Researching the potential of the 3D virtual learning environment to complement work integrated learning in higher education

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Work integrated learning (WIL) is important when positioning students for employment (Patrick et al, 2008). This paper reports on research into the potential of the three dimensional virtual learning environment (3DVLE) to assist students identify and articulate their employability skills. Using a mixed methods approach (Creswell, 2009), feedback was received from 202 students, 10 teaching staff and 12 employers representing the defence, pharmaceutical, utilities, age care, education, engineering and IT industries on three interactive learning scenarios under construction within the University of South Australia’s virtual campus on OpenSimulator (OpenSim); an open source multi-platform, multi-user 3D application server. Each scenario highlights one of three key employability skills (AAGE, 2011): communication, team work, and problem solving. Student input will contribute to the design, look and feel of the 3DVLE, while the insights of teaching staff will influence the pedagogical approach. Employer feedback will help fine-tune scenario content and format to better reflect the workplace. The 3DVLE approach to WIL gained acceptance from each of these stakeholder groups. This paper argues that 3DVLEs, if shown to be effective, have the capacity to become an important WIL tool for preparing both campus-based and distance education students for real world placements and future employment.

**Keywords:** work integrated learning, 3D virtual learning environment, employability skills.

**Introduction**

Research suggests that Australian higher education (HE) students are of the view that universities should be responsible for facilitating the skills they need to develop their careers (Urbis, 2011). It is argued that higher education students are also seeking an increase in student-industry contact through more work integrated learning (WIL). WIL, “an umbrella term used for a range of approaches and strategies that integrate theory with the practice of work within a purposefully designed curriculum” (Patrick et al, 2008, p.9), reinforces students’ growing professional knowledge and practical skills and develops their work-relevant attributes or employability skills (Curtis & McKenzie, 2001).

An employee’s employability skills (e.g. written and verbal communication, team work, problems solving, self-management) enable him or her to contribute effectively to the interpersonal aspects and productive outcomes of the workplace (ANTA, 2004). The three most highly valued employability skills reported by Australian employers are communication, team work and problem solving (AAGE, 2011). This contrasts with a survey of Australian universities students in 2007, in which students rated the extent to which they had developed these skills during their studies as 81.7% (communication), 65.9% (teamwork) and 54.2% (problem solving) respectively (Graduate Careers Australia, 2007). Increasing HE student numbers (Access Economics, 2008; Mather, 2012) will lead to increasing demand for the work placement form of WIL, especially in the engineering, teaching and health care disciplines. As placement opportunities are finite and limited, universities will need to provide similar but alternative ways for student-employer interaction.

3D virtual learning environments (3DVLE) are computer software-based technical systems or “worlds”, for example Second Life, which allow synchronous interaction among participants via the utilisation of “visually depicted projective identities: avatars” (Franklin, 2008, p.3). Such environments have the potential to address the identified need for increased cost-effective WIL opportunities (Kluge & Riley, 2008; Gamage, Tretiakov & Crump, 2009). Use of the 3DVLE is not new in Australian HE institutions (see for example Gregory et al, 2011). However despite an extensive search of databases and review of the literature there are no examples of universities using the 3DVLE for employability skills development.
This paper reports on research investigating the use of 3DVLE based scenarios to provide students with practice in the development of three employability skills; teamwork, communication and problem solving. Results of this research will inform future trials of the 3DVLE in curriculum.

Methodology

A careers atrium and three employability skill scenarios have been under development within an existing virtual University of South Australia (UniSA) campus on a 3DVLE platform in OpenSim. The first scenario, an interview situation, requires a student-driven avatar (SDA) to respond to questions from a chatbot interviewer (a chatbot is a computer program designed to simulate an intelligent conversation with human users). The second scenario, a staff meeting, requires the SDA to interact with a group of chatbots discussing a workplace issue as a team (Belbin, 2010). The third scenario, a staff meeting, requires the SDA to work with chatbots to resolve a workplace problem. Chatbots, or software agents (Holmes, 2007) are used in preference to a person driven avatar to enable students to access the scenarios at any time and to reinforce the sense of anonymity (Dickey, 2005) avatars provide. The final design and implementation of the scenarios will be informed by input from three primary stakeholders – students, teaching staff and employers using an action research approach (Berg, 2004). Feedback from students is particularly important as they will be the end user of the activity and fulfills the need for potential users to be “engaged within the whole process of development and testing the product” (Starčič, 2008, p 787).

Classes of student participants, along with any attending academic teaching staff at the time, were invited to take part in the study at the end of several in-class career related presentations by the primary researcher. This is the identical approach taken in an earlier, smaller study (Stokes-Thompson, Wood & Scutter, 2011). Employer participants, recruited during UniSA’s 2012 Careers Expo, were taken in groups of two or three to a small room off the main exhibitors’ area and shown a video of the proposed employability skills scenarios.

All participants were shown the same early stage, 4 minute, silent, electronic recording of the researcher’s avatar touring the careers atrium and briefly partaking in each of the three scenarios. The researcher spoke to the recording, pointing out the main features of the atrium and the structure and purpose of each scenario. At the end of the presentation student participants were asked to complete and hand up a feedback sheet. Staff and employer participants were also asked to complete the feedback sheet but only after they had an opportunity to discuss what they just seen and heard. Points raised in discussions were noted by the researcher.

Stakeholder opinions were sought on the appropriateness of the 3DVLE approach to highlight and promote employability skills. Participant feedback was gained via responses to a series of Likert-Scale and open-ended questions (Gamage et al, 2009) concerning: the appropriateness of the 3DVLE for the delivery of career material; features participants liked and disliked about the 3DVLE as proposed; and a request for stakeholder suggestions for improvement. Student and staff demographic data (age, gender, gaming technology experience) were also collected (Stokes-Thompson et al 2011). For employers, the demographic questions were replaced with a request to indicate the industry being represented. They were asked for suggestions regarding questions they would like to see asked in the interview, and topics that could be covered in the team and problem solving scenarios.

Results

The current research gained input from 152 students, 6 academic staff and 12 employers. Total feedback on the three scenarios to date has been received from 202 students (aged 18 to 60 years; 50% male, 50% female), 10 teaching staff (aged 24 to 59 years; 20% male, 80% female) and 12 employers representing the defence, pharmaceutical, utilities, age care, education, engineering and IT industries. Combined feedback from this and the earlier study are collated and summarised in the following table.
Table 1: Summary of student and teaching staff feedback on the 3DVLE careers atrium and scenarios proposal.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Appropriate?</th>
<th>Comments</th>
<th>Likes?</th>
<th>Dislikes?</th>
<th>Improvements?</th>
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</table>
| Students (215)  
Response: 202 (94%)  
Ages: 18 – 60 years  
Gender: 50% M, 50% F  
Virtual Reality experience: 121 (60%)  
Disciplines: - computer science  
- midwifery & nursing  
- education  
- podiatry  
- pharmacy  
- social work  
- physiotherapy  
- management  | most appropriate 53 (26.2%)  
appropriate 110 (54.5%)  
not sure 32 (15.8%)  
not appropriate 7 (3.5%)  | Positive – interactive; suitable for today’s learner; ease and accessibility of information; novelty; encouraged people to access resources; ability to explore information at own pace.  
Negative – lacked detail; needed refinement.  | Practise at interviews; choose avatar’s outfit; online saved time and effort; fun; immediate feedback; interactive; alternative to reading; relevance to career and interviewing.  | Animation “laggy”; “archaic”; lame graphics; computer interaction stifles spontaneity; detail needed improvement.  | Needed more people in environment; ability to interact, communicate with others; needs to be accessible by lower-end computers; better colour. graphics, animation; more features; non-gamers may find it difficult to navigate.  |
| Staff (10)  
Response: 10 (100%)  
Ages: 24 – 59 years  
Gender: 20% M, 80% F  
Virtual Reality experience: 3 (33.3%)  
Disciplines: - learning & teaching  
- management  
- social work  | most appropriate 5 (50%)  
appropriate 1 (10%)  
not sure 4 (40%)  
not appropriate 0/ (0%)  | Positive - very interesting; potentially useful; engaging for users of technology; Negative - pre and post measure of learning needed.  | Access to readily downloadable resources; role play better for learning; fun; engaging; novel.  | Needs to be accompanied by traditional learning approaches; students may not all be interested in immersive technologies; scaffolding to be included; may widen the gap between the have and have-nots.  | Needs game or reward elements; ensure ease of navigation; be supportive of participation; need to consult game developers/ youth who play online games.  |
Employers (20)

Response: 12 (60%)

Gender: 17% M, 83% F

Industries:
- defence
- pharmaceutical
- utilities
- age care
- education
- engineering
- information technology

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<tr>
<td>Positive</td>
<td>Students can assess written and verbal communications skills; the 3DVLE would engage students who do not seek face-to-face help; it can be tailored for a specific organisation/company;</td>
<td>The 3DVLE may not resonate with some students; the interview scenario did not have a panel of interviewers; the system seemed slow and not 100% user friendly; there was a lot of time spent walking to the scenarios.</td>
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<td></td>
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<tr>
<td>Negative</td>
<td></td>
<td>Guidance be given to students with limited IT or English communication skills; incorporation of real organisational scenarios and settings; providing students with choices regarding body language and access to psychometric assessment; assessment centre practice; voice interaction; graduate employee reviews of their companies; employer use of the environment as part of their interview/recruitment process.</td>
</tr>
</tbody>
</table>

In response to the question seeking employer suggestions for interview questions and/or meeting topics, responses included:

Interview questions – topics associated with time management; knowledge of organisation or industry; what drew them to the position; why they wanted to be an (engineer, accountant, etc.); skills and abilities they bring.
Team work topics – how they are a team player; safety in the field; examples of a good team; influencing others; dealing with competing opinions.
Problem solving topics – resolution of a customer complaint; strategies to overcoming problems; what would they do differently next time; handling competing priorities; things not going to plan; example of creative thinking.

Employer Focus Groups responses

Use of the 3DVLE and the scenario concept was well received by employers with some commenting it was “excellent”. Discussion centred on the potential of the 3DVLE for wider employability skills development, linking the 3DVLE to employer information and resources, and how students do need to be better prepared for interview. Some employers saw it as important to introduce students to the staff meeting environment; one suggesting minute-taking practice.

Discussion

Overall, feedback on the use of the 3DVLE was positive, with 80% of students, 60% of teaching staff and 100% of employers indicated that the use of the 3DVLE was either appropriate or most appropriate. This contrasts with 92% of students and 25% of staff in the smaller, 2011 study. As anticipated, feedback from students related to the look and feel of the 3DVLE, staff input about improving the pedagogy and employer suggestions relating to workplace authenticity. Pedagogical changes as suggested by the academic respondents will be incorporated into the final design of the scenarios as will the inclusion of a range of elements which will provide more workplace authenticity. Interestingly, employer input also reflected a concern for students’ interests. The
number of ‘likes’ of all stakeholders were greater than the ‘dislikes’, with many suggestions for improvement. Stakeholder feedback also emphasised the motivational and interactive aspects of using the approach; a finding which is consistent with results obtained by others (Sweigart et al, 2010; Tanti & Kennedy-Clark, 2010). Similarly, student comments of needing to interact and collaborate reflect Tanti & Kennedy-Clark’s students’ call of needing “more than just ‘fast knowledge’” (p 966).

Several limitations of this study are apparent. It might have been better if the questionnaire had been given to the staff and employer groups before the focus group sessions. They may have responded differently. Employer and staff focus group sizes were small. Larger group sizes may have generated increased discussion thereby varied feedback and suggestions. Staff participants represented only three program groups perhaps skewing feedback results. Collection of feedback data from stakeholders is continuing, so over time with increased participation, the findings should provide a more balanced perspective.

Conclusions

Stakeholders enjoyed being involved in the project and provided valuable and actionable feedback. As a result, the design of the 3DVLE will be improved to provide students with an authentic, purpose built, user-centred, innovative way to engage them in activities designed to develop their work related attributes, and supplement traditional WIL approaches. The next stage of the research involves trialing the scenarios within the curriculum. This will involve one or two classes of students using the scenarios as part of their formal learning associated with communication, team work and/or problem solving. Feedback from these trials will inform the final stage of the project, which will involve comparing the use of the 3DVLE with traditional teaching methods (lectures and reading materials) to determine the effectiveness of the 3DVLE in assisting students to identify and develop their employability skills.

This paper reports on research into the development a 3DVLE designed to facilitate the ability of higher education students to identify and articulate three employability skills. Despite the small sample sizes the initial findings indicate that there is general stakeholder acceptance of use of the 3DVLE as an approach to teaching, learning and WIL. If the 3DVLE, as proposed, ultimately shows to be of benefit to students, it will added to the range of UniSA’s WIL approaches from which students can select in order to meet their changing learning and work related needs, wants and expectations.

References


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