

LEARNING AS IMMERSIVE EXPERIENCES USING THE FOUR-DIMENSIONAL FRAMEWORK FOR DESIGNING AND EVALUATING IMMERSIVE LEARNING EXPERIENCES IN A VIRTUAL WORLD

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Abstract

This paper proposes an evaluation methodology for supporting the development of specified learning activities in virtual worlds, based upon inductive methods and augmented by the four-dimensional framework. The purpose of this is to find the efficacy of the proposed evaluation methodology and framework, and to evaluate the broader use of virtual world for supporting learners specifically in their educational choices and career decisions. The paper presents the findings of the study and considers that virtual worlds are reorganizing significantly how we relate to the design and delivery of learning. This is opening up a tradition in learning predicated upon the notion of learning design through the lens of immersive learning experiences rather than set of knowledge to be transferred between instructors and learner. The challenges that remain for instructor rest with the design and delivery of these activities and experiences.

Background of the study

Virtual environments over the last few years have been facilitated greatly through web-based technologies and applications, as well as increasing broadband connectivity and computer graphics capabilities. Together these allow a range of options in the context of education and training, not least sharing documents and files, holding meetings and events, networking and hosting virtual seminars, lectures and conferences, running research experiments, providing forums for sharing research findings and meeting international colleagues (De Freitas, 2008). Such applications also have even greater potentials for integrating different technologies to supporting social software applications, presenting e-learning materials and content and offering learners' games and rich social interactions. In addition custom online virtual originating mainly from universities and research institutes has also been developed mainly for educational and learning

purposes (Liarokapis et al, 2004). These are more experimental prototypes and usually use dedicated hardware devices such as advanced visualization (head-mounted displays, stereoscopies displays interaction (3D) mouse, orientation and position sensors) as well as hepatics (gloves). However, usually the costs involved in these types of configurations are still very high compared to the alternatives presented above.

Virtual applications were identified and not all were mechanic applicability for learning while many are aimed at young children and the extent of the field are not just in terms of potential use for education and training, but actual usage and uptake by users is extensive. This study is centred on how virtual worlds can be better understood and used specifically in the context of education and training for support seminar activities, and lectures and other educational purposes which has been documented in a number of recent studies (Dickey, 2005; Hut, 2007; Jennings and Collins, 2008). Both the broad emergence and the applicability of immersive space for undertaking learning have led to wide interest from learning practitioners in find out more about how they may be best developed in the classroom and seminar room. However, the breadth of applications of virtual worlds, and their relatively swift emergence has made this a challenging area for researchers. (Hendaouti et al, 2008). Universities should set out ways to explore way how virtual world might be most effectively evaluated in relation to designed learning process and feedback into a interactive design of activities that could then be replicated by other researchers and learning practitioners.

Underpinning this approach to the emerging field of serious games and virtual worlds, it was discovered that some scholars have been attempting to reconceptualize ideas around learning in particular way from more traditional approaches and towards a notion of learning experience and exploration. Thus to understand this we shall be considering the role of multimodal interfaces like 3D interfaces and perceptual modeling i.e. cognitive based approaches such that our interactions with the environment and other social interactions are adopting an approach towards constructing learning experiences as a process of 'choreography' rather than based around data recall strategies (Alabi, 2009). This approach reorganizes how we can produce and develop learning activities with a greater emphasis upon learner control, greater engagement, learner-generated content and peer-supported communities which jointly may increase learning gains. Jarvis et al (2009) states that exploratory learning model can support this experience-based approach to learning and training contexts as shown in table 1.

| FOUR DIMENSTIONAL FRAMEWORK | |
|------------------------------------|-------------|
| Learner specifics | Pedagogy |
| Profile | Association |
| Role | Cognitive |

| | |
|----------------|----------------------|
| Competencies | Social/simulative |
| Representation | Context |
| Fidelity | Environment |
| Interactivity | Access to learning |
| Immersion | Supporting resources |

Table 1: The four dimensional framework
Source: Sara de Freitas, 2008

This study used the inductive method which requires researchers to construct theories and explanations based upon observations coordinated using educational research approaches including the use of survey data and observations. A similar approach was adopted in the serious games – engaging training solution project (Gill & Johnson, 1997) but their focus were upon measuring the efficacy of game-based learning rather than virtual world learning activities. This was used to address some of the wider issues on efficacy and the challenges arising from this approach to learning and teaching.

In addition, the study combined the use of the four dimensional framework to provide a more structured approach to the synthesis and analysis of this research findings. In this study the four dimensional framework proposed the learner, the pedagogic models, the representation used and the context within which learning takes place (table 1).

The first dimension involves the process of profiling and modelling the learner and his/her requirements. This ensures a close match between the learning activities and the required outcomes. The emphasis is upon the learner, highlighting the importance of the interaction between the learner and his/her environment. Example, there could be more naturalistic interactions which may provide less gap in learning transfer and also information communication technology (ICT) may affect the way the learner interacts with the experience and his/her abilities to become immersed in the activities in the first place, so feedback is important to be central to the most effective learning experiences of individual perception of effectiveness (Jarvis et al, 2009).

The second dimension includes consideration of various learning and teaching model adopted alongside the methods for supporting the learning processes may include the use of associative models based upon task centred approaches of learning and consistent with training methodology and constructivist models of learning and involve building upon existing knowledge on the part of the learner. Immersive experiences based upon task-centred analysis and learning task construction result in task-centre outputs and although effective may be limited to more training base contexts for learning. Also certain forms may reinforce particular approaches more readily.

The third dimension of context may impact upon where learning undertaken, for example in school. It may also affect the disciplinary conte

which subject area is being studied and whether the learning is conceptual or applied. The interaction between the learner and his/her context are particularly important as the learner may be present in a physical and a virtual space at the same time. These hybrid spaces are relatively unexplored in research terms, but may allow for different approaches to learning beyond those outlined here. This study aimed to explore the possibilities of using virtual world for supporting lifelong learners in their career decisions and educational choices. In particular the study is interested in whether this method could support mentoring and social interactions for learner in a blended virtual context supplemented with face-to-face tutoring.

The data collection methods for the study included pre- and post activity surveys, video observation of real world and the in-world sessions, recording and chat logs. A total of 18 learners answered the pre-activity survey. 11 (61.11%) were students from Federal University of Technology, Minna and 7 (33.89%) were from College of Education, Minna. The average for self rated ICT skills (using scale 1-5 where 1 = not very good and 5 = excellent) was 3.94 where College of Education students skill was rated as 3.57 and Federal University of Technology, Minna students skill was rated 4.18. The high self rating for ICT skills and in particular FUT, Minna students is higher than College of Education Minna students. This could be due to the familiarity with new technologies (Mohammed and Oliver, 2006).

Also the capabilities of the learners in using related games technologies were surveyed and it was found that in the user groups the polled 66.6% of learners do play video games, (28.57%) from the students of College of Education, Minna while 90.91% from the Federal University of Technology, Minna.

Table 2: A comparison of how well liked each aspect of the session was by each

| Aspect of session | College of Education, Minna | Federal University of Technology, Minna |
|--|-----------------------------|---|
| The face-to-face sessions | 3 | 2.5 |
| Using the second life (SL) application | 3.14 | 2.66 |
| Creating avatars | 2.2 | 3.14 |
| Moving in the virtual space | 2.42 | 2.75 |
| Meeting the experts | 3.14 | 2.87 |
| Reacting with your fellow learners | 3.5 | 3.14 |

Discussion

While multiplayer games may have educational potential in the future, virtual worlds are generally regarded as having greater educational

potentials (Alabi, 2009). Currently this is broadly because of the focus of activities. However, the method for comparing the benefits of structured activities in games over open-ended explorations of virtual worlds is an area in need of further research. Of interest here may be how to bring together the structured activities of games with the exploration and social power of virtual worlds. The motivational capacities of game-play when brought together with the social interactions of virtual worlds may be a powerful teaching combination in the future. The main lessons arising from this study demonstrated a need to evaluate the platform with a larger sample of learners. Orientation is important for new users of virtual worlds to induct them into using the platform, and for maximizing their engagement with virtual worlds as a whole. As found out in this study, those who are familiar with gaming and who are multiplayer of games regularly often find the unstructured and open-ended aspect of virtual worlds difficult to adapt to, as they are used to more structured and purposeful activities and it can take a long while for them to adapt to these more open and exploratory social worlds.

Conclusion

This study tried to test the virtual world using a procedure loped evaluation methodology and approach. The approach was based upon an assumption that learning experiences need to be designed, used as tested in a multidimensional way due to the multimodal nature of the interface. To support this, four dimensional frameworks were used with the inductive method to gather data and analyses our findings. The approach has worked well in the interaction with main strength being that the evaluation methodology which allowed the research to evaluate the learning experience according to specific criteria, this methodology may be used as a design tool for designing learning activities and as used in evaluating the efficacy of these experiences due to its set of consistent criteria. The study also suffered some technical issues that in general terms were off-putting for those unfamiliar with virtual worlds. Virtual world may also support peer collaboration and may be used for example collaborative assignments with practical outputs, example, designing a marketing campaign and work centering upon social interactions which would be well served in the virtual world.

Finally, this immersive learning approach could work well with distance, face-to-face learners and even online learners. The use of virtual worlds may also need to be considered with respect to using a blend of other media support mechanisms, such as video conferencing and virtual learning environments which may help support the learners.

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