Reality and Virtuality in Schools

Working Group 3.1

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Abstract: The increasing use of virtual environments in education raises many issues and challenges for educators. Teachers and students need to develop critical understandings about its nature and use. Teachers need to develop skills in creating new kinds of learning experiences for students, and to explore new forms of pedagogy. There is also a need to develop an increased awareness of ethical issues and social concerns with this medium. VR can extend and enhance teaching and learning through multi-sensory experiences that can support role-playing and simulation in which the participant is an active element.

1. REALITY AND VIRTUALITY

In any discussion about the nature and use of virtual learning environments in education, there is a need to consider the nature of those environments, their relationship to 'reality', and the socio-cultural and critical frameworks that inform their development and use in particular social and cultural contexts. In this report, we suggest some areas that need further detailed consideration by educators and developers in order to develop a situated understanding of the principles and issues that form the basis of the development and use of virtual learning environments.

The use of the terms 'reality' and 'virtuality' in relationship to ICT is problematic, in that there is a long-standing philosophical debate about their

fundamental nature and relationship. However, in this report, we take a focus on the implementation of virtuality in education settings. I doing this, we adopt the framework in Figure 1, which posits that there is a continuum of experience from reality (face-to-face classroom environments) to complete immersive virtual-reality environments.

- a) Virtual reality is a way for humans to visualise, manipulate and interact through computer generated objects and environment and with people.

– Adapted from “*Silicon Mirage: The Art and Science of Virtual Reality*. Steve Aukstakalnis and David Blastner “

Figure 1: Framework for considering the reality – virtuality continuum

This framework is not meant to be a definitive model, but rather, an aid to considering the relationship between reality and virtuality, and the kinds of educational experiences and learning environments that might be employed for particular educational contexts. This professional group spent considerable time in debating many aspects of this framework, and the philosophical and educational issues that it is embedded in. In the remainder of this paper, we discuss a number of key issues, and elaborate on aspects of them that need further detailed consideration by students and educators of virtual learning environments.

2. CLASSROOM ENVIRONMENTS

While Virtual Reality (VR) supports the visualisation of events, objects etc. that are usually inaccessible, it also supports new forms of interaction, engagement, and pedagogy. If we see VR as a fundamentally new way of teaching, we might see the virtual existence of students as a threat to old methods of teaching. However, it is possible to see VR as a logical extension of modern pedagogical methods. The potentially wide range of sensory inputs that VR supports allows for more and complex and authentic experiences. For example, VR could give a common experience to a class in a short period of time, and allow for individual students to explore a subject both individually and with other members of the group (including the teachers) so that the experience is both personal and social. It also allows for new kinds of exploration of the classroom in which students interact virtually with people and events from other places and times. In this way, VR allows teachers to spend less time delivering facts and more time at discussion challenging (scaffolding) pupils.

However, we still have to be critical about its use and purpose because sometimes the use of film or discussion may be a better approach to achieve the desired goals. This means that we really have to think very carefully about the goals of using VR, and why we want to use it instead of other media. In addition students need to be trained in its nature and use and to be made aware of possible dangers to be found in some VR environments. They also need to develop an understanding of the appropriate etiquette of behaviour and communication in VR environments, and how to use it and why.

3. THE ROLE OF TEACHERS

The role of teachers in regard to virtual environments is the same as in 'normal' classroom environments – to scaffold and guide the students' development within the applicable curriculum structures. However, they also have to help students to understand their experiences – to develop ethical behaviour (in these environments), to help develop their skills in analysis and critique so that they can interpret their experiences in some rational manner. Perhaps when the technology becomes more empowering students will be able to construct their own VR materials/environments, developing a literacy of the new medium that empowers them to fully comprehend its power and limitations, and embedded notions of manipulation and control of the medium by designers and developers.

There is also a strong need to educators to define models of good practice with VR in regard to instructional design, pedagogy, and the evaluation of learning outcomes. Is it, for example, easy (or appropriate) to translate existing 'good teaching' models from the classroom into a VR equivalent, or does the use of multi-sensory media demand new pedagogical models? In this regard, the professional group agreed that the focus of the educational use of VR should be on providing students with a broader range of developmental experiences, or applying existing knowledge to new contexts, rather than on using it as a medium for delivering 'routine' content i.e., the medium should be used for its power as a multi-sensory medium to enhance the curriculum, rather than replace existing media forms such as film and textbooks.

The question is then how will teachers develop the knowledge and skills to be able to do these things? How will teacher training have to adapt to this challenge? Currently, Teacher Education is having great difficulty addressing related issues from 'basic' forms of ICT, such as multimedia and online environments. Virtual reality environments present a further level of concern because they are not yet routinely used in education, and especially not in Teacher Education, yet are increasingly being used in a variety of applications outside of Education – such as in Museums. Given the reluctance of many educators to develop extensive ICT competencies, there may be a need to explicitly include material on virtual learning environment design (including VR) in Teacher Education programmes. There is a clear need for teachers to understand the technology they work with in order to make effective educational use of it – Shulman's notion of Knowledge Bases for Teaching provide a clear rationale for such an approach. Similarly, recent work on teacher cognition has demonstrated its situated and contextual nature, and implies that teachers need a diverse range of knowledge from different domains in order to be effective teachers. Further support for this position comes from the 'out of field' problem experienced by teachers – where they are least effective teachers in areas with which they are least familiar (such as the use of technology, and its educational application). It is therefore important for teacher educators to explicitly scaffold the development of teachers' understandings of the relationships between pedagogy and technology. And in particular the development of pedagogical content knowledge that bridges both domains, so that teachers can both understand, and make effective use of, technology for a diverse range of educational purposes.

4. CONCERNS

One potential concern held by the group is that the large investment needed to make quality VR might lead to the selective representation of ideas and understandings through the wide scale dissemination of commercial products, rather than a representative sampling such as might be produced by educators. It was felt that more empowering technology, when it emerges, might help to address this issue. There is, however, considerable concern that the high quality of commercial products might be difficult for educators to match, and given the sensory nature of VR, might lead to products that children would find unappealing.

An additional concern may be that children become confused about the blurred boundaries of reality and VR. However this might serve as a starting point for a critical discussion on representations of reality in general: how real or objective are the news programs we are exposed to, and the implicit manipulation of all media forms.