

# Virtual Reality and HyperReality Technologies in Universities

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## INTRODUCTION

The term HyperReality (HR) was coined by Nobuyoshi Terashima to refer to “the technological capability to intermix virtual reality (VR) with physical reality (PR) and artificial intelligence (AI) with human intelligence (HI)” (Terashima, 2001, p. 4). HR is a technological capability like nanotechnology, human cloning and artificial intelligence. Like them, it does not as yet exist in the sense of being clearly demonstrable and publicly available. Like them, it is maturing in laboratories where the question ‘if?’ has been replaced by the question ‘when?’ And like them, the implications of its appearance as a basic infrastructure technology are profound and merit careful consideration (Tiffin & Terashima, 2001). Because of this, universities – if they are to be universities – will be involved with HR as a medium and subject of instruction and research, and for the storage and development of knowledge (Tiffin & Rajasingham, 2003). The concepts of HyperUniversities, HyperClasses, Hyperschools and HyperLectures are at the same level of development as the concepts of virtual universities, virtual classes, virtual colleges and virtual schools in the later part of the 1980s (Tiffin & Rajasingham, 1995).

HR subsumes virtual reality. HR is only possible because of the development of computer-generated virtual reality, in particular, the development of distributed VR, which makes it possible for different people in different places to interact together in the same VR. It was the theoretical application of this capability to education and especially to university education that led to the concept of virtual classes in virtual schools and universities (Tiffin & Rajasingham, 1995). Initial experiments simulated virtual classes by using videoconferencing, audio

conferencing and audiographic conferencing. The emergence of the Internet shifted these ideas from a laboratory stage to development of institutions calling themselves virtual universities and virtual schools by virtue of being able to bring teachers and students together in classes using telecommunications and computers instead of public transport and buildings.

HR also subsumes AI. Teaching machines and computers have been used for instruction since the early days of CAI (Computer-Assisted Instruction) in the 1960s, albeit with little overall impact on education, especially at the university level. However, the growing capability and ubiquity of AI expert systems and agents, the vast amount of repetitive work involved in teaching and the growing application of business criteria to the management of education suggests that AI agents, conceivably in avatar form, will be adopted in education, and the place where this will begin is likely to be in universities.

## THE NEED

Worldwide, governments face the challenge of increasing demand for university education. In Asia alone, the numbers seeking university places is predicted to rise from 17 million in 1995 to 87 million by 2020 (Rowe, 2003). It is unlikely that such demand can be fully met using the traditional communications systems of education (Daniel, 1996). These are:

- The public transport systems that bring students and teachers together for regular epi-

- sodes of face-to-face instructional interaction called classes, lectures, seminars or tutorials.
- The buildings that provide dedicated instructional environments called classrooms, lecture theatres or seminar rooms characterised by frame-based presentation media and workspace on desks and tables. The buildings also need support environments such as offices, rest areas and recreational facilities.
- Provision for the use of paper-based storage media (books, notebooks, exercise books, assignment folders) in libraries, carrels, desks, assignment drops.
- Laboratory space and facilities.
- Infrastructures for telecommunications.

The costs of building and maintaining universities and the support infrastructures they need are high and getting higher. Increasingly, universities turn towards the Internet, where students and teachers can be brought together as telepresences in virtual classes, virtual lectures, virtual seminars and virtual tutorials. Rumble (1997, 1999, 2004), Turoff (1996) and Butcher and Roberts (2004) all agree that virtual universities on the Internet are significantly less costly than conventional building-based universities. Virtual universities that function primarily through the Internet and have no buildings for student needs and no demand on public transport infrastructures for students have been in existence since the mid-1990s. At minimum, conventional universities now have a home page on the Web; their students use the Web to help with assignments and to link with other students, teachers and administrators; and university management is exploring other ways of expanding teaching and administration activities on the Internet.

Initially, people tend to communicate through new media in the manner of the old media they are accustomed to. Universities use the Web as a library resource and for what was traditionally done by means of handouts and brochures, and e-mail for housekeeping notices, seminar discussion and written assignments. Virtual universities on the Internet tend to operate as electronic correspondence colleges. However, the Internet is becoming broadband, and computers get more powerful and portable. Universities can now use the Internet for streamed lectures and for holding classes by

audiographic conferencing and video conferencing. It is possible for students and teachers to have telepresence as avatars and be fully immersed in three-dimensional distributed virtual classes (Tiffin & Rajasingham, 2001).

### **The Virtual Class/Lecture/Seminar**

Roxanne Hiltz coined the term “virtual classroom” for the use of computer-generated communications “to create an electronic analogue of the communications forms that usually occur in a classroom, including discussion as well as lectures and tests” (Hiltz, 1986, p. 95). In 1986, John Tiffin and Lalita Rajasingham inaugurated a long-term action research program with postgraduate students at Victoria University of Wellington, New Zealand that sought to conduct what they called virtual classes, where students communicated with computers linked by telecommunications. They used the term “class” in the sense of an interactive instructional communication function between teachers and students and between students and the term “virtual” in the sense of existing in effect, but not in fact. Tiffin and Rajasingham hypothesized that learning could be effected by means of computers interlinked by telecommunications without the physical facts of classrooms, schools, colleges and universities. In contrast to Hiltz, they assumed that education delivered in this way would not be analogous to conventional educational practice, but would be modified by the new information technology and take new forms; and that in time this would include meeting for interaction in computer-generated virtual realities which would become increasingly immersive. They concluded that a virtual class need not necessarily be synchronous and that the people in it formed virtual networks that were independent of location. “The effect would be to make education available anywhere anytime” (Tiffin & Rajasingham, 1995, p. 143).

The “virtual class” research project began in pre-Internet days of 1986 using a lash-up of equipment that sought to comprehensively conceptualise what would be involved in a virtual university that depended on computers and telecommunications. Assignments, student-to-student and student-to-teacher discourse and course administration were online, and a variety of audiographic modes were developed

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