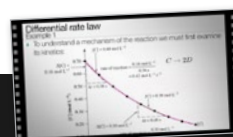




LEARNING TO TEACH ONLINE

CASE STUDY



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Using online lectures to support active learning

Featuring: Dr Daniel Southam & Associate Professor Mauro Mocerino, Curtin University

Context

- 140 students in a first year Pharmacy class, [Introduction to Pharmaceutical Chemistry 121](#)
- 350 first year Science and 2nd year Chemical Engineering students from Australian and Malaysian campuses in a class called [Chemistry 102](#)

Description

- [Blended](#) class using an [active learning](#) strategy
- Face-to-face tutorials using in-class polling software, supported by online lectures

Technology

- Online lectures recorded using [Echo360](#) lecture capturing software, and distributed using the [Blackboard](#) Learning Management System (LMS)
- In-class polling using [Turning Point](#) audience response system

Written by Simon McIntyre

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Aims and overview

This case study examines how technology can be used to support an active learning strategy within face-to-face Chemistry classes. Both in-class polling software and online lectures are used as part of a comprehensive teaching strategy, designed to enable students to develop critical thinking and analytical skills. While in-class polling is not an online process, it is included within this case study to highlight how different types of technology can be used together to effectively support classroom teaching, when integrated with a carefully considered pedagogical approach.

What are in-class polling and online lectures?

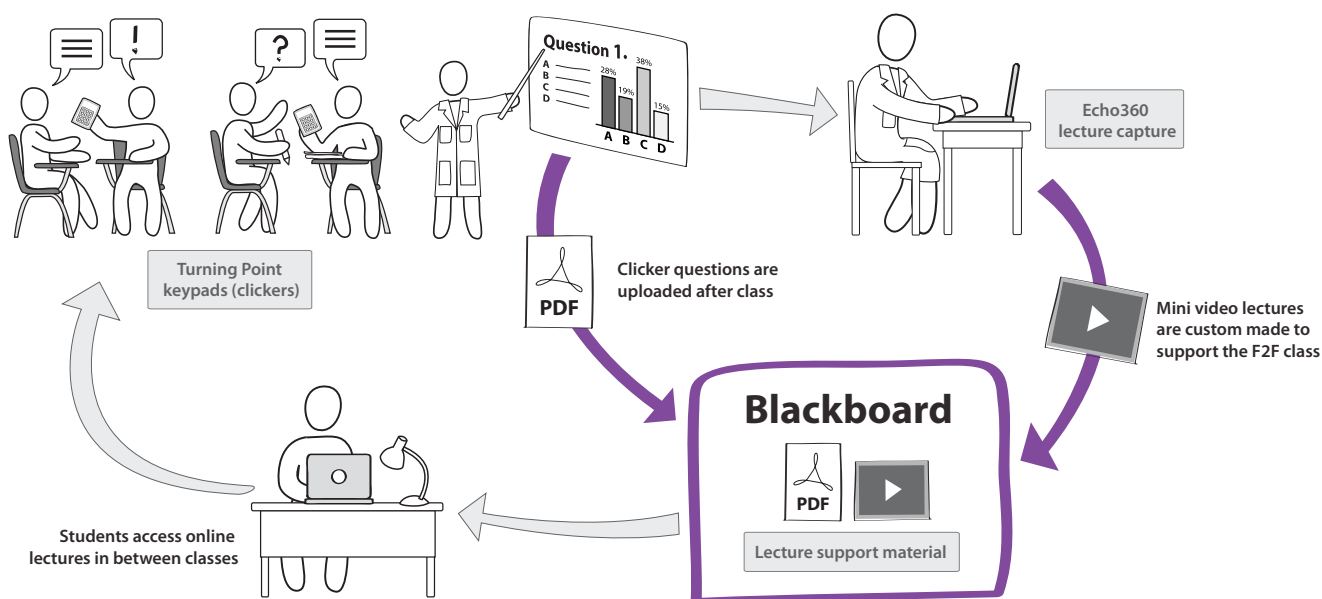
These two technologies are very different, however within this case study, both are successfully used to support different elements of a single learning and teaching strategy.

In-class polling using 'clickers'

In-class polling creates an [interactive audience response](#) during a presentation or lecture, whereby a teacher can ask students to vote on multiple choice style questions posed in class. A [Turning Point audience response system](#) was used in this case study. Students use special wireless remote devices often referred to as 'clickers'. They feature a keypad with several buttons representing different voting options. As students press the buttons on the clickers, the answers are gathered by software that can graph the responses in real time. In many cases, results can be overlaid onto any presentation from the teacher's computer, and projected for the class to see and discuss. This type of interaction is designed to increase student engagement and information retention. With many polling systems, students may use their own [smartphones](#) instead of clickers to contribute answers.

Online lectures

The term online lectures simply refers to any type of lecture material that can be delivered in a variety of online formats. These can include but are not limited to, text based documents such as PDF files, Powerpoint presentations, or even audio or videos recordings (refer to the episode '[Increasing student engagement using podcasts](#)' for one example). Teachers can make video based online lectures called [screencasts](#) from presentations on their computer, using a range of different screen capture software (as detailed below). In this case study, [echo360 software](#) was used (formerly Lectopia). Online lectures offer students the increased flexibility of being able to access the learning materials as often as required, 24 hours a day, 7 days a week.



The diagram above represents a weekly cycle of the [active learning strategy](#), used in the large face-to-face Chemistry classes at Curtin University. Clickers are used in to help students working in groups compare and validate the results of their problem solving activities. After the classes, the lecturer creates and distributes specially tailored online lectures in response to the students' performance. Students refer to the lectures and problem based activities in-between class times, to help them validate and consolidate what they have learnt when actively engaged with their peers.

Other examples of interactive polling and online lecture tools

There are several different tools available for both interactive classroom polling and creating online lectures via screen capture:

- [Poll Everywhere](#), [Option Technologies Interactive](#), [H-ITT](#), (interactive polling software and clickers)
- [Adobe Captivate](#), [Slideshare](#), [Camtasia](#), [Screenflow](#) (screen capturing tools).

Case study outcomes quick summary

Key benefits

- *The chosen active learning strategy (see below) combined with the online support and interactive clicker questions, have helped equip students with more developed analytical skills, and given them confidence in their own abilities*
- *The use of in-class polling and online lectures is effective in large classes*
- *Students have easy access to the online lectures 24 hours a day, 7 days a week*
- *Students report that the online lectures are more engaging than reading a textbook, and are referred to several times over the course of the semester*
- *Since lectures are created in response to students' performance with the active learning 'clicker' questions in class, they are able to be targeted to students' immediate learning needs as a feedback mechanism*
- *The use of in-class polling with clickers has improved levels of student engagement and discussion, enabling students to validate their own understanding of ideas and processes with peers*
- *No technical training for the clickers has been necessary, as students have found them very easy to use*
- *In-class polling using clickers can provide instant feedback to both teachers and students about their understanding and performance*

Key issues to consider

- *Teachers need to possess the skills required to use lecture or screen capturing software*
- *Clickers and polling software can be expensive if used in large classes. This should be considered early in the planning stages of a class. However newer systems enable students to use their own smartphones rather than clickers to vote, which can drastically reduce the cost*
- *Some resistance to new learning approaches was evident amongst students when these approaches were introduced. Students need to be involved in discussions about why the technology is being used, and how it will benefit their learning*
- *Initially, the rate at which students were covering the content in the syllabus was slower as compared to a more traditional teaching approach. However as the semester progressed and students became used to a new way of working, this situation was resolved*

Motivation for adopting an online teaching strategy

Dr Daniel Southam from Curtin University's Department of Chemistry, along with Associate Professor Mauro Mocerino, are leading the adoption of a student centred active learning strategy in large classes called [Process Oriented Guided Inquiry Learning](#) (POGIL). This pedagogy is a departure from the traditional didactic methods of teaching, favouring the facilitation of the collaborative construction of knowledge and analytical

skills through problem solving and discussion. Students are given basic information about new concepts, and are then encouraged to actively work together on problems and questions that are designed to help them develop an understanding of the key principles and concepts for themselves.

Daniel saw great potential in the use of technologies such as in-class polling and online lectures in supporting this active learning strategy. The application of technologically supported active learning strategies in the classes at Curtin University, and the study of their impact, was supported by an ALTC funded project called [Active Learning in University Science \(ALIUS\)](#).

The following were main motivators for incorporating technology into the learning process:

- *Increasingly over the years, class evaluations showed that students were requesting more flexibility in content delivery, including online lectures and resources*
- *Daniel was dissatisfied with the results from using more didactic, passive instructional techniques traditionally used in a dynamic discipline such as Chemistry*
- *Students in first year Chemistry programs were used to more didactic learning processes, and did not possess the key critical analytical skills they needed to develop deeper understanding of the content and processes being studied.*

Planning

The following were important considerations for the technological side of the planning process:

- *The technology has to add to students' learning and challenge them, and not just be used for technology's sake. Therefore careful consideration of the aims of objectives of the class, and the larger context of how the technology fits with and supports the face-to-face learning strategies was crucial*
- *Simply uploading notes and lectures online is not an effective method of engaging students. Structured activities that integrate with online resources and in-class activities are essential*
- *It was important for the students to experience a seamless learning experience between the classroom and the online environment. Therefore a large amount of time needed to be allocated for preparing the in-class clicker questions and online lecture slides, so that they align and support the class learning outcomes*
- *This investment of time was quite large in the early stages of developing the approach, but was seen to become more efficient in future iterations of the class*
- *Daniel worked with his university's IT department to get planning and practical support for setting up the online lectures and resources.*

Teaching

Daniel described how teaching using POGIL approaches is quite a departure from the usual large class

lecture and tutorial format traditionally associated with the sciences. Below are important points to consider when using both in-class polling and online lectures:

The use of 'clickers' and in-class interactive polling

- Traditional didactic lectures are replaced by collaborative problem solving and discussion, integrated with the use of in-class polling and interactive 'clickers' to provide feedback and validation of ideas
- Students work together in small groups on problem solving exercises. After an allocated time for solving a problem has elapsed, students vote on what they believe to be the right solution from a list of several possibilities using clickers
- The software displays a real time graph of the results, enabling Daniel to discuss the results of the poll with the class. If there is a large discrepancy in the answers the groups will try to convince their neighbours of the correct answer, discussing and comparing their problem solving approaches

Supportive online lectures

- The online lectures are made each week after the face-to-face session, and then placed within the class Blackboard LMS for students, along with copies of the clicker problems used in class
- Daniel prepares a [Keynote](#) presentation (Apple's equivalent to Powerpoint), then plays it through speaking to the slides. This is recorded with Echo360 and uploaded into the LMS

Issues to consider and suggestions for dealing with them

The following issues are worthy of note:

- Issue

Students resist changing the way they are accustomed to learning

Suggested strategy

Time must be taken to carefully explain the reasons behind adopting a new way of learning and how the technological aspects will be used, and how they will provide a benefit for students in their learning and understanding.

- Issue

Many academics initially lacked the confidence to adopt the technology

Suggested strategy

Staff had to be supported in learning how to effectively use the technology, and in how best to apply it from a pedagogical perspective. Having technical support available, and providing evidence on why adopting the technology as part of an active learning strategy was essential in convincing teachers to commit to changing their teaching practice.

Conclusion

Both in-class polling and online lectures are relatively simple technologies that have the potential to offer many benefits to students. This case study reflects how different technologies can be effective when integrated with a carefully planned pedagogical approach. You may find reviewing our other pedagogy focused episodes such as [‘Planning your online class’](#) useful if you are thinking of adopting these technologies into your own teaching.

Additional reading*

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**Note: Some readings are held in subscription only databases. In most cases accessing the link from your institution's network will enable access*

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To find out more about the Learning to Teach Online project, or to view the video component of this episode, please visit the COFA Online Gateway.

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About the project

The [Learning to Teach Online](#) project is a free professional development resource designed to help teachers from any discipline, whether experienced in online teaching or not, to gain a working understanding of successful online teaching pedagogies that they can apply in their own unique teaching situations. It hopes to encourage dialogue, discussion and the sharing of ideas about online learning and teaching across disciplines and between institutions around the world.

About COFA Online

COFA Online is an academic unit at the College of Fine Arts (COFA), The University of New South Wales (UNSW), Sydney, Australia. It has been innovating online pedagogy, academic professional development and effective online learning strategies since 2003.

About The University of New South Wales

UNSW has an enrolment of approximately 40,000 students, and is the leading international university in Australia with over 10,000 international enrolments from over 130 nations. UNSW was also ranked as the top university in 2009 in the Australian Government Learning and Teaching Performance Fund for the quality of its teaching.

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