A virtual way to teach introductory physics

Dominic McGrath, Teaching and Educational Development Institute, The University of Queensland, Australia

Margaret Wegener and **Timothy McIntyre**, School of Mathematics and Physics, The University of Queensland, Australia

Craig Savage and **Michael Williamson**, Centre for Learning and Teaching in the Physical Sciences, The Australian National University, Australia

d.mcgrath1@uq.edu.au

Abstract: Much of modern science explores domains outside the experiential world of students. In these situations virtual reality, and carefully constructed accompanying experiences of active exploration, can provide a contextualised experience to develop connected understandings. This paper presents the development of two virtual reality simulations in physics. Real Time Relativity explores Special Relativity and QSim introduces Quantum Physics. We report the successful outcomes of the implementation and development of Real Time Relativity considering students' experiences and learning. Evidence is presented as to the effectiveness in the teaching context, with students engaging with the material, demonstrating improved learning outcomes and wanting to experience more science and simulations.

Are our students engaged with their learning?

Janet Macaulay and **Elizabeth Davis**, School of Biomedical Sciences, Faculty of Medicine, Nursing and Health Sciences, Monash University, Australia

Janet.Macaulay@med.monash.edu.au

Abstract: Many academics are reporting that students appear to be disengaged from their studies and from university life in general, as reflected by a lack of attendance at lectures, participation in general University life and interaction with peers and staff.

This study investigated student's engagement with their academic studies and their perception of being a member of the university community. Student participants were enrolled in second and third year Biochemistry and Pharmacology units of the Bachelor of Science at Monash University. Data was collected from student questionnaires, usage data from Blackboard (the Monash student online web platform) and attendance numbers at lectures.

The data obtained indicated that the students did minimal preparation before classes and lecture attendance was low (frequently less than 50% of enrolled students attending). Although academics frequently cite the increased flexibility of the learning environment (including recording of lectures and the availability of electronic lecture notes) as a major factor encouraging non-attendance at lectures, this was rarely mentioned by students as a contributing factor. The most common reasons identified by students for non attendance at lectures were timetabling issues (clashes, lectures too early in the morning and long breaks between classes), other academic commitments (assignments and tests), paid work commitments, travel time and the lectures themselves (content and presentation).

In all units surveyed, online formative assessments were provided and students were encouraged to use these throughout semester to develop continuous learning habits. However, the usage data indicated that the major use of the online formative assessments was immediately prior to summative assessment tasks (mid semester tests and end of semester exams) rather than for continuous learning throughout the semester. Online learning activities which did not clearly relate to assessable tasks were rarely accessed.

Questions related to engagement with the peers and academics revealed that greater than 50% of the student did not work with other students outside of class and did not interact with their lecturers. Less than 85% interacted with unit convenors.

These data indicate that while the students in the study were engaged in some aspects of their studies ways of encouraging greater engagement with their studies and university life need to be explored.