003.

**Results and Discussion**

An evaluation of the implementation of authentic activities is structured around Reeves et al's (2002) key design characteristics for authentic activities for learning:

*Real-world relevance*

Authentic activities should have real-world relevance (e.g. Cronin 1993, Jonassen, 1991, Winn 1993). Learning activities should match as nearly as possible the real-world tasks of professionals in practice rather than decontextualised tasks.

A building project was selected that had just commenced construction. All students strongly agreed that the project had a sense of real-world relevance, which was absent from most of their previous learning experiences within the degree program. Students considered they were "involved in the real world' and the authentic activities 'gave an idea of what work in the construction industry would be like". However, there was strong consensus that the selection of a project that was 600km from the campus made it very difficult to reinforce the realness of the project, requiring students to visualise aspects of the project beyond information (drawings, specifications, photographs)

provided. In the real world, construction professions would visit and view construction sites and buildings, therefore real-world relevance within authentic learning for construction management would be enhanced if students could physically view the project.

*Ill defined activities*

Authentic activities are ill defined, requiring students to define tasks and sub-tasks needed to complete the activity (e.g. Lebow and Wager 1994; Brown et al. 1989). Students are in charge of their own learning and must identify their own unique tasks.

Most students felt uncomfortable in dealing with ill-defined problems. There was strong perception that lecturers were 'lazy' in not providing more detailed information. Furthermore, students found it difficult to know the scope of the work required, creating the concern that it would be easy to 'miss the point' of the problem, resulting in a poor student mark. At the time of handing out the problems, it was explained to the students that the problems were purposely ill-defined in order to replicate the type of situations they would faced in the construction industry. The students were in the final year of their degree course and it was a novel experience to deal with ill-defined problems. Learning through authentic activities should be introduced gradually throughout the degree program. This could entail more simple problems in the early years leading to more complex, ill-defined and comprehensive problems in the later years.

The planning and implementation of ill-defined problems was also a major challenge for academic staff. Staff was more accustomed to setting assessment work that was prescribed in some detail. Staff has been gradually introducing problem-based learning over the past two years and it was agreed that they were only just now mastering the concept and feeling confident that their assessment work truly mirrored problem-based learning principles.

*Competing solutions*

Authentic activities allow competing solutions (e.g.; Young and McNeese, 1993, Branford et al., 1990). They allow a range and diversity of outcomes open to multiple solutions of an original nature, rather than a single correct response obtained by the application of rules and procedures.

Most students found dealing with problems with competing solutions difficult but they appreciated the learning benefits of 'thinking more deeply" and "thinking outside the box". Students felt unprepared for a learning process rarely experienced previously in the degree course. This suggests that learning through authentic activities should be introduced gradually throughout the degree program.

*Complex tasks*

Authentic activities comprise complex tasks to be investigated by students over a sustained period of time (e.g. Lebow and Wager 1994, Bransford et al. 1990). They require significant investment of time and intellectual resources.

Students generally found it difficult to view the problem as any different from a 'typical" assignment. It took some time for students to realise that a different approach was needed for the determination of the problem requirements, the identification and collection of necessary data and the format and content of submitted work. For example, one problem required students to write a business letter but several students' responses contain academic references, which were typically required for 'traditional' assignments.

There were no scheduled lectures but a weekly session was set up whereby academic staff made themselves available for consultation. Few students attended these sessions, mainly because students viewed the problems as "just another assignment". Consequently, the tasks were perceived by students as traditional assignments whereby that they are not expected to seek advice from academic staff. Paradoxically, students felt that academic staff were "copping out' by not providing conventional face-to-face lectures, which compounded the problems of the students' discomfort of dealing with the novel approach of authentic activities and problem-based learning.

*Collaboration*

Authentic activities provide the opportunity to collaborate (e.g. Lebow and Wager, 1994, Gordon 1998). In authentic learning situations, people work together (Gordon 1998a). For students to succeed in real-life problems, it helps if they have experience working in collaborative problem-solving teams.

Students worked in teams for several parts of the problem. This element of authentic activities was familiar to all students as they had experienced team assignments throughout their studies. Therefore, working in teams caused relatively few problems to students. Several students expressed the view that working in teams was particularly beneficial because the problems were ill-defined and teamwork allow for "bouncing ideas" and 'clarifying the problem".

*Reflection*

Authentic activities provide the opportunity to reflect (e.g. Young 1993; Gordon 1998). Reflection refers to "those intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciations" (Boud et al. 1985, p.19). Its intention is to help students to value and make sense of their learning.

Students had to complete a reflective journal throughout the authentic activities. Students were given a handout and lecture to outline the process and purpose of reflective learning. All students expressed difficulties in producing a reflective journal

and many produced a diary of events rather than a critical reflection on their learning experiences. Students noted that they had never been required to provide a reflective journal previously in the course whereas they had completed diaries in previous units so there was a natural tendency to again produce a diary. Most students said it was a worthwhile learning experience to attempt to think about their learning. However, it would have been beneficial to introduce reflective journals gradually throughout the degree program.

*Integration*

Authentic activities can be integrated and applied across different subject areas (e.g. Jonassen 1991, Gordon 1998). Authentic activities encourage interdisciplinary perspectives and enable diverse roles and expertise rather than a single well-defined field or domain. The real world requires people to access a wide and diverse range of information in order to perform their duties.

The assessment work consisted of separate but interrelated problems. For example, decisions made in an earlier problem assignment were later to be used in a separate but interlinked subsequent problem assignment. All students agreed that this provided a valuable learning experience by creating a holistic view of construction processes and emphasising the integrative nature of these processes. Students were unanimous that this integration was lacking from most of the degree program which they perceived as discrete packages of knowledge. The integrative nature of the problems was the most strongly supported aspect of the authentic activities.

**Conclusions**

Action research was used to implement and evaluate authentic activities as an approach for teaching and learning. The key reflections are:

- The literature on the application of situated cognition for learning through authentic learning provides an essential framework for any academic desirous of incorporating the 'real-world' into their teaching. In particular, Reeves et al. (2002) list of the key elements for authentic learning provides an excellent framework for formulating and implementing authentic activities for learning.

- It is important to clearly articulate to students the rationale and benefits in using authentic activities for learning students. The case study found that students are very receptive to the concept of bringing the 'real world' into the classroom. However, it is critical to explain the rationale and benefits of using authentic activities for learning so that students are positively motivated to engage in the process. Interestingly construction management is perceived by students as a vocational activity, which enhances their receptiveness to introducing authentic activities into the learning process.

- It would be highly efficacious for authentic activities to be introduced early into the curriculum and developed gradually throughout the learning program, starting with simple and short applications and culminating in complex and comprehensive treatments during the later years.

The next phase of the action research will be to plan, implement and evaluate simple authentic activities for the early years of the degree program leading to more complex, ill-defined and comprehensive problems in the later years.

## References

Anderson JR, Reder LM and Simon HA 1996, 'Situated learning and education', *Educational Researcher*, vol.25, pp.5-11.

Baccarini, D 2003, 'The planning of authentic activities for learning: a case study'. *Proceedings of the Australian University Building Education Association Conference,* 9-11th July, Geelong

Barab SA, Squire KD and Dueber W 2000, 'A co-evolutionary model for supporting the emergence of authenticity', *Educational Technology Research and Development,* vol.48, no.2, pp.37-42.

Boaler J 1993, 'The role of contexts in the mathematics classroom: Do they make mathematics more 'real'?' *The Learning of Mathematics*, vol.13, pp.12-17.

Boud D, Keogh R and Walker D 1985, 'Promoting reflection in learning: A Model', in *Reflection: Turning experience into learning,* Boud D, Keogh R and Walker D (eds.), pp.18-40, Kogan Page.

Bransford JD, Vye N, Kinzer C and Risco V 1990, 'Teaching thinking and content knowledge: Toward an integrated approach', in *Dimensions of thinking and cognitive instruction*, Jones BF and Idol L (eds.), pp.381-413, Lawrence Erlbaum Associates.

Brown JS, Collins A and Duguid P 1989, 'Situated cognition and the culture of learning', *Educational Researcher*, vol.18, no.1, pp.32-42.

Burns RB 2000, *Introduction to research methods,* Longman, Sydney.

Cronin JC 1993, 'Four misconceptions about authentic learning', *Educational Leadership*, vol.50, no.7, pp.78-80.

Gordon R 1998, 'Balancing real-world problems with real world results', *Phi Delta Kappan,* vol.79, pp.390-393.

Gordon R 1998a, 'A curriculum for authentic learning', *The Education Digest,* vol.63, no.7, pp.4-8.

Hendricks CC 2001. 'Teaching causal reasoning through cognitive apprenticeships: What are the results form situated learning?' *Educational Research*, vol.94, no.5, pp.302-316.

Herrington J and Oliver R 2000, 'An instructional design framework for authentic learning environments', *Educational Technology Research and Development*, vol.48, no.3, pp.23-48.

Jonassen D 1991, 'Evaluating constructivist learning', *Educational Technology,* vol.31, no.9, pp.28-33.

Lebow D and Wager WW 1994, 'Authentic activity as a model fro appropriate learning activity: Implications for emerging instructional technologies', *Canadian Journal of Educational Communication,* vol.23, no.3, pp.231-244.

Patton MQ 1990, *Qualitative evaluation and research method,* Sage Publications.

Reeves TC and Okey JR 1996, 'Alternative assessment for constructivist learning environments', in *Constructivist learning environments: Case studies in instructional design*, Wilson BG (ed.), pp.191-202, Educational Technology Publications.

Reeves TC, Herrington J and Oliver R 2002, 'Authentic activities and online learning', *Higher Education Research and Development SA*, pp.562-567.

Resnick L 1987, 'Learning in school and out', *Educational Researcher,* vol.16, no.9, pp.13-20.

Stein SJ, Andrews T and Isaacs G 2001, 'Incorporating authentic learning experiences with a business management course', *Australian Association for Research in Education Conference Proceedings*, Paper STE01249, Fremantle

Tochon FV 2000, 'When authentic experiences are 'enminded' into disciplinary genres: Crossing biographic and situated knowledge', *Learning and Instruction,* vol.*10*, no.4, pp.331-359.

Wineberg SS 1989, 'Remembrance of theories past', *Educational Researcher*, vol.18, pp.7-10.

Winn W 1993, 'Instructional design and situated learning: Paradox or partnership', *Educational Technology,* vol.33, no.3, pp.16-21.

Young MF 1993, 'Instructional design for situated learning', *Educational Technology Research and Development*, vol.41, no.1, pp.43-58.

Young MF 1995, 'Assessment of situated learning using computer environments', *Journal of Science Education and Technology,* vol.4, no.1, pp.89-96.

Young MF and McNeese M 1993, 'A situated cognition approach to problem solving with implications for computer-based learning and assessment', in *Human-computer interaction: software and hardware interfaces,* Salvendy G and Smith MJ (eds.), Elsevier Science Publishers.