IS TAILORING SCENARIOS TO LEARNERS NEEDS EFFECTIVE IN A VIRTUAL environment?

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Abstract

This paper discusses the findings of the pilot study of the Canberra Institute of Technology (CIT), Virtual Worlds in Health Education, project. This project was part of the Targeting Skills Needs in Regions (TSNR) initiative funded by the Council of Australian Governments (COAG). CIT have been working with ACT Health, Charles Darwin University, Northern Territory and Gippsland TAFE, Victoria to develop this virtual world environment and scenario-based role plays to engage a wide variety of learners.

From this research CIT has constructed a framework for teachers to develop scenario-based role plays in a virtual world environment and has validated the use of virtual worlds as part of a blended learning approach to teaching communication skills. The research focuses on three different learning groups: Indigenous students (Community Services and Health areas), Community Services students and Allied Health Assistant students. Scenarios have been tailored for each group based on advice from industry experts and the project reference group.

This research employed a mixed method research methodology, and used a triangulation process to analyse and validate data. As Triangulation tests the consistency of findings obtained through different instruments (Sydenstricker-Neto, 1997) was used to corroborate the evidence to support the claims and findings. Collection methods include questionnaires, observation, group interviews and journal entries. Research results indicate that participants enjoyed the activities and 80% of participants would recommend using virtual worlds to learn and practice communication skills in the workplace.

Introduction

The purpose of the *Virtual Worlds in Health Education* project was to gather data about the tailored structure of scenario-based role play that are being utilised in a virtual world environment and whether or not they are an effective teaching and learning tool for Community Services and Allied Health Students.

Students undertaking the Allied Health Assistants qualification over a two year part time program delivered at the Canberra Institute of Technology are required to participate in an industry placement or practicum. These practicum placements are generally at hospitals, aged care facilities and private practices. It is hard to find placements for students that fit in with the demands on students, institutes and placement providers. Using a virtual world environment for part of this placement is expected to help alleviate the pressures on placement providers and as an added benefit give students the opportunity to work alongside professionals in a simulated workplace environment.

Teachers and students question why a virtual world was chosen, in which to practice communication skills and develop students' workplace skills. They also wonder why a virtual

world would be used instead of the more traditional method of inviting other health professionals to provide demonstrations of best practice in the workplace. One of the aims of the 'Virtual World in Health Education' project was to demonstrate that in a virtual environment a community of practice (where novices learn from professionals) would be a legitimate learning environment eventually reducing the stress and load on student work placements.

Research derived from the *Virtual Worlds in Health Education* project focused on data sourced from the trial and evaluation of the project. Rudestam and Newton (2001, p.69) suggest that 'one chooses a topic rich with personal significance and social meaning, a topic that reflects an experience that the researcher has had and about which there is a passionate interest in understanding its nature' . The project team chose to examine the structure of the scenario-based role plays for the following reasons:

1. They believe that there is a place for virtual world environments in teaching and learning, in particular, in teaching professional Communication Skills,
2. They believe that practicing work related scenarios in a virtual world environment will enhance students skills to be job ready, and
3. They also believe that one scenario structure will not fit every student's needs.

Virtual environment offer the ability to leverage aspects of authentic learning conditions that are hard to cultivate in traditional classroom settings according to M Griffin (1995), this is one of the main reasons that a virtual environment was chosen for the 'Virtual Worlds in Health Education" project. For example is that it is very difficult to simulate a conflict situation in a real workplace for the benefit of the student's while on practicum. In addition to creating experiences that take advantage of the situated and distributed nature of cognition, CIT's virtual world scenarios allow for the design of situations that are not possible or practical in the real world. CIT's virtual world project has provided teachers, educational designers and 3D object developers the funding to create scenarios that are 'real-world' in appearance, are safe, cost effective and directly target learning outcomes.

Creating scenarios in virtual environment is not a new idea, Gippsland TAFE conducted a project in 2005, The Virtual Experience of Risk-Based Learning (VERBL). The VERBL project had many positive outcomes. One positive outcome was that the learners may be assessed more realistically within a virtual environment as the role plays within this environment are closer to a real life experience than traditional role plays conducted within the classroom (VanDerKlift, 2007). An issue that was raised often in the *VERBL* study is that "*additional time from teachers to prepare and practise*" (VanDerKlift, 2007) was essential to adequately frame the scenarios. It is hoped that the framework developed by the "Virtual Worlds for Health Education" project will help to reduce the time it takes to prepare scenario-based role plays for teaching staff.

The project took a scaffolded approach to scenario-based role plays. There are three levels to this approach, the first level is a simple scenario not time consuming for the teachers to develop). The second level or for the intermediate user (similar levels of time needed to prepare the scenario). The final level is a more complex (high level of commitment to time and resources). This strategy was taken by the project to help imbed the use scenario-based learning in a virtual world into the culture of CIT, having the opportunity (and confidence) to get a learning activity up quickly in the virtual environment will encourage more uptake from the teaching staff.

The outcome of this research will allow the refinement of our scenario development procedure to help reduce the time for scenario development by teachers.

Background

The purpose of the trials was to gather data towards constructing and defining a framework for virtual world scenario building and to validate the use of virtual worlds as part of a blended learning approach to teaching communication skills. Secondly, the trials was structured to evaluate the virtual world platform, the learning environment, the structure and if it is a comfortable and enjoyable learning environment.

The project constructed a readily and remotely accessible virtual world environment that combines a scalable set of educational settings depicting the health industry (i.e. rehabilitation and community centres) to support learning in an appealing, realistic and engaging online environment. A platform was selected that had high resolution graphics, VOip (audio tools) and the ability to be easily changed, the platform is also invite only, meaning that to access it you have to be given the URL, this was chosen to stop incidental interruptions to scenario-based role plays.

Networked laptops were used to host the purpose-built virtual world. Before commencement of the scenarios, participants were given a brief verbal explanation of the project and the aims of the evaluation. A short demonstration video was played to explain how to use the avatars to navigate in-world. Written instructions were provided for each of the activities.

A total of 45 individuals participated in the trailing of the "Virtual Worlds in Health Education" project. The age range of the participants completing the questionnaire started with on 18 year old, eight people from the 19 – 25 age range, six people from the 26 – 29, nine people from the 30 – 39 age range, twelve people from 40 – 49 age range and nine people who are over 50 years old (Figure 1).

The Trail Team provided support to participants during the trial (e.g. assistance with navigation for example when participants had trouble moving around the world, assistance was provided).

At Charles Darwin University, 1 student and 3 teachers from culturally diverse backgrounds participated in the trial. This cohort had limited time available and only completed the Tunnel Vision Activity.

At the Wugularr Community, located near Katherine, 2 Indigenous students participated in the trial. The remaining participants completed the Angry Client scenario. The participants completed the exercise twice, once as the Angry Client and once as a youth worker. Support for this cohort was by the Indigenous Support Officers it was suggested that it may be inhibitory for the team to be present.

In ACT, at the Yurauna Centre, CIT's Indigenous support centre, 4 indigenous students participated in the trial, although the project team had been informed that 10-12 participants would be available. These students completed the Tunnel vision activity only.

Overall, 36 CIT students participated in the trial across the Allied Health Assistants and Community Services qualifications.

The scenario-based role plays were designed and developed on the advice of industry experts, and three scenarios were selected for use in the pilot study. Hereafter they are described as the 'Tunnel Vision Activity', the 'Angry Client Activity' and the 'Tailored Activity'. A short description of each follows:

Tunnel Vision Activity: is an example of the use of the Virtual World to give users a firsthand perspective of the difficulties faced by people who have a disability. In this case, the user's avatar has tunnel vision. Tunnel Vision is the loss of peripheral vision with retention of central vision, resulting in a constricted circular or tunnel-like, and field of vision. This condition can result from a large number of causes, including *glaucoma* and *retinitis pigmentosa*. Difficulty in navigation and locating objects in the virtual world environment is experienced firsthand. This is generally undertaken as an individual 'in-world' activity.

Angry Client Activity: This is a two-person scenario role play. In this activity participants take on either the Health Care/Community worker role, or the role of an angry client. Participants are given instructions and a brief on their role; they then spend up to 5 minutes performing the role play, using the information to hand to stimulate their interactions. The aim of the activity is to train students in communication skills and dealing with difficult clients. For the purposes of the trial, each pair of participants reversed their roles.

Tailored Activity: This activity has been tailored for groups studying different areas in Health and Community Services. Under the guidance of relevant industry experts, three different scenarios were designed for the three focus groups of this trial, including:

1. Indigenous students - in this activity students are given the opportunity to create their own scenarios, using basic guidelines in which to work.

2. Community Services students- this multiplayer scenario is structured around an anger management course, where one participant is the session facilitator and the rest of the students are participants in the anger management course. The information for each participant is brief, but provides sufficient information to each participant about their character and their role for the session.

3. Allied Health Assistant students- this multiplayer scenario centred on an interdisciplinary meeting about, and including, a client with multiple sclerosis. Students are provided with detailed information on their character along with an extensive client file. They must discuss the client's needs and seek to develop a care plan for the client.

These scenario-based role plays are a part of a blended learning approach. The underpinning knowledge is delivered in a classroom, online or a distance model, the virtual world is practice and skill development and the briefing part can happen either online or in a classroom environment post the 'in world' experience.

The data collection instruments comprised:

a. A questionnaire provided to participants at completion of the activity (or activities) – which provided demographical data and information about their learning experience to support the data collected in the debrief and video evidence,
b. A verbal debrief in the form of conversation with the group on their experience and opinions, with written notes taken by one of the project team. Information gathered here concentrates on their learning experience and technology and forms part of the focus group activity. The debriefing was also videotaped and transcribed to ensure no data was missed.
c. Video of the participants, as they undertook the activities, to subjectively gauge reactions and engagement with the material.

Literature Review

The literature review which informed the project, gives evidence of the benefits of using virtual worlds, scenario-based role playing for teaching and learning and supports the pedagogical approach that has been used in the "Virtual Worlds in Health Education" project.

Research by the *New Media Consortium* suggests 'Virtual worlds bring … networking to another level, allowing people to interact in ways that convey a sense of presence lacking in other media' (NMC, 2007a). Conducting training in virtual worlds eliminates some of the disadvantages associated with classroom dynamics and interacting face-to-face. Virtual worlds allow people to use avatars (a digital representation of oneself) to take on the look and feel of their clients, including voice modification to simulate age and gender. 'Virtual worlds have the ability to take online collaboration and interaction to new levels, break down hierarchies, and eliminate geographic boundaries' (Gronstedt, 2007; Hutchinson, 2007).

Clarke (2005, p.4) goes one step further and states that the 'immersion in a mediated, simulated experience (such as a virtual environment) involves the willing suspension of disbelief'. This provides students with a safe and controlled environment in which to practice and to be able to make mistakes that in the real workplace could have dire consequences. This also allows students to test the boundaries and develop new skills and protocols for dealing with difficult situations that are likely to occur in the workplace.

It is very difficult to simulate a conflict situation in a real workplace for the benefit of the student's practicum. In addition to creating experiences that take advantage of the situated and distributed nature of cognition, CIT's virtual world scenarios also allow for the design of situations that are not possible or practical in the real world. CIT's virtual world project has provided teachers, educational designers and 3D object developers the funding to create scenarios that are 'real-world' in appearance that are safe, cost effective and directly targeting learning outcomes.

Regardless of the platform the benefits of using virtual worlds for teaching and learning are universal. General benefits include the flexibility of being accessible 24 hours a day; it is recordable and can be used as a resource or for the debriefing session and be considered environmentally friendly, reducing travel time and costs. Virtual worlds also allow for collaboration, persistence (capacity for immediacy and synchronous activity), inclusion of sharable and user generated digital content and they are immersive and interactive (Fretias, 2008). Role playing itself is "an important part of cultural learning" (Champion, 2009, p. 37); roles are intrinsically related to the notion of social worlds and examples can be seen in children as they play-act a mother pretending to cook or look after children, for example.

The benefits directly related to scenarios are the options for anonymity of the participants, allowing students to practice and make mistakes without the risk of losing face, as well as the immersive nature of virtual worlds. It has been documented that when people think about their avatars the brain activity on an MRI is the same as when they think about themselves (Caudle, 2009, p.19).

There is a lot of evidence in this review to support the use of virtual worlds as a teaching and learning tool, however when there are issues with the technology (e.g. audio feedback or delay) it can be inhibit learning this is sported by Van Der Klift (2007) and Horan, Garden and Scott (2009).

Scenario-based role plays in virtual worlds can be single player or multiplayer. Erik Champion (2008) states in his paper *Roles and Worlds in the Hybrid RPG game of Oblivion*, that "single player games are now powerful enough to convey the impression of shared worlds with social presence and social agency" (p39). It seemed a necessary step to scaffold the learner engagement for this trial; starting with an orientation, the single person activity, building to a multiplayer activity. The single person scenario that a participant can participate in either in class time, scheduled time or when it suits them and the education use is to develop empathy for people suffering from tunnel vision and a thus have a better idea of what it would be like to have this condition. Peter Yellowless and James Cook (2006) developed a virtual hallucination scenario on Second Life to give people perceptual phenomena of a psychiatric illness. It was experiencing this scenario first hand that lead to the tunnel vision scenario being developed.

The educational benefits of fictional or fact-based interactive scenarios include developing problem solving skills, decision making skills, and interpretation of data or observation skills in a real world context (Stewart & Brown 2008). Stewart and Brown (2008) also highlight the importance of planning the scenario. This was certainly the case with the "Virtual World in Health Education" project. Ill thought out scenarios were quickly discarded as the outcome often didn't meet the learning requirements expected from the activity.

A study by Minjie Hu (2007) at Tairawkiti Polytechic, New Zealand, researched using scenarios to motivate programming students. The study revealed more benefits than they expected. "The teacher motivates the students to learn programming. The motivation of learning from students also encourages the teacher to improve the way they are teaching. Game scenarios provide a common thread throughout the whole teaching process leading students from low-order thinking to higher-order thinking" (Hu, 2007, p. 96). The debriefing process that has been employed with this research has highlighted this motivational aspect of using scenario-based role plays for teaching and learning, the teachers who have been involved in the project to date are very excited and have offered many ways in which they can use scenario based role plays in virtual worlds to improve their educational delivery.

A scenario-based role play is a structured learning activity. The underpinning knowledge can be delivered as part of the scaffolded approach either in the classroom, online or in a distance model. The preparation brief is where participants are assigned their roles in the scenarios. The participants may be required to research into the skills and characteristics that they will need to act appropriately in the role play. The post-scenario debriefing is the most important part of the learning; this is the time to critically reflect on the activity and knowledge and skills that were displayed in the scenario role play.

Three theoretical approaches can be applied to the development, the implementation and evaluation of scenario role play learning activities in a virtual environment; scaffolding

(constructivism), situated learning (legitimate peripheral participation) and critical reflection debriefing (cognition). Merrill's (2002) educational design principles are well represented in this three layered approach.

Scaffolding in education works like scaffolding in the construction industry; in construction it is used to support a structure as it is being built but is taken away when the building is completed. The object of using a scaffolding model is to develop the students into a self-reliant learner and the achievement of competency (Pahl, 2002).

The scenarios are designed in a constructivist model (Darvasi, 2008):

- The scenarios are authentic and the learning goal encourages "ownership" by the learner
- Understanding is developed through interactive experiences in an authentic learning environment
- Knowledge evolves through social negotiation and collaborative learning
- Learners are aided by scaffolding and "just in time" information

Wilson (2008) expands on this model with the addition of:

- Extending student understanding – teachers sequence activities, provide individualized support and guidance, and allow students necessary time to process and benefit from the support.
- Temporary support – Scaffolds will decrease in level and intensity as students construct their own connections and understanding.
- Focus – Tasks must satisfy curriculum requirements but they must also be designed to meet the needs of a variety of learners at different levels.

By starting the scenarios at a basic level and building to an advanced level the project has been able to incorporate all of the effective scaffolding criteria (Wilson, 2008).

1. Intentionality: The task has a clear overall purpose to the learner requiring individual contribution to the whole
2. Appropriateness: Instructional tasks should build upon prior knowledge and should be appropriately challenging to the student
3. Structure: The learning environment is structured to present appropriate approaches to the task and lead to a natural sequence of thought and language
4. Collaboration: The teacher's primary role is collaborative rather than evaluative as tasks are solved jointly in the course of instructional interaction
5. Internalization: As students internalize new procedures, external scaffolding for the activity is gradually withdrawn.

This scaffolded approach is also represented in Callanan and Perri's (2006) paper on teaching conflict management using a scenario-based approach, this study does not use virtual world technology, which demonstrates the interoperability of this framework for teaching and learning across a range of mediums.

During the development of the virtual worlds the project has used two types of scaffolding. *Designed In Scaffolding* (Wilson, 2008) the project sequenced the activities to connect previous knowledge to new knowledge and *Point of Need Scaffolding* (Wilson, 2008) the scenarios and interactions were designed that they can be paused if a teacher recognises a

"*teacher moment*", this allows questions to be answered, concepts to be pointed out and assistance given if needed.

Keeping within the *Designed in scaffolding* model we have three scaffolding layers:

1. The first layer is for support with learning scenarios, teaching the participants how to move and function in a virtual environment.
2. The second layer starts with simple one to one scenarios, these can be with or without teacher participation to help the participants to become immersed in the roles and be able to develop their role playing skills in a safe, non judgmental environment.
3. The third level of scaffolding is where the support starts to be removed, the participant gets the opportunity to "show off" these skills and knowledge, in more complex multiplayer scenarios.

Teacher-assisted scaffolding is also embedded into this framework. Teachers can support participants in a multiple of ways including: the teacher can play one of the roles, the teacher can be invisible and assist as required, the first session can be held in a computer lab (hand holding participants as required) and the debriefing sessions at the end of the scenario to help participants break out of character and critical reflect on the experience.

While all scenarios can be used for assessment purposes, the first two levels can be used to assess elements of a competency. The more complex multiplayer scenarios can be used for whole competency assessment or for the recognition of prior learning.

Teacher training to facilitate and train in a virtual environment also has a scaffolding component. This process starts with the teacher participating in simple scenarios, with lots of instructor support, and moving to them designing and delivering multiplayer scenarios. It still needs to have the situated learning characteristics (Herrington & Oliver. 1995), these include:

- Authentic context that reflect the way the knowledge will be used in real-life;
- Authentic activities;
- Multiple roles and perspectives;
- Collaborative support for the construction of knowledge;
- Coaching and scaffolding at critical times;
- Debriefing (reflection) to enable abstractions to be formed;
- Articulation to enable tacit knowledge to be made explicit;
- Integrated assessment of learning within the tasks.

By designing virtual environment to be a legitimate workplace (situated learning) the participants will become involved in a "community of practice" (Wenger, 1991). A "community of practice" has three crucial characteristics:

1. The domain: in our environments the participants all have a shared goal, to develop knowledge and skills for a set outcome. All participants come to the domain or the virtual environment with their own sets of skills and knowledge (ranging from beginners to professionals) and as a collective they have the range of skills and knowledge to achieve an outcome
2. The community: within the environment and the scenarios the participants engage in joint activities and discussion to help each other. These environments enable all participants to build relationships that enable them to learn from each other.
3. The practice: In this case we are bringing together a group of practitioners (who are at different stages in their development, skill and knowledge), who are able to share

ideas and resources. The practice is evident in the experiences, stories and tools that are used to help achieve an outcome ergo a shared practice.

Laluvien (2010, p.177) supports these characteristics and states that "mutual engagement and learning are at the head of the "community of practice" which is defined both by its membership and by the practice in which the membership engages". One of the goals of the "Virtual Worlds in Health Education" project was to have professionals from all over the country participate in the scenario-based role plays. In a similar vein, Herne (2006, p.1) explored this type of interaction between art and design and museum and gallery education and he concludes that "trans-instructional and inter professional communities of practice can be established that have the potential to generate new forms of engagement, shared repertories and joint enterprise". Group dynamics shape a community and a 'pecking order' is generally established, where the participants are working out their position in the community.

The group dynamics or power struggles that operate within a community of practice are distilled within the phrase "legitimate peripheral participation" (Lave & Wenger,1991). Basically, legitimate peripheral participation means that when you put professionals and beginners together, the beginner will learn by watching and working alongside the professional. Laluvien (2010, p.179) also stated that "distilled with the phrase 'legitimate peripheral participation' is an understanding of how operation of power fosters or impedes access to, and continuing membership of 'communities of practice'". There is a strong hierarchical structure within community service centres and within the health system more generally, where the power is "relatively formal and centralized" (Laluvien, 2010, p.179). This structure has been maintained in the scenario-based role plays that were developed for the trial. By acknowledging that this type of power struggle does occur in most work environments, the skills that participants develop in the scenarios in a virtual will be transferred once the students are in a work environment.

This situated learning or experiential learning possible in a virtual world environment also encourages serendipitous learning, meaning that while participants are in-world playing in a scenario they will learn and develop skills without knowing it; this is where the debriefing stage is important to highlight these skills and bring them to the participants' attention.

The post scenario debrief is perhaps the most important part of the learning. This is where metacognitive processes such as critical reflection (Brookfield, 1995) are employed. Brookfield's model of critical reflection focuses on three interrelated processes;

1. "The process by which adults question and then replace or reframe an assumption that up to this point has been uncritically accepted as representing commonsense wisdom
2. The process through which adults take alternative perspective on previously taken for granted ides, actions, forms of reasoning and ideologies, and
3. The process by which adults come to recognise the hegemonic aspects of dominant cultural values and understand how self-evident renderings of the 'natural' state of the world actually bolster the power and self-interest of unrepresentative minorities" (Brookfield, 1995, p4).

This debriefing process will allow the teacher to guide the user either students or participants to avoid confusion, or refer to students AND research participants if you need to make such a distinction through the experiences by focusing on their actions, thoughts, values and beliefs and moving to how this experience and the skills they have developed will change their behaviour and beliefs when dealing with similar situations in the future. This can be

addressed using a scaffolded process such as question starters and protocols (Sanders & McKeown, 2007); teachers can tap into a wider pool of experience not for ideas but for questioning values and beliefs, practices and understandings as well as the new content present in the scenario based role play. This again is a metacognitive activity (Norton, Owens & Clarke, 2004) that will allow students to relate new information or skills to prior knowledge building connections between theory and practice, validating ideas and feelings, and personalising knowledge gained.

Method

Participants were required to complete questionnaires, tailored to each of the above activities, on completion of each activity. The questionnaires consisted of multiple choice and short answer questions, having 18, 16 and 12 questions respectively. Five questions on each questionnaire were demographic in nature; these questions were used when cross-tabulating answers.

45 people participated in the pilot study; 24 were female and 21 male. The age range was 18 to over 50 with the oldest participant being 62 years old. The mean age was in the group 40 – 49 years old. Out of the 45 participants, seven were Indigenous Australians. Not all participants completed the three activities; all 45 participants attempted the tunnel vision activity, 38 participants completed the Angry Client activity and 22 participants took part in the tailored activities.

The other questions in the questionnaires covered the teaching and learning aspect of the scenario e.g. did this scenario allow you to use your communication skills. Most questions had the following three responses agree, disagree or don't know options, additional comments were requested to justify their responses.

Mixed research method is a combination of quantitative and qualitative methods and by applying the triangulation design: Validating quantitative data model (Creswell & Plano-Clarke, 2007). This method was chosen to support the qualitative data collection that occurred during the debriefing and video observation data.

Quantitative can have a constructivist approach while qualitative can have a post-positivist approach. Tashakkori and Teddlie (2003) suggest that "*Pragmatist supports both qualitative and quantitative research methods*"(Tashakkori & Teddlie, 2003). A pragmatist researcher considers the question, to be more important than either the method they use or the paradigm that underlies the method.

Students participated in 'in-world' activities, which were followed by debriefings, interviews, questionnaires and journal entries. Results were recorded and evaluated. The preliminary results indicate that CIT's Virtual Worlds for Health Education will be a valuable asset for training a wide range of students in community services and health.

The questionnaire was not provided to the participants from the Wugularr Community, as we were advised by the Indigenous Education Support Officers that this would be culturally inappropriate for this cohort. The Yurauna Centre cohort were reluctant to participate in the debrief session, but were willing to fill out the questionnaires. This cohort was participating in the trial between classes and in their break time so they were very time pressed.

A questionnaire is a easy way to gather data from large groups (Kervin, Vialle, Herrington, & Okely, 2006), and it can be administered using a variety of approaches. Questionnaire is an appropriate tool for an online environment, the questionnaire can be completed online or in a

written form. The nature of virtual worlds (being remotely accessible) made an online questionnaire an appropriate choice for this trial.

In this case, the questionnaire will be given as an option to participants on completion of a virtual world scenario session. The reasons for administering the questionnaire in an electronic form include:

- The ability to make it more user-friendly, encouraging higher response rates
- Designed to be simple and quick to fill in and include a variety of question types from yes/no to open-ended responses
- Responses can be fed automatically into a spreadsheet or data base, increasing the speed and accuracy of data collection
- Participants may provide more candid responses as there is a greater sense of anonymity (Madge, 2006)

This is supported by Saxon, Garratt, Gilroy & Cairns (2003) who also add "*web-based survey, these include speed of creation, ease of access, speed of response, reduction in paper*" (p.53). Questionnaires do have limitation as this is supported by Kervin et al., (2006) participants may not complete the questionnaire honestly and the participants may choose not to complete the questionnaire at all. The problem that occurred with the questionnaires for this study was that some participants didn't fill in information that was being used to cross tabulate results (e.g. gender), this meant that the questionnaires need to be excluded from the data analysis.

The ethical considerations were considered when constructing the questionnaires includes for this trial, they included: not asking leading question, the cognitive ability of the participant and the language differences.

Observation

The observational data for this research includes researcher's notes, audio interviews and background recordings, photos and video of participants engaged in the activities (in person and in-world). These observations are going to be open-ended, where ongoing natural behaviours are observed and recorded (Kervin et al., 2006). This open-ended approach aligns with the inductive nature of the qualitative data analysis. In this case the researcher is also running the pilot study and has limited interaction with the participants once the trail has started. The observation data allows for the researcher to make use of the short time that was available with some of the trial groups. This means that the researcher will be relatively unobtrusive and only interacts with participants when further clarification of action is needed (Kervin et al., 2006).

The advantage of using observational data includes (Kervin et al., 2006):

- *The researcher gets to experience what is being studied*
- *The researcher can record information as it happens*
- *The researcher can take note of unusual events or situations that my impact upon the research*
- *Allows for insight into interpersonal behaviour*

Limitations include:

- *Researcher's presence may be intrusive*

- *Time consuming*
- *Events may be perceived by the observer differently from what is actually happening due to researcher bias*
- *Some information may be observed that cannot be reported*
- *Researcher may not notice key happenings*
- *Researcher may experience difficulty in gaining rapport with participants*

To help combat some of these limitations the researcher has not relied solely on researcher observation. Evidence collected including photographic, audio and video in-world and real world will be triangulated with the data from the questionnaires.

All ethical considerations have been taken into account with a separate consent form for all audio and visual data collection.

Debriefing focus groups

Debriefing is a process that is part of the blended learning pedagogy that we are pilot studying with this virtual world project. This process is similar to a focus group; the researcher will only be using a portion of the information gathered at these sessions.

For the journal entry participants left anonymous thoughts on a WIKI. This is an opportunity to capture participant's feedback, comments on self-reflection and other thoughts and concerns that participants might wish to share with the researcher. All participants have up to one week after the pilot study to make their contributions.

Data Analysis

Given the small sample size, data analysis was limited. Quantitative data (gathered from the questionnaires) was analysed using the propriety package *SurveyMonkey* (SurveyMonkey.com). Because of the small sample sizes, tests of significance were not conducted, but these will be incorporated as the trial widens. *SurveyMonkey* software provides tools for classifying, sorting and arranging unstructured (qualitative) information.

Questionnaire Exclusions

Three questionnaire results were excluded from the 45 collected in Activity 1 – Tunnel Vision. These results were excluded as the participants did not answer questions about gender and if they were Indigenous. These questions are important for cross tabulation. One questionnaire from Activity 2 and 3 were also excluded for the same reason.

Findings and Discussion

The low numbers in the trial to date make forming conclusions difficult. From the data collected it is apparent that this environment and the scenarios developed did allow participants to demonstrate their communication skills.

Tunnel Vision Activity Results

The full cohort of 45 trial participants attempted the tunnel vision activity. To determine the ability of participants to undertake the scenario, they were asked to respond to the statement "I was able to complete the tunnel vision activity" – Yes, No, Don't Know (Figure 2).

Most respondents indicated that they were unable to complete, however, it appears that females had greater difficulty completing than males. One of the major reasons for

incompletion of this activity was a time restriction. Participants were often time limited and this activity was cut short. When participants were given more time for this activity they were more successful.

A clear majority of participants indicated that they enjoyed the activity. This was also true for the categories 'Male', 'Indigenous' and 'Non indigenous'. A similar proportion of females responded 'yes' to those who responded 'no'. (Figure 3)

To evaluate the learning provided by this activity we asked participants to respond to the statement 'I now have more empathy for people with tunnel vision'. Results are shown in Figure 4, and suggest participants' empathy was related to their learning about the difficulties in being afflicted with tunnel vision. Having empathy for people with tunnel vision is not the same as learning about it. That is, one can know about tunnel vision and still not be concerned for people who suffer from it. Similarly, one may feel empathy for someone with tunnel vision without having much knowledge about it.

The majority of participants engaged well with this activity. Signs of engagement are focusing on the screen for more than 30 seconds, talking or pointing to what is happening on the screen or actively helping another participant with the exercise. One person experienced motion sickness and couldn't continue the activity. The level of frustration that participants felt with this activity was directly related to how small an area they could see through. The level of frustration was also directly related to the amount of empathy that the participants felt at the end of the activity for people who suffer with tunnel vision.

Positive participant comments include "deeper empathy for people with tunnel vision", "simulation of the client's experience, empathy for the level of frustration", "helping me to understand what it is like" and "learning to use the avatar through an activity". Things that participants would like to change include; "Navigation made easier", "more things to find", "first person view" and the "way the mouse works". This highlights not only the frustration with experiencing tunnel vision, but also the potential influence or impact of the technological aspects.

These results support Yellowless and Cooks (2006) findings from their research using second life virtual environment as the platform for a virtual hallucination experience that it is a valid educational tool. They are using "the virtual reality scenario as a teaching tool in our medical school program ..." as well as "..an educational tool for caregivers attending an early intervention program for patients experiencing a first episode of psychosis" (Yellowless and Cook, 2006, p537).

Angry Client activity results

A total of 38 individuals participated in the Angry Client activity. Twenty one were female and 17 were male. There were only six Indigenous participants and only one filled in the questionnaire. For these reason comparisons between Indigenous/non-Indigenous participants were not made.

This activity focused on developing communication skills. There are two different roles that can be played in this activity, that of the Angry Client and that of the Youth Worker. Sixteen participants played the Angry Client, and 22 played the Youth Worker.

To evaluate the ability of this activity to develop communication skills we asked participants to respond to the following statement – 'I was able to use my communication skills in this

role play'. The results are shown in Figure 5, and indicate that most participants considered they could develop communication skills using this medium.

The debriefing sessions for this activity highlighted the use of escalating and de-escalating words or actions, participants were readily able to point out what skills they had used during the activity and how they responded to the angry client when playing the youth worker. Callanan and Perri (2006) study also noted that "individuals can also be trained to spot important contextual factors and social cues as a mechanism to adjust their conflict-handling strategy to match the situation" (p135) using scenario-based role plays.

To evaluate whether the participants considered this activity to be worthwhile, we asked them to respond to the statement- 'I would recommend virtual worlds for communications skills practice to other people'. Results are shown in Figure 6. A clear majority of participants saw value in the Virtual World for communications skills practice, but females clearly are more sceptical than males.

The participants engaged with this activity but found the delay in the audio distracting. Participants were able to display anger or use their communication skills to complete this role play. One participant commented "it's too much fun!", others commented; "the audio is fun – makes it more real time than typing", "interaction", "teamwork"," humour". Comments for improvement included; "more facial expressions", "gestures would enhance the experience", "more background on procedures for responding to angry client". It was interesting to see the different responses from students to procedures when dealing with an angry client, students didn't think about what restriction and policies there would be for booking a client in for an emergency appointment, they just did it! Teaching staff had difficulty with the booking process as they didn't know what it was for this centre, this made them pause and get frustrated, while the student's adlibbed and made it up.

Activity 3 results

Activity 3 involves a series of tailored activities for specific groups. In each case the scenario is largely student driven, rather than prescribed. For example the scenario for the Allied health workers revolves around a client with multiple sclerosis, the allied health workers need to work with the physiotherapist and the client to come up with some energy saving techniques. This activity had 22 participants, all participants were between 18 and 49 years of age, with 12 females and 10 males and only 1 indigenous participant. As with activity 2 due to the low numbers of indigenous participants this data will not be used in cross tabulation.

Half the participants thought that the scenario designed for their learning group suited them more than the generic activity (angry client). The ratio of males who agreed with the above statement to females was higher (Figure 7).

The majority of participants were undecided if they would like to write their own scenarios, rather than the teachers writing them. Fourteen out of the 22 participants thought that they used more of their communication skills with activity 3 than with activity 2.(Figure 8)

Participant's comments about activity 3 include; "allowed for integration of all my skills", "able to express myself", "more suited to my profession", "more difficult with more people" and "it was good to have more people involved in the discussion". Things that people would change included; "pre-reading for characters", "camera angle", and "more movement".

Tailoring the scenarios to different learning groups increased the feeling of immersion that the participants experienced and allowed participants to use more of their communication skills. This was particularly evident in the debriefing sessions where participants talked about the role they were playing and discussed why their avatar made the decisions to act like they did. One participant commented that she took on an authoritative persona when playing the physiotherapists because that is how she thinks they behave in the hospital.

Most of the trials that have been conducted have had some form of technical difficulty. These difficulties range from networking (linking all the computers together) to poor sound quality (echo's and/or crackling). While problems are expected when trialling emerging technologies, we have been working in a *test harness* of the software, this means that we don't have the polished product. This has allowed the project to inform the software designers and developers regarding problems with the software.

The large majority of comments around the scenario-based role plays were concerned with the quality of the sound, problems like audio feedback and delay were experienced. While this was a concern it didn't seem to lessen the immersion that participants experienced. The ability of the avatars to display emotion was a concern for a lot of the participants and would be something that they would require, especially for the angry client scenario. Technical difficulties are not new to online learning "the frustration that can occur for both staff and students" can "impede online teaching and learning" (Shelly, Veness and Rankine, 2000).

Informal discussion around the methodology of the trial from participants, program reference group members and from the researcher suggest that while the trial is extensive, fun and informative and the data gathered is relevant, the questionnaire needs to be revised if a second trial is to be conducted. Informal discussion about the running of the trial in the Wugularr Community suggested that a longer period of time to establish firmer links in the community and to have a reimbursement system for time taken away from community activities were required.

Basing the virtual environment and the trial around scenario role-play activities has a positive potential for engaging Indigenous and non-Indigenous learning in rural and remote areas. The flexibility that this environment allows teachers and students is also a positive outcome. Post trial discussion engaged participants and many ideas for different scenarios and settings were discussed with enthusiasm.

Active participation by key stakeholders in the development of the 3D objects and the scenario role-plays has given ownership of the virtual environment to a wide range of teachers and students. Participants, both students and teachers, feel a loyalty to the project and are interested to see how it will be embedded into CIT teaching and learning culture.

Original methodology for this project was to have equal weighting on the qualitative and quantitative data. The qualitative data (observation, journal entry and comments on questionnaires) has proved useful and is contained in this report and has been triangulated with the quantitative data to authenticate it. The video footage has not been used to gauge participant engagement for two reasons; the first reason is the sheer volume of footage for a limited amount of data and the second is quality, the camera was stationary with the aim to view all participants, due to the nature of using virtual world technology all participants were not always in a local area, this means that the footage is not a true indication of the participants reactions to the virtual world trial. However, the video footage was used by the researcher to transcribe the debriefing sessions.

Conclusion

From these results we can conclude that there is a place for virtual worlds as part of a blended learning structure for teaching and learning communication skills in the health industry. While this is a great outcome the project team doesn't feel that there is enough evidence currently to answer the question "Does tailoring scenarios to learners' needs work in a virtual world environment?"

Results from the project so far indicate that virtual worlds do provide deeply immersive, situated learning experiences for both novices and experienced practitioners. Debriefing proved to be a powerful instructional tool that enhanced the teaching and learning experience within the virtual world environment. Role plays within virtual worlds encourage participants to take on behaviours and characteristics of clients and professionals. This allowed participants to form strong and meaningful workplace values and attitudes, and this occurred from both serendipitous and formal learning experiences.

The next phase of this project is to study the sustainability of the virtual environment and the scenario-based role play's pedagogical framework that has been described in this paper. The sustainability of the project will directly relate to how it will be imbedded into the Canberra Institute of Technology (CIT) online learning environment to be remotely accessible to students and teachers. A study by Horan, Garden and Scott (2009) also noted this is the next phase for their study "MiRTKE: A Mixed Reality Teaching & Learning Environment", their challenges are similar to the CIT's with firewalls being the major issue.

There is much to be gained from further research into this innovative and exciting approach to scenario based role plays and virtual world environments for teaching and learning and the ability to embed the technology into teaching culture.

References

Brookfield, S. (1995) Adult Learning: An Overview. In A. Tuinjman (ed.) (1995). *International Encyclopaedia of Education,* Oxford Pergamon Press

Callan, D & Perri, D. (2006) Teaching Conflict Management Using a scenario-Based Approach, Journal of Education for Business, January/February 2006, Heldref Publications

Caudle, K. (2009), Me, myself and my avatar. *New Scientist Weekly*, 14 November, 2009, 19

Clarke, J. and Dede, C. (2005) *Making learning meaningful: An exploratory study of using multi-user environments (MUVEs) in Middle School Science* Retrieved November 18, 2009 from http://muve.gse.harvard.edu/rivercityproject/documents/aera_2005_clarke_dede.pdf

Champion, E. (2009) Roles and Worlds in the Hybrid RPG Game of Oblivion, International Journal of Role-Playing, Issue 1, January 2009, 37 - 52. Retrieve January 18 2010, from http://journalofroleplaying.org

Creswell, J. W., & Plano-Clark, V. (2007). *Designing and Conducting Mixed Methods Research*. CA USA: Sage Publications.

Darvasi, P. (2008). 3D Virtual Learning Environments. Retrieved January from 2009 http://design.test.olt.ubc.ca/3D_Virtual_Learning_Environments

Ferdig, R. (2006). Assessing technologies for teaching and learning: understanding the importance of technological pedagogical content knowledge. *British Journal of Educational Technology, 37*(5), 11.

Griffin, M. M. (1995). *You can't get there from here: Situated learning, transfer, and map skills.* Contemporary Educational Psychology, *20*(1), 65–87
Gronstedt, A. (2007). *Second life produces real training results*. *T & D*, August, 2007, 44-49.

Herne, S (2006) 'Communities of practice in art and design and museum and gallery education', Pedagogy, Culture & Society, 14: 1 – 17. Retrieved January 18 2010 from http://dx.doi.org/10.1080/14691360500487512

Herrington, J & Oliver, R. (1995) Critical Characteristics of situated learning: Implications for the Instructional Design of Multimedia, Retrieved December 15, 2009, from http://methodenpool.uni-koeln.de/situierteslernen/herrington.pdf

Horan, B., Gardner, M. & Scott, J (2009) TECHNICAL REPORT MiRTLE: A Mixed Reality Teahcing & Learning Environment, Sun microsystem, CA USA, retrieved January 22, 2010 from http://research.sun.com/techrep/2009/smli_tr-2009-182.pdf

Hu, M. (2007) A Framework for Teaching Novice VB Programming Using Motivational Game Scenarios, 20th Annual Conference of the National Advisory Committee on Computing Qualifications (NACCQ 2007) proceedings. Retrieved January 18 2010 from http://hyperdisc.unitec.ac.nz/ naccq07/proceedings/paper/89.pdf

Hutchinson, D. (2007). *Video games and the pedagogy of place*. The Social Studies, 98(1), 35-40.

Kervin, L., Vialle, W., Herrington, J., & Okely, T. (2006). *Research for Educators*. Melbourne Victoria Australia: Thomson Social Science Press.

Laluvein, J. (2010) Parents, Teachers and the "Community of Practice", The Qualitative Report Volume 15 1 January 2010 176 – 169. Retrieved January 18 2010, from htto://www.nova.edu/ssss/QR/QR15-1/laluvein.pdf

Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*: Cambridge University Press.

Merrill, MD. (2002) Fist Principles of Instruction, Educational Technology, Research and Development; 2002;50,3; Research Library, 43 - 59

NMC (2007a). *Spring 2007 survey: Educators in Second Life*. Retrieved November 4, 2007 from http://www.nmc.org/pdf/2007-sl-survey-summary.pdf

Norton, L.S, Owens, T. & Clarke, I. (2004) Analysing metalearning in first year undergraduates through their reflective discussions and writing," Innovations in Education and Teaching International, 41 (4), pp. 423 – 441 Retrieved December 15, 2009 from http://www.cfkeep.org/uploads/norton_owens_and_clark_analysing_metalearning.pdf

Pahl,C. (2002). An Evaluation of Scaffolding for Virtual Interactive Tutorials. In G. Richards (Ed.), Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2002 (pp. 740 – 746). Chesapeake, VA:AACE

Rudestam, K., & Newton, R. (2001). *Surviving your dissertation - A complete guide to content and process*. Newbury Park, CA: Sage Publications.

Sanders, R.L & McKeown, L. (2007) Promoting Reflection through Action Learning in a 3D Virtual World, International Journal of Social Sciences 2:1 2007, p50 – 55 Retrieved December 15 2009, from http://www.waset.org/journals/ijss/v2/v2-1-8.pdf

Saxon, D., Garratt, D., Gilroy, P., & Cairns, C. (2003). Collecting data in the Information Age - Exploring Web-based survey methods in educational research. *Research in Education*.

Sheely, S., Veness, S. & Rankine,L (2000) Building the Web Interactive Study Environment: Mainstreaming Online Teaching and Learning at the University of Western Sydney, ASCILITE 2000 conference proceedings. Retrieved January 23 2010 from http://www.ascilite.org.au/conferences/coffs00/papers/stephen_sheely.pdf

Stewart T. & Brown, M (2008) Developing interactive scenarios: The value of good planning, whiteboards and table-based schemas. In Hello! Where are you in the landscape of educational technology? Proceedings ascilte Melbourne 2008: Full paper: Stewart & Brown 983 - 990

Sydenstricker-Neto, J (1997) Research Design and Mixed-Method Approach. A hands-on experience. Retrieved January 22 2010 from http://www.socialresearchmethods.net/tutorial/Sydenstricker/bolsa.html#Why%20Mixed

Tashakkori, A., & Teddlie, C. (2003). *Handbook of mixed methods in social and behavioural research*. Thousand Oaks CA: Sage.

VanDerKlift, J. (2007). *Virtual Experience of Risk-Based Learning VERBL*: GippsTAFE Retrieved October 2008, from http://verbl.flexiblelearning.net.au/Immersive_elearning/pdfs_for_release/2_VERBL_model_overview.pdf

Wenger, E (1991) Communities of practice, retrieved November 2008 from http://ewenger.com/theory

Wilson, S. (2008). Components of Cognitive Apprenticeship: Scaffolding. Retrieved November 2009, from http://design.test.olt.ubc.ca/Components_of_Cognitive_Apprenticeship:_Scaffolding

Yellowlees, P & Cook, J. (2006) Education About Hallucinations Using an Internet Virtual Reality System: A Qualitative Survey, Academic Psychiatry, 30:6, November – December 2006, Retrieved January 20 2009 from http://ap.psychiatroyonline.org/cgi/reprint/30/6/534

Appendix 1 Charts

Figure 1: Age range for trial participants.

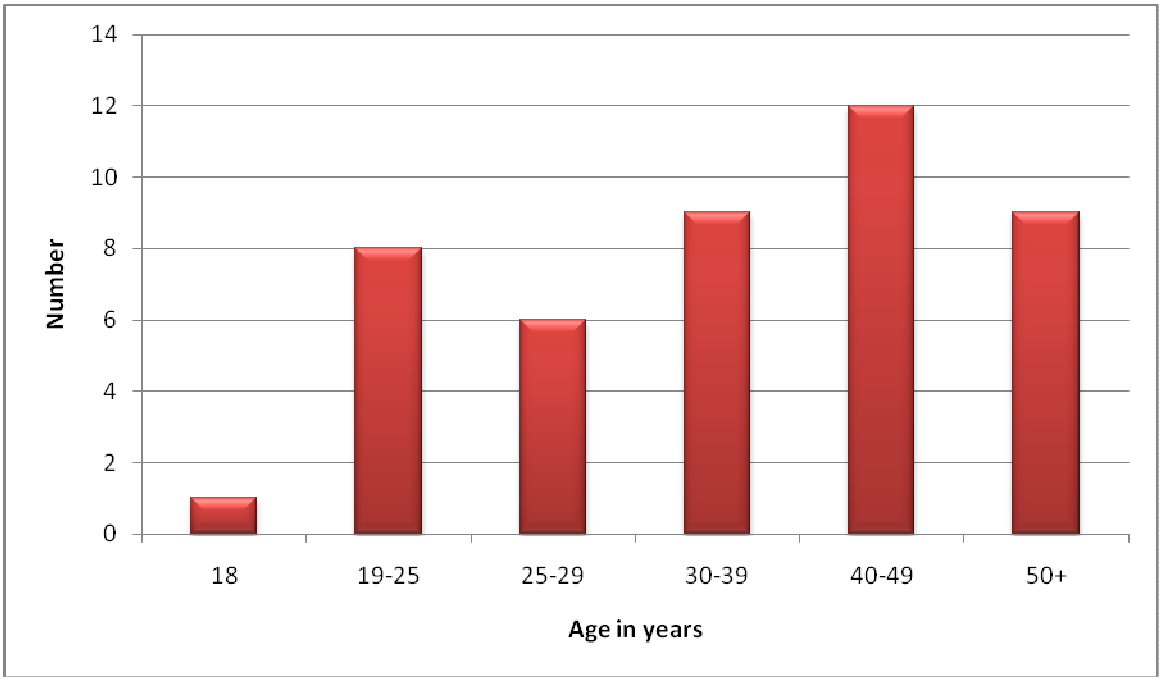


Figure 2: Participant responses to the statement "I was able to complete the tunnel vision activity". (Tunnel Vision activity N=45)

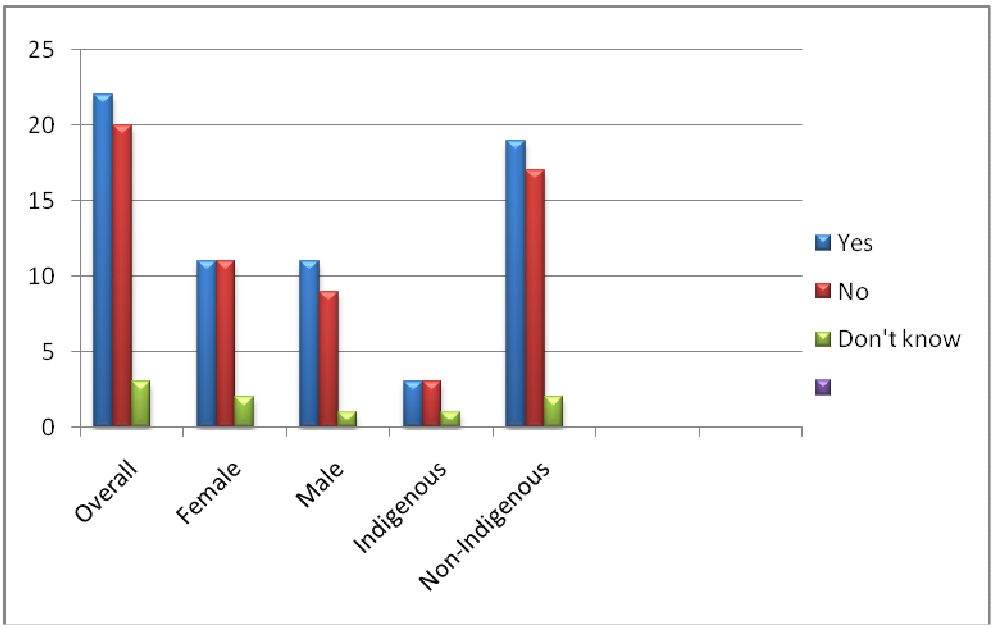


Figure 3: Numbers of participants who enjoyed the activity (Tunnel Vision activity N=45).

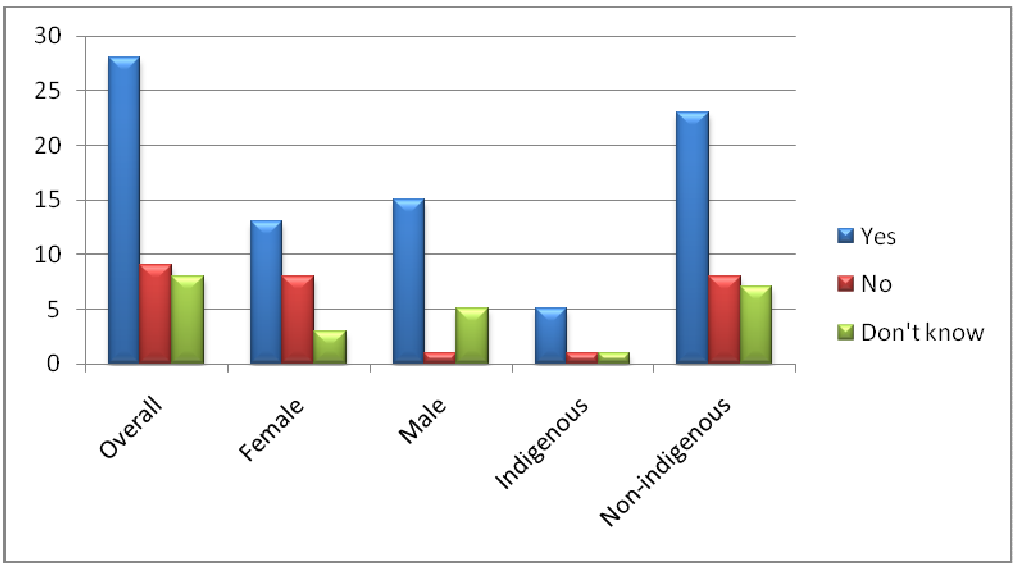
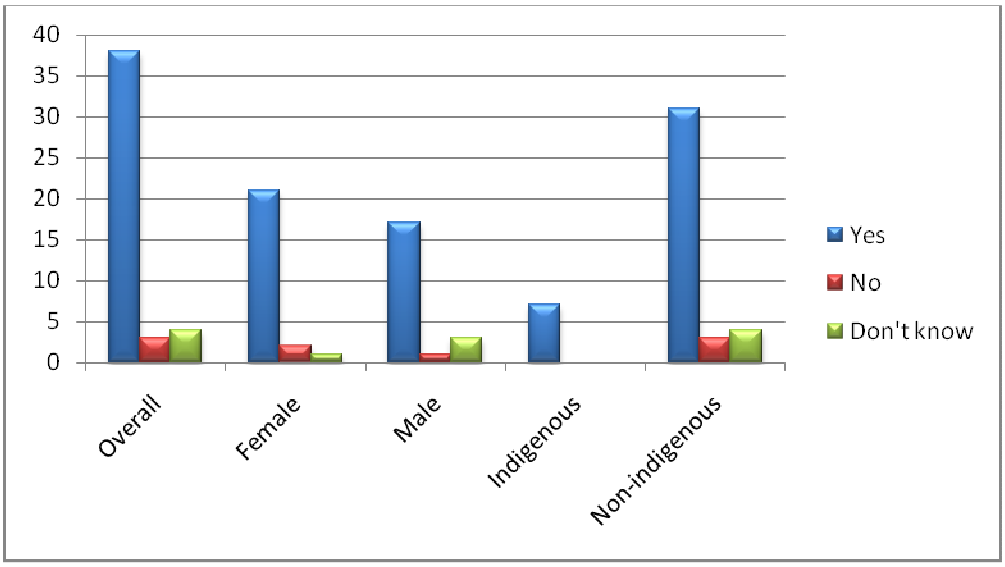


Figure 4: Participant responses to the statement "I now have more empathy for people with tunnel vision" (Tunnel Vision activity N=45).



Angry Client Activity

Figure 5: Participant responses to the statement "I was able to use my communication skills in this role play" (Angry Client activity N=38)

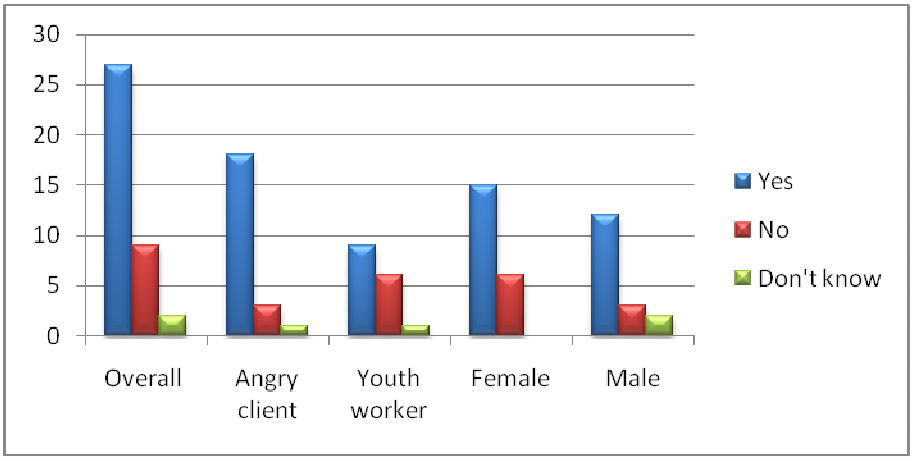
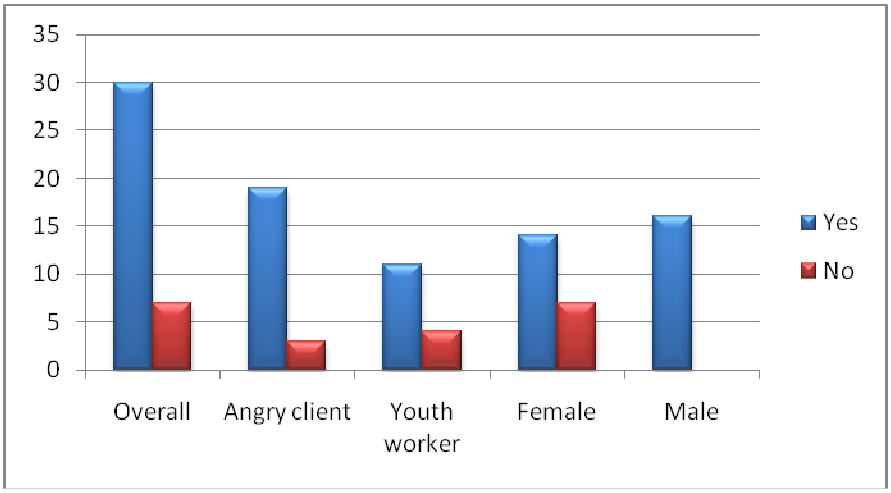


Figure 6: Participant responses to the statement "I would recommend virtual worlds for communications skills practice to other people" (Angry Client activity N=37)



Tailor Activity

Figure 7 - Activity 3 suited my learning needs more than Activity 2 (angry client scenario / role play

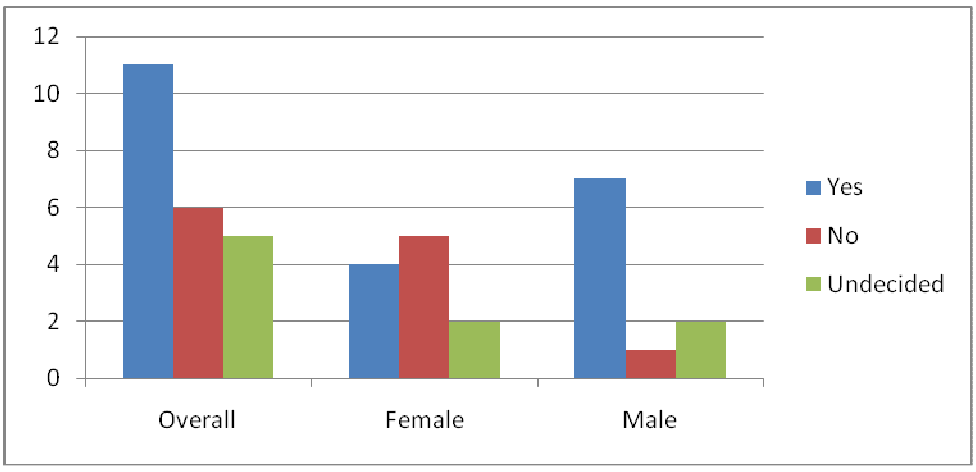


Figure 8 - If I was using a virtual world as part of my course I would like to develop my own role plays rather than have they made up by the teachers