Winning Work: An Action Research Approach to Improve Experiential Learning through Industry Simulation in a Construction Management Course

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Winning Work: An Action Research Approach to Improve Experiential Learning through Industry Simulation in a Construction Management Course

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ABSTRACT
This paper reports an action research enquiry undertaken to improve experiential learning in a construction management course through the implementation of an industry simulation. The first cycle of action research is described and discussed. Theoretical literature relating to action research and experiential learning is reviewed as it influenced the process. The planned action drew upon industry input to simulate in the classroom the procurement process undertaken by a construction company in preparing a tender submission for a building project. In the context of a broader study of the procurement of projects in the construction industry students participated in teams in a staged scenario entitled Winning Work. An industry guide tutored students at each stage of the process as they prepared specific deliverables. Each student also wrote in their learning journal reflecting upon their experience of preparing the tender submission with the industry guide. Evaluation of the planned action took multiple forms and indicated that student engagement was enhanced by learning based on experience. Implications for future teaching strategies and action research are discussed.

KEYWORDS
action research, experiential learning, construction management

INTRODUCTION
This paper describes an action research enquiry undertaken in 2010, when the focus of the action research was to improve experiential learning for students in a construction management course. The perceived problem, the plan, the action, the evaluation of the effect of the action and implications are described. Theoretical literature relating to action research and experiential learning is reviewed as it influenced the action research process.

Context
In 2007 University of South Australia (UniSA) introduced a new Teaching and Learning Framework (University of South Australia 2007) with a commitment to increased student
engagement by 2010 through experiential learning, using some preferred mechanisms including authentic and active learning in workplaces and in the classroom. In implementing the Teaching and Learning Framework, the School of Natural & Built Environments (School of NBE) at UniSA involved all academic staff through a network of working groups, and also engaged as a consultant Martin Jenkins, Academic Manager at the Centre for Active Learning (CeAL) at University of Gloucestershire in the UK, ‘an international centre of excellence reviewing, developing, promoting and embedding inclusive and exemplary active learning for students throughout the University of Gloucestershire’ (University of Gloucestershire n.d.). The particular approach to enhancing experiential learning described in this paper was influenced by the work of Martin Jenkins and CeAL.

**Experiential learning**

The theoretical basis of experiential learning derives from the work of Kolb (1984) who in turn built on earlier work by other scholars in the fields of human learning and development. Kolb and Kolb (2005) comprehensively review the earlier development of experiential learning theory (Kolb 1984) and subsequent research and developments. Kolb and Kolb (2005, p.194) identify six propositions that form the foundations of experiential learning theory and most relevant in the context of the action research enquiry described in this paper is the statement that ‘Learning is best conceived as a process, not in terms of outcomes. To improve learning in higher education, the primary focus should be on engaging students in a process that best enhances their learning- a process that includes feedback on the effectiveness of their learning efforts’ (p.194). Experiential learning theory defines learning as: ‘the process whereby knowledge is created through transformation of experience. Knowledge results from the combination of grasping and transforming experience’ (Kolb 1984, p.41). The resulting approach is based upon a learning cycle ‘that shows how experience is translated into concepts, which in turn are used as guides for active experimentation and the choice of new experiences’ (Healey and Jenkins 2000, p.186). Kolb (1984, p.41) identified four stages to be followed sequentially, although a learner may enter the cycle at any stage, and should go through the cycle repeatedly. It is clear that feedback and reflection upon experience are critical elements in experiential learning.

The four stages of the Experiential Learning Cycle are shown in Table 1, including some variations to the language used by other authors to describe each stage. The simpler language is more accessible and particularly useful when planning learning activities.
Table 1 – Alternative descriptions of the four stages of Kolb’s Experiential Learning Cycle

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Experimentation (AE)</td>
<td>PLAN Where the learner is trying to plan how to test a model or theory or plan for a forthcoming experience</td>
<td>Wanting</td>
</tr>
<tr>
<td>Concrete Experience (CE)</td>
<td>DO Where the learner is actively experiencing an activity</td>
<td>Doing</td>
</tr>
<tr>
<td>Reflective Observation (RO)</td>
<td>OBSERVE Where the learner is consciously reflecting back on that experience</td>
<td>Feedback</td>
</tr>
<tr>
<td>Abstract Conceptualization (AC)</td>
<td>THINK Where the learner is being presented with/or trying to conceptualise a theory or model of what is (to be) observed</td>
<td>Digesting</td>
</tr>
</tbody>
</table>

There are two critical characteristics of experiential learning that warrant further examination: it is a student-centred approach, and the role reflection is critical. If it is accepted that ‘the aim of teaching is simple: it is to make student learning possible’ (Ramsden 2003, p.7) then effective teaching requires an understanding of the learning process. Experiential learning theory advances that understanding and through the Experiential Learning Cycle provides some guidance for teaching.

There is a range of ways to think about teaching. Experiential learning is at the basis of thinking about teaching as student-centred / learning-oriented and not teacher-oriented / content-oriented, with a student-focused strategy aimed at students changing their conceptions and not a teacher-focused strategy with the intention of transmitting information to students (Prosser and Trigwell 1999, p.153). The focus is on what the student does, not what the student is, or what the teacher does (Biggs 1999, p.22). Experiential learning therefore requires a commitment to ‘teaching as making learning possible’ (Ramsden 2003, p.7), rather than ‘teaching as telling or transmission’, or ‘teaching as organising student activity’. However, Ramsden (2003, p.113) also notes that ‘student activity does not itself imply that learning will take place’. It is important that students go through each stage of the experiential learning cycle. As noted by Gibbs, a long-time contributor of practical guidance in teaching and learning: ‘It is not enough just to do, and neither is it enough just to think. Nor is it enough simply to do and think. Learning from experience must involve links between the doing and the thinking’ (1988, p.9).
The question remains as to how to apply the theory and engage students in the Experiential Learning Cycle. Gibbs (1988) provides some practical methods. University of South Australia (2007) provided some guidance on the preferred mechanisms for implementing experiential learning. The Centre for Active Learning developed an approach, extended from Kolb’s (1984) Experiential Learning Cycle, and also Performances of Understanding (Blythe and Associates1998, cited in University of Gloucestershire, n.d). More usefully, CeAL developed some planning tools for use in the design and the development of new courses and individual learning activities (University of Gloucestershire, n.d.), all consistent with Kolb’s Experiential Learning Cycle, and further informed by research on learning design (Oliver 1999, Boud and Prosser 2001). This range of guides provided a framework to utilise in the action research enquiry described in this paper.

**THE ACTION RESEARCH ENQUIRY**

The enquiry consisted of one cycle of action research, which is one of a range of methods (Kuit, Reay & Freeman 2001) for use in reflective teaching practice where our own teaching practice becomes the object of systematic enquiry (Brookfield 1996, p.39). Prosser and Trigwell (1999, p.166) note that good teaching is characterised by a continuing effort to evaluate our teaching for improved learning. Action research applied in teaching is a process in which teachers ‘observe situations in their classrooms that are less than optimal, they identify the problem, they think about what and how to change, they make the change, they evaluate the impact of the change on the situation and begin again’ (Collins & Speigel, 1995 p.118). The Kemmis & McTaggart (1988, cited in Kemmis 1999) approach to action research is based on repeated application of plan, act, observe and reflect.

The approach as implemented was based on the guidance of Kemmis (1999), Altrichter et al (2002) and Collins & Speigel (1995), and had been used to improve the likelihood that students would use a deep approach to their learning in this same course (Mehrtens 2007). Although the results of action research are not to be generalised, it is recommended practice (Collins & Speigel 1995) to communicate with others about the research and share the knowledge. The enquiry is described and discussed as it unfolded, to convey the approach, outcomes and implications.

**THE PROBLEM**

There was a requirement to fulfil the university’s commitment to increase experiential learning experience for students. Construction Management 3 is a fourth year option course in the Bachelor of Construction Management and Economics program at UniSA.
In 2010 there were 42 students (98% male). Approximately 70% of the students had at least 100 days industry experience, some continued to work in construction firms. Other students had little or no industry experience.

The university approved assessment structure for the course, not able to be changed, included two assignments (weighting 15% and 35%), reflective learning journal (15%) and open-book exam (35%). The second assignment as designed in previous years provided an opportunity to implement change at the same time as sensibly limiting the scope of the action.

The assignment and associated learning activities used in the previous year was analysed and assessed as experiential learning based on the checklist for active engagement developed by the CeAL (University of Gloucestershire, n.d.), and elaborated by direct reference to the framework of influences on high quality learning activities (Boud & Prosser 2001). The checklist and the results of that assessment are shown in Table 2.

Considering the results of the analysis as shown in Table 2, there were several areas with scope for improvement. Written summative feedback to students was provided, but with very little opportunity to use that feedback within the course. Formative feedback, although offered, was not often sought by students. Flexibility of delivery, and increasing inclusivity, were both challenges. There was scope to move to a more authentic focus for the learning activities. In the planning for 2010, what could be done to improve the experiential learning for students in the course?

<table>
<thead>
<tr>
<th>Areas influencing high quality learning activities</th>
<th>Principles</th>
<th>Prompts</th>
<th>Not at all</th>
<th>To some extent</th>
<th>To a great extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engage learners</td>
<td>Learner empowerment</td>
<td>To what extent are students encouraged to take greater responsibility for their learning as they progress through their learning?</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>What scaffolding is provided to help equip students with the demands of the learning activity?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>What support is in place for new skills?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Peer collaboration</td>
<td></td>
<td>To what extent are students provided with opportunities for working within learning communities through collaborative learning and peer interaction?</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>To what extent have the students been inducted to group work?</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 – Analysis of experiential learning in previous assignment and associated learning activities
| Feedback | Are students provided with regular opportunities to receive feedback? (Tutor and peer)? What opportunities does the learning activity provide for students to engage with their peers and gain feedback from them? How is formative and summative assessment used to facilitate student engagement? Do students have opportunities to use the feedback provided? | X |
| Delivery | To what extent is flexibility in delivery allowed? How does the learning activity take account of different learning styles? | X |
| Inclusion | To what extent does the design and delivery show awareness of diversity and cultural issues and students individual learning needs? How does the learning activity engage with students as individuals? (affective support) To what extent are students prepared to make connection with different ideas or groups of people? | X |
| Acknowledge the learning context | Reflection | Are students provided with opportunities for reflection, both individual and social (public)? Have students been provided with scaffolding learning activities and experience of reflection? How does the learning activity help students see the transfer of current learning to other contexts and situations? | X |
| Authenticity | To what extent does the nature of the learning activity have an authentic focus? To what extent does the learning activity and resources used provide substitution for direct work experience? | X |
| Challenge learners | Complexity | Are students engaged in complex, unstructured problems? Have students been involved in designing some aspects of the learning activity? | X |
| Exploration | Are students stimulated to seek and explore new information and knowledge? | X |
| Provide practice | Articulation | To what extent are students provided with opportunities to articulate their learning (to self and others)? Are students provided with examples of the kind of work expected of them? | X |
THE PLAN
The planned action was developed with four elements, all focused on the assignment and associated learning activities for 2010 and taking account of three selected areas of experiential learning with scope for improvement as previously identified i.e. authenticity, feedback and reflection.

Planned element 1: to introduce more authenticity by staging a scenario, Winning Work, to simulate an industry process in the class
The Procurement Manager of a locally based construction company with annual turnover approximately $350 million was engaged to prepare a scenario and guide the 42 students through the preparation of a Tender Submission, replicating as far as possible the processes undertaken in the company’s office. Before the scenario was introduced to students, it was planned that students would undertake a wider study of procurement of building projects, including examination of a range of procurement strategies commonly used in the industry. In 2010 the Australian Government’s economic stimulus program Building the Education Revolution (BER) was being implemented across the country, and with access to published sources and a presentation by a Government official, students would also examine the different procurement strategies utilised by each state for the BER. When the scenario for the assignment was introduced to students it would then be placed firmly within the context of the BER, and based on a BER project under construction at that time.

The scenario was developed to unfold in 4 stages. At each stage, the Procurement Manager would provide specific information and resources, and guidance for set tasks for student groups to undertake before the next stage, and also meet with each student group to discuss current tasks and review draft deliverables from the tasks set in previous stages.

The authenticity of the learning activity would be further emphasised by providing to each student a full set of printed tender documents including all drawings and specifications. Students would also inspect the site where the building was already under construction.

The teacher’s role in the staging the scenario would include developing the learning design (as described in this paper), facilitating the learning activities including each session with the Procurement Manager, providing learning resources, support and specific coaching to students, reviewing submissions with the Procurement Manager and providing formative and summative feedback to students.
Planned element 2: *to provide multiple opportunities for feedback, both formative and summative*

It was planned that students would receive formative feedback from the Procurement Manager at each stage of the scenario. They could then act on that feedback to review and improve the deliverables before the final Tender Submission. Summative feedback, after the Procurement Manager reviewed the Tender Submissions, would be written (according to a framework of previously advised assessment criteria) and also provided in a subsequent class session scheduled for the Procurement Manager to return the Tender Submissions and discuss his feedback and students’ response to that feedback.

Planned element 3: *to strengthen the emphasis on reflection and prompt students to see the transfer of current learning to other context*

It was planned to maintain the requirement in the course for students to write a reflective learning journal, with the added specification that each student write at least one entry based on their experience of participating in the Winning Work scenario. Scaffolding for the reflective journal would include prompting questions. To stimulate students to transfer their current learning to other contexts, a final session was planned, after the return of their Tender Submissions with feedback from the Procurement Manager, to prompt them to discuss their reflections within each group and formulate theoretical guidelines for good practice in preparing a future tender submission.

Planned element 4: *to evaluate the planned action through multiple sources*

There would be three sources of feedback from students to aid evaluation.

- The content of entries in the reflective learning journals would be analysed to identify themes as they arose but also seek evidence that the student might transfer their learning to other contexts.
- The student perceptions of their experience of participating in the Winning Work scenario as obtained through a specific survey to be administered in class at the end of the scenario.
- The student perceptions of their teaching and learning experiences in the overall course as obtained through standard online evaluation instruments at UniSA

**THE ACTION**

*Students participating in the industry simulation scenario: Winning Work*

The scenario proceeded over as planned in 4 stages over a period of 6 weeks. At the first class session each student collected a full set of printed tender documents and received a
briefing document. Students worked in self-selected teams of 4 people. For each session the classroom was set with a work table for each student team and a large conference table where each team met separately with the Procurement Manager.

Each class session began with the Procurement Manager introducing the new stage with a discussion of the context, objectives and issues. He then briefed the students on the tasks and deliverables required for that stage, and provided resources and guidance. In this period of the session students also practiced some aspects of the required tasks with immediate feedback from the Procurement Manager.

In the next phase of the session, students worked in their teams to review draft deliverables from the previous stage, discuss the new information and tasks, plan how to proceed, and also prepare to meet with the Procurement Manager to seek advice, ask clarifying questions, show draft deliverables and seek feedback and advice on how to proceed and improve them. Each team was scheduled to meet with the Procurement Manager at an appointed time in each session. When all teams had met with the Procurement Manager he had obtained an overview of the current issues, problems and questions arising from the whole class. In the final phase of the class session he then discussed these with the all of the students and responded to further questions.

These class sessions required careful planning and scheduling, and considering Ramsdens’s (2003) theories of teaching, although the intention was ‘for teaching as making learning possible’, it was more akin to ‘teaching as organising student activity’.

The nature of the student activity was however an authentic industry based process involving peer collaboration, feedback and opportunity for planning, doing and reflection. Beyond the scheduled sessions, in their own time, the student teams worked on preparing the deliverables. Student attendance was close to 100% for all of the class sessions with the Procurement Manager.

**Students receiving and acting on feedback**

As described above, the Procurement Manager provided informal formative feedback to students in each scheduled class session. Students did use these opportunities to obtain feedback and then revise and improve their final submission. After the Procurement Manager had reviewed all of the Tender Submissions, written summative feedback was also prepared using a framework of previously published criteria. Finally, when the Tender Submissions were returned to students, the Procurement Manager provided general feedback to the whole class and met with each student team to discuss their submission and provide feedback beyond the formal written assessment and feedback.

Students reflecting on their experience and thinking about transferring that learning.
Immediately following the return of Tender Submissions and the feedback session with the Procurement Manager, there was a learning activity where each team discussed the overall experience and the lessons learned and formulated guidelines of good practice for preparing a Tender submission. Students were able to readily formulate their guidelines based on their recent experience. All guidelines from every team were then recorded and displayed, and in a whole class activity, involving much discussion, the guidelines were categorised and grouped to formulate a final set of guidelines for good practice.

35 of the 42 students wrote a specific entry in their reflective learning journal on the experience of participating in the scenario. It is not clear why other students did not write a reflection. Three themes emerged from the submitted reflections, as shown in Table 3, with excerpts from student reflections tagged with relevant principles from the CeAL checklist for active engagement.

### Table 3 – Analysis of excerpts from students’ reflective learning journals

<table>
<thead>
<tr>
<th>Relevant principles from CeAL checklist for active engagement. Refer to Table 2 above.</th>
<th>Excerpts from students’ reflective learning journals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major Theme</strong></td>
<td><strong>Students were engaged by the authenticity of the industry based scenario.</strong></td>
</tr>
<tr>
<td>Peer collaboration Feedback Reflection Authenticity Articulation</td>
<td>“This by far was the best assignment I have worked on throughout my time at the university because it clearly related to the industry I will be working in and the amount of information that goes into a tender submission. …It makes me have a greater respect for project managers because of the great pressure that need to deal with, when going over all the cost from the sub-contractors and selecting the best price for the work. Many factors come into this when selecting a price received from sub-contractors for example cost, is everything included in the works, is it thorough are they reliable. This assignment helped me understand that point.”</td>
</tr>
<tr>
<td>Reflection Authenticity</td>
<td>“Procurement is the means by which the industry survives. Without winning work a company will not last long. The tasks which we carried out as part of the assignment were reflective of industry practices. This provided a good perspective for a student aspiring to have a career in the construction industry.”</td>
</tr>
<tr>
<td>Peer collaboration Reflection Authenticity Articulation</td>
<td>“I have never been involved in an assignment which has seen the availability of such extensive and detailed documentation; this has been excellent as it gives you a very good idea of all the documents that are actually involved in a construction project no matter how simple. I was also previously unaware of how stressful tender submission due dates can be. The PM was able to provide us with an activity that simulated this environment and gave the class an idea of how quickly decisions have to be made on days such as this. The activity required our groups to select the “best price” from a range of prices for various trade packages in a given time frame. This assignment I found was very good at relating back to the industry, as it presented a very real scenario.”</td>
</tr>
<tr>
<td><strong>Major Theme</strong></td>
<td><strong>Students valued and did act on the constructive formative feedback.</strong></td>
</tr>
</tbody>
</table>
| Peer collaboration Feedback Reflection | “The assignment was a great way to learn how the industry goes about how to procure work for their company. I learnt how a tender submission is compiled together and the specific documents and information in what must be provided in the submission. By completing the assignment in stages, weekly,
Authenticity Articulation and having the opportunity to present drafts in class sessions it enabled my group and I to ask questions in which we were unsure and to gain constructive feedback in completing the next step of the assignment. By doing this assignment, it exposed me to documentation and information in which I have not had the chance to work with closely, such as creating an environmental management plan. It also showed me the amount of work put into a tender submission, and how small errors can affect the chances of the company winning the tender. Overall I enjoyed the project, my group and I worked well consistently and collaborated well together. I think the time frame we were given to complete each task weekly was very adequate and it was a great way to learn how a tender submission was put together."

Minor Theme Some students indicated that they were likely to transfer learning from this experience to other contexts.

Reflection Authenticity "This assignment has encouraged me to be more involved during the tender period at my work with the estimator and head project division manager in understanding the approach to pleasing the client’s needs as well as pricing the works."

Reflection Authenticity "Knowing more about the roles of procurement teams, or estimators as referred to at my place of employment, makes me more inclined to get involved within the department to build my knowledge of this process. As part of the company’s graduate program some time must be spent in an estimating role and I look forward to developing my skills in a real life scenario in this department. Since taking part in my current employer’s scholarship program I have been exposed to a number of different departments and roles including programming, contract administration, project coordination and management of various tasks however I have had no experience yet in procurement/winning work. As a result of this learning I feel that in order to enhance my knowledge some time spent in the estimating department will provide me with both new and enhanced skills in the area of procurement."

Reflection Authenticity "I was able to relate to this learning activity quite well as I have been involved with preparing quotes and tenders for the past couple of years. I could identify with the pressure and the importance of being well organised on the close of tender date. The processes were quite similar to the processes that we follow at work. Witnessing how other companies prepare their tender helps to identify ways in which we can improve our tender preparations. This was a positive outcome."

Students reporting their perceptions of the teaching and learning experience

The content of 35 student reflections (representing 85% response rate) was analysed and the major themes were summarised in Table 3 above.

70% of students completed the specific survey (10 closed questions, 2 open questions) of student perceptions of their experience of participating in the Winning Work scenario. The most positive responses (more than 80% strongly agree or agree) were in relation to the following statements:

- *This assessment task is related to my future in the construction industry.*
- *The industry guide provided clear direction.*
- *The way in which the scenario was staged over several weeks suited my approach to learning.*
During the process I received feedback on draft deliverables that was constructive and useful.

I learnt new skills through undertaking the scenario.

The least positive responses (60% strongly agree or agree) indicated that the assignment did not provide a challenge for some students, and also that the feedback on the final submission could have been more constructive and useful. 65% of the students completed text responses to the open questions. The best aspects identified by students were very similar to the content and themes also evident in their reflective learning journals: the authenticity of the scenario, and the value of formative feedback. Asked how the experience of undertaking a similar scenario could be improved in future, there were strong responses that recommended more clear assessment criteria, and more direction and assistance with some of the tasks and deliverables. Three students noted specifically the effect of their lack of industry experience e.g. ‘I found some aspects difficult due to not having any job experience in this area’. Other students commented that their industry experience assisted them e.g. ‘My job experience meant I could tackle the scenario with confidence’.

There was a 20% response rate for the standard online evaluation instrument at UniSA, offered to the students 4 weeks after the completion of the scenario. The most positive responses were in relation to the following statements:

- The staff teaching in this course showed a genuine interest in their teaching.
- I felt there was a genuine interest in my learning needs and progress.
- The least positive responses were in relation to the following statements suggested
- The course developed my understanding of concepts and principles.
- I have received feedback that is constructive and helpful.

Text responses valued that the course was ‘practical and industry related’, but sought ‘clearer expectations’.

EVALUATING THE ACTION

Collins and Spiegel (1995, p.120) provide a framework to stimulate evaluation of the action and lead to a new action plan for the next cycle of research.

What impact did this change have on the students?

The students felt satisfied. As they noted ‘it clearly related to the industry’ and ‘it provided a good perspective for a student aspiring to have a career in the construction industry.’ Considering the characteristics of the industry simulation and the process of the scenario, the student satisfaction is consistent with their involvement in a holistic process:
‘the integrated functioning of the total person-thinking, feeling, perceiving and behaving’ (Kolb and Kolb 2005, p. 194). There are indications that they were more likely to be engaged in the learning process and enjoying their participation in the industry simulation because they were ‘learning to satisfy internal demands’ (Prosser and Trigwell 1999, p.75).

**What impact did this change have on the students’ learning?**

The students wanted to learn. The change provided an opportunity for students to learn through doing, feedback and making sense of what they had done. There is evidence for this in the range of indicators from the students’ reflections and evaluations. Considering these indicators in relation to the CeAL checklist for active engagement (refer to Table 2), the strengths of industry simulation were particularly in the areas of authenticity, feedback, peer collaboration and reflection. The plan as implemented focused on ‘what the students do’, with the teaching mainly directed to ‘making learning possible’, although in future there is scope to reduce some of the remaining elements of ‘teaching as telling’ as described by Ramsden (2003, p.115).

**What did the teacher learn about students?**

Every student is an individual, with a unique set of prior knowledge and experience. The student reflections and evaluations confirmed that student related factors, such as prior knowledge and ability, do influence the student’s perceptions of the learning task. This was also one of the key findings of a previous action research enquiry (Mehrtens 2007). It is consistent with experiential learning theory (Kolb 1984) and the emphasis on the ‘presage factors’ identified by Biggs (1999, p.21). The student evaluations show that some students sought more direction and assistance, and it is possible and likely that it was the students who did not have some related prior knowledge and experience. In future, it will be necessary consider the variation in prior experience of the students, because although it may not be a necessary pre-requisite for their learning, it does influence how the student perceive the learning task and therefore how they approach it.

**What did the teacher learn about learning?**

Students are likely to want to learn if they are engaged in learning process which they perceive as valid, and they particularly value feedback throughout that process. On the basis of the action research enquiry reported here, with the positive outcomes for student engagement and satisfaction, then experiential learning theory and Kolb’s (1984) Experiential Learning Cycle do together provide a valuable basis for thinking about learning. However in order to translate that theory into practice, it is necessary to take a deliberate approach to learning design as described by Oliver (1999). The practical
guidance provided by the resources of Centre for Active Learning (University of Gloucestershire n.d.) and Boud and Prosser (2001) informed the learning design and contributed to the effectiveness of the learning activities and the positive outcomes for students.

What did the teacher learn about the subject matter: in this case an industry simulation to enhance experiential learning?

The practical reality of the construction industry exerts a powerful force on the students. The teacher may think of them as students, but it is evident from their reflections and evaluations that they are more likely to perceive of themselves as prospective or existing employees in the construction industry. As one student suggested in evaluation- ‘Emphasise the fact that the tender submission is for a client and it is not just submitting an assignment – treat it more like a job than uni work’. In order to make learning possible, then ‘uni work’ must be more real and valid for the learners. This action research enquiry has shown that an industry simulation, in conjunction with careful learning design, does provide an effective mechanism to introduce that essential authenticity, and so improve experiential learning.

Should this change become a regular feature?

Learning designs should be devised to provide experiential learning opportunities, and industry simulations would be an effective mechanism to provide the authentic focus for the learning activities. Authenticity is one of multiple features of experiential learning, although it is a powerful motivator to engage learners. Design for experiential learning should continue, considering not only authenticity but also other aspects such as learner empowerment, feedback, reflection and complexity as prompted by the CeAL checklist for active engagement and consistent with Kolb’s (1984) Experiential Learning Cycle.

What new problems emerged that the teacher now wants to research?

Some areas remain with scope for future improvement and action research. In their evaluations some students noted the need for more assistance with new skills and activities, so learner empowerment remains to be addressed, particularly in view of the differences in prior knowledge and experience. Complexity must also be reviewed. Some students reported that they were not challenged by the process. The industry simulation as implemented did lack some opportunities for students to be engaged in complex unstructured problems.
CONCLUSION

This action research enquiry was the first cycle and there is potential to further improve the experiential learning in the course that was the focus of this research. Evaluation of the effect of the planned action took multiple forms and indicated that student engagement was enhanced by learning based on experience in an industry simulation. The strengths of industry simulation, as evaluated by students, were particularly in the areas of authenticity, feedback, peer collaboration and reflection. The industry involvement provided the key feature of authenticity; the other features resulted from deliberate learning design.

There are several implications for future teaching strategies. The focus of teaching should be to make learning possible. It is preferable think of the students as learners. Consider every learner an individual with a unique set of prior experiences and knowledge which influence their perceptions of learning tasks and their approach to learning. Empowering and challenging learners is therefore necessary. Kolb’s (1984) Experiential Learning Cycle provides a valuable basis for thinking about learning, however in preparing experiential learning designs it is effective to also utilise more practical guidance, for example the checklist for active engagement ((University of Gloucestershire n.d.) and the framework of influences on high quality learning activities (Boud and Prosser 2001). Action research provides an effective approach to reflect upon and improve teaching practice for the benefit of learners.

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