

# ACTIVE LEARNING USING ONLINE INTERACTIVITY

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Preparation for classes and interactivity are core components of active learning. Both of these components can be implemented in ways enabled by technology, using online resources and activities. This presentation will discuss a range of online strategies to support active learning, from the viewpoint of at least a decade's work on implementing active learning in a variety of university physics courses.

A particular focus has been the development and evaluation of online learning modules. "Five Minute Physics" was originally envisaged as lecture preparation material. Its concise text, videos/animations and quizzes with instant feedback are designed to provide students with a fundamental understanding of course material, preparing them for interactive in-class activities. Once it was proven that students actually use this resource, its content was extended. An introductory-level service course has a complete suite of Five Minute Physics modules covering the course material. These have been consistently nominated by students over many semesters (pre-COVID, at the height of the pandemic crisis, and now), as one of the best aspects of the course. Initially, student engagement with interactive simulations that were incorporated in Five Minute Physics varied widely. We have since integrated simulations in learning tasks, for example, small-group worksheets for tutorials. Students across a number of courses have responded very positively to use of online simulations, reporting gains from simulation-based activities, and describing how simulations helped their learning.

In the rapid transition to new delivery modes prompted by COVID-19, we attempted to retain advantages of active learning – supported by technology. In recent semesters, for a first-year course with hundreds of students, consisting of lectures, tutorials and practicals, most students experienced a blend of online and face-to-face teaching. Interactive lectures have been achieved online, and in simultaneous face-to-face/online mode. Tutorials on-campus and online have used the same activities, based on online interactive simulations and small-group discussion. Student attitudes to the use of online simulations in both situations have been overwhelmingly positive. Student engagement in in-person tutorials was relatively high. In online tutorial sessions, engagement was generally lower, the productive student discussion varied dramatically, but engagement improved over the semester with tutors working to encourage discussion.

As we aim to address contemporary and future challenges in physics education, technology-enabled strategies will continue to offer interesting possibilities to support active learning.

## REFERENCE

Five Minute Physics. <http://teaching.smp.uq.edu.au/fiveminutephysics/>

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