Position paper for the workshop 'Learning activities across physical and virtual spaces' (AcrossSpaces)

MiRTLE (Mixed-Reality Teaching and Learning Environment): from prototype to production and implementation

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Position paper

We have previously presented our work on building a Mixed Reality Teaching & Learning Environment (MiRTLE) in a series of presentations and publications [1 – 4]. Moreover, we have suggested how we could go beyond the classroom to create much larger mixed-reality environments based on the wider university campus, with greater integration between devices and resources in the real and virtual worlds [5].

MiRTLE is a mixed reality environment that links the physical world of the classroom with a virtual world for remote learners, so permitting real and remote students to come together in a single traditional instructive higher education setting. A key objective of the MiRTLE project was to provide online access to classrooms for remote students while providing education practitioners with a 'business as usual' environment for their teaching, so allowing institutions to increase class size while retaining their existing practices. Figure 1 illustrates the MiRTLE virtual classroom from an online student perspective. The environment augments existing teaching practice with the ability to foster a sense of community amongst remote students, and between remote and co-located locations. The first achievement of the project was the successful demonstration of the concept of combining physical and virtual worlds into a single practical service. This was then validated in several deployment scenarios. Others have now begun to adopt MiRTLE [6], and its use has also moved beyond Higher Education to other sectors including Community Education and the K12 school system in the USA [7].
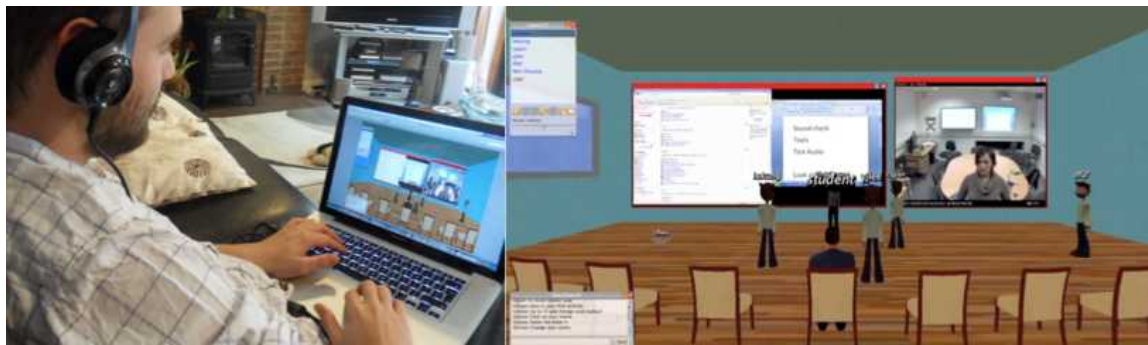

Figure 1 – MiRTLE student interface

This position paper reports on our latest research, which aims to take MiRTLE beyond the prototype stage into 'production' and regular use and describes the planned content for the presentation which will accompany this paper.

From the initial evaluations of MiRTLE at the University of Essex, a number of valuable issues were highlighted that have implications for future uses of this technology. It particularly highlighted potential social issues, such as the impact on student motivation and perceptions of crowding and jostling for position in the virtual classroom. The trial also showed that there was potential for impromptu and naturalistic social interaction between virtual and physically present students. Teachers also recognized the potential value of the product, reporting that, once students are logged on and settled, the MiRTLE environment had a minimal impact on normal patterns of teaching, and the teachers perceptions of the learning occurring in their teaching environment. An important emerging theory is that the previously described finding of spontaneous social exchanges between virtual and physically present students suggests that MiRTLE can facilitate a breaking down of the

barriers between the virtual and the physical, and increase a sense of presence for all learners and teachers involved.

Emerging uses for MiRTLE lie not only in expanding class size, but also in providing a teaching tool for: remote settings where it is difficult for all students to come together in a single physical environment routinely and regularly; post graduate professional education where employers would like to reduce absence from the workplace whilst still encouraging continuing professional education; and in providing a communication tool for policy or other decision making environments where bringing together thinkers who are distant from each other, and who can ill afford the time to travel for meetings, is commercially desirable.

The key challenge now for MiRTLE is to go beyond a prototype to become an established part of the teaching and other organisational infrastructures. This presents a number of technical, pedagogical and commercial challenges.

The presentation accompanying this position paper will report on our efforts to implement and evaluate MiRTLE in higher education institutions and other organisations:
  o Strategies to secure buy-in and organisational access and co-operation
  o Overcoming technical implementation problems within existing institutional IT structures
  o Managing user concerns and expectations
  o Evaluating user experiences
It will also describe our current technical research to streamline and improve the utility of MiRTLE, including:
  o Implementing MiRTLE on different virtual world platforms
  o Streamlining the installation and setup phases
  o Creating more portable versions of MiRTLE which can be shared across teaching rooms
  o The capture and streaming of live MiRTLE classes to a wider audience
From a pedagogical perspective we want to go beyond the use of MiRTLE for the simple delivery of lectures, and explore other pedagogies that can further exploit the affordances of the mixed-reality environment. This includes:
  o Creating more reference sites for different educational uses
  o Linking MiRTLE installations to explore richer collaboration and co-creation scenarios
  o Integrating MiRTLE into our research testbed – the iClassroom
We also show how we are incorporating some of these ideas into our future research work on mixed-reality and smart classroom environments

References

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