Enhancing Student Learning: Providing Recordings of Chemistry Teaching
University of Liverpool
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This document is a report of the activities and experiences of the team from the University of Liverpool in their Higher Education Academy backed Discipline-focused Learning Technology Enhancement Programme 2009-10, titled "Enhancing Student Learning: Providing Recordings of Chemistry Teaching".

Aim of the Project

The aim of the project was to use technology to enhance learning and teaching. This was to be achieved through the provision of audio and video recordings of teaching sessions given by academic colleagues within the Chemistry Department at Liverpool University. It was believed that there was no barrier to the practical aspects of the project. Thus the project was to bring about a change such that at least 10 academic colleagues from within the department would provide recordings of their teaching sessions to students by the end of the programme. At the start of the project it was just the team leader who provided recordings of his lectures.

Background

For the two years previous to the start of the project the team leader recorded lectures and made them available to students via the university's virtual learning environment. These recordings may be viewed on a desktop computer or downloaded to a personal media player (Figure 1 a) and b)). The video recordings capture all "on screen" activity, e.g. Powerpoint presentations, websites, animations etc. along with the associated audio, whilst the audio recordings capture the vocal part of the lecture. The idea was that the students should not use this as an alternative to lecture attendance, as they would lose the opportunity for questioning and feedback, but rather as a supplement to aid learning.

Alignment with Internal and External Policies

The project is aligned with HEFCE's Enhancing Learning and Teaching through the use of Technology policy, as the project enhances flexibility and choice for learners, enhances student achievement, improves access, meets learners' expectations, potentially attracts and retains students and supports the diversity of speed of learning within the student body. Additionally, the project is aligned with University of Liverpool e-learning policy which has been informed by the Bologna Declaration (to support student learning), Government policy (provision of out of hours opportunities to learn, more and better flexible ways to study) and JISC (creation of a better learning environment for all learners). The university's policy recognises e-learning as an aspect of the blended learning approach to enhance student learning. This project is aligned with the local policy of embedding e-learning within all parts of the university.

Benefits

There are many perceived benefits of the proposed project for the student learning experience:

- Enables more effective revision

  Revisiting the recordings when revising, supplements the students lectures notes, textbooks and other sources

- Increases student engagement particularly outside traditional "contact hours"

  Use of the recording by students maximises the potential for learning and they can access the material anytime day or night via a computer with internet connection

- Promotes personalisation of learning for the students

  Students can choose where, when and how they view/listen to the recordings maximising the potential for learning

- Supports flexibility of learning in a diverse student body

  Provides resources for students with different learning styles who perhaps do not fully engage with "traditional" learning and teaching methods to successfully engage. Students with audio/visual disabilities have the ability to revisit material enhancing the chances of successful learning. Similarly students for whom English is not there first language can use the resources to hopefully achieve effective learning. The recordings also offer a solution for students who miss lectures due to illness or other eventualities

- Encourages active learning on the part of the student

  Students who use the material provided via the recordings are much more likely to become active learners once engaged

- Supports student progression

  Evidence exists that use of such recordings has a positive influence on the student progression rate

- Promote lifelong learning

  Through using the recordings students may realise they are more receptive to material presented in this way, informing their preferred individual learning style for future life

- Learner entitlement

  Enhance equality between students (disabilities, language)

The benefits to staff include higher levels of student engagement which should lead on to higher and/or more rapid achievement. This will result in increased rates of student progression leading to higher retention rates overall. Provision of recordings of teaching sessions will also improve the attractiveness for some learners to the programmes available.

Scale of Change

The scale of the change that we aimed to achieve was that by the end of the programme the team would have influenced at least ten academic colleagues to record and make available to students their lectures/teaching sessions. The colleagues would cover the range of disciplines within chemistry (Organic, Inorganic and Physical) and would have a slight bias towards the early years in undergraduate degree programmes (years 1 and 2). The project may be described as a positive change which is introducing new processes to the learning and teaching methods which are focussed on enhancing quality. In the longer term we aim to increase the number of lecturers recording their teaching

sessions well beyond this in the department, wider in the School of Physical Sciences, Faculty of Science and the University. This would make lecturers more receptive to change in general, especially using new technologies.

Practical Aspects

The practical aspects of the proposal have been shown to be quick, easy and cheap. The university's virtual learning environment is capable of storing and streaming the content and the software needed to perform the screen and audio capture as well as the conversion to a format suitable for a personal media player or computer is free. The setup time is <2 minutes. The format conversion and uploading to the virtual learning environment is <2 minutes.

Achievements so far

At the start of the project, through financial support of the department, a new computer was purchased for one of the lecture theatres within the chemistry department to enable easy recording of lectures. At the same time all academic members of staff were contacted giving further details of the project and lecture recording. A document was been prepared which gives a "quick guide" on how to use the computer for lecture recording and was been circulated to colleagues. The academics on the project team provided "training" sessions on how to record lectures.

Awareness of the project was heightened within the department through the Teaching & Learning committee, at a staff meeting and informally in discussions over coffee. Subsequent conversations and discussions of team members with colleagues concerning their experiences of recording lectures have informed us of the "staff reaction" which has been positive.

Through the efforts of all the team there are now over 10 academic colleagues who are recording their teaching sessions. In addition there are currently another 4 colleagues who are just about to start recordings. In total the recordings cover over 25 different modules and well over 100 lectures have been captured across all undergraduate year groups.

Challenges, Issues and Unexpected Achievements

A few months into the project the audio-visual infrastructure within the department had problems. The projectors in all of the lecture theatres in the department broke down. Temporary projectors were found and installed and necessary extra cabling installed by the team so that the lecture recordings could continue. A member of the team arranged a meeting with the Computer Services Department to show them the lecture recordings in action and also highlight the need for updating the audio/video infrastructure. This led directly to new PCs being installed in all lecture theatres in the department which are capable of performing lecture recording in every lecture theatre within chemistry.

This new academic year has seen the introduction of a centralised timetabling system meaning that not all chemistry lectures were likely to be within the department, clearly a barrier to engaging more colleagues to record their lectures if they are giving a lecture in a room without a suitable PC. Fortunately, the vast majority of colleagues who we had approached did end up lecturing in chemistry or had their own laptop which was suitable for recording.

Evaluation

The project evaluation consisted of two parts: i) staff reactions and ii) student reactions.

i) Staff reactions: Conversations and discussions of team members with colleagues concerning their experiences of recording lectures have informed us of the "staff reaction" which has been universally positive. Evidence has been gathered that shows that the provision of the recordings has no effect on lecture attendance. This finding mirrors a growing body evidence from other departments and institutions.

ii) Student reactions: The student reaction has been assessed via access statistics on the virtual learning environment, a student focus group and via the staff student liaison committee. The reaction has been extremely positive with evidence showing that across all modules and all year groups the recordings have been used by a large proportion of the students. The students liked the availability of the recordings and found them particularly useful either for revision (e.g. Figure 1 c) i)), revisiting a portion of the lecture they found challenging either because the lecturer "went too fast" or the student "missed it" or to further annotate notes taken in the lecture. They found the ability to "fast forward" and "rewind" to certain points of the lecture particularly useful (Figure 1 a) and b)) as was the ability, on occasion, to turn the volume up to make the lecturer more audible. Across a wide range of modules students accessed the recordings on every day of the week and at all times of the day (Figure 1 c) ii) and iii)). It is noteworthy that students engaged on distance learning courses were particularly supportive of the lecture recordings. Generally, students accessed the recordings using a desktop PC. It is notable that students did not want the recordings to replace the lecture experience as they felt they would miss out on the interactive experience and feedback that the face-to-face lecture offers. There was also evidence for increasing demand from students for more lectures in different modules to be recorded.

Quotations from students given below support the general conclusions:

"The lecture recordings are brilliant, thanks!"

"The recorded lecture really helped me."

"The recordings are really useful."

"I just watch the sections I am having difficulty with - probably making notes."

"I watched all of the recording for a missed lecture, and made notes. For revision – I skipped to relevant parts."

"I used the recordings for revision."

"I watched several bits on sections I did not understand and made notes."

"Generally I go to relevant part or recording - sometimes listening to those bits more than once."

"The recordings are very useful as I can go back over the material - would be very useful in most modules".

Sustainability

As an indication of the sustainability of the project, all members of staff who recorded lectures last academic year are now recording this year's lectures "as a matter of course". This is taken as an indication of how easy it is to record the lectures (once the initial "training" has occurred) and that there is "no reason not to record lectures". There is increasing evidence from conversations with colleagues that colleagues are beginning to discuss lecture recording

amongst themselves – not instigated by members of the team. If this continues then the likelihood of colleagues recording their lectures will continue to increase. There is anecdotal evidence that the delivery and content of lectures improves motivated by the fact that the lecturer knows that they are recorded.

On a practical level discussion with computer services has indicated that there should be no problem on the storage capacity of the virtual learning environment to store the recordings. A new piece of software has been sourced (http://www.nchsoftware.com/capture/index.html) which enables even easier lecture recording on the newly installed PCs in the lecture theatres. A suitable permanent microphone is currently being sourced for each lecture theatre.

Dissemination

Internal communications with members of staff have been via staff meeting, teaching & learning committee and informal discussions with colleagues all raising awareness of project and sharing experiences. Further internal communication has been by team members "training" colleagues on how to record their lectures and mount them on the virtual learning environment. These have been supplemented through a discussion with a colleague from the engineering department who is finding out about all aspects of e-learning occurring within the science faculty.

External communication has occurred through our Subject Supporter team member from the UK Physical Sciences Subject Centre. Discussions have occurred with delegates at the Variety in Chemistry Education conference 2010 who have started lecture recording at their institution (University of Southampton) and discussions with contacts at Newcastle University which have an institution-wide recording system set up (contact made via the team's critical friend). An online Elluminate discussion was organised, prompted by this project, by the team's Higher Education Academy Subject Supporter which involved seven UK institutions and this is to be followed up by a face-to-face in the summer in which participants will exchange their ideas and experiences. Future communication plans involve the production of a pamphlet in collaboration with the UK Physical Sciences Subject Centre taking the form of a case study/tutorial of our experiences in lecture recording to be distributed to the Physical Sciences Community. We plan to report on the project at our internal university-wide teaching & learning conference and also next year's Variety in Chemistry Education conference.

The project has several associated web pages:
  i)   Higher Education Academy (gives an overview of the project)
        http://www.heacademy.ac.uk/projects/detail/DFLTEA1_Liverpool
  ii)   UK Physical Sciences Centre (contains an example short recording of one of the recorded lectures
        http://www.heacademy.ac.uk/physsci/home/projects/recordingedlectures
  iii) University of Liverpool iTeach (contains a case study of project on the University's Centre for Lifelong Learning Inclusive Teaching – iTeach - site)
        http://www.liv.ac.uk/eddev/iteach/case_studies/iTeach_Case_Study_E-Learning_in_Chemistry.doc

Assistance Provided through the Programme

The consultancy support of the "critical friend" throughout the 12 month period was extremely useful for the external view he provided the project. Specifically, suggestions in developing the strategy to be presented at the residential event were very helpful as was support from the subject centre supporter. The various residential events provided thought provoking ideas which helped to shape the project. Importantly other participants in these events gave illuminating perspectives to our project through sharing of ideas and experiences from a variety of backgrounds.

Where now?

In order to move the project forward internally we are seeking to continue to increase the number of colleagues recording their lectures within chemistry. We will seek to provide ways of enhancing visibility with the newly formed School of Physical sciences (Chemistry, Mathematics and Physics); the University's new Central Teaching Laboratory provides a suitable mechanism for this to happen. Alongside this the science lecture block will be undergoing renovation consequently we will seek to ensure that the lecture theatres housed there will be suitably equipped for lecture recording – enabling more departments to record their lectures. Externally, our dissemination via the UK Physical Sciences centre and Variety in Chemistry conference will hopefully encourage other departments and institutions to record their teaching sessions. Further into the future, we are currently considering technology that will be able to capture other lecture delivery techniques such as the blackboard/whiteboard and overhead projector. Another enhancement that would be extremely useful would be a record of access statistics for particular sections of a lecture as this may indicate topics that the students find particularly challenging. A solution to this is being sought.

Summary and the wider context

The key messages for higher education are that no matter what the discipline "there is no reason not to record lectures" and provision of recordings has many benefits for both students and staff. Providing these recordings is quick, easy and cheap to achieve provided there is a computer and a virtual learning environment.
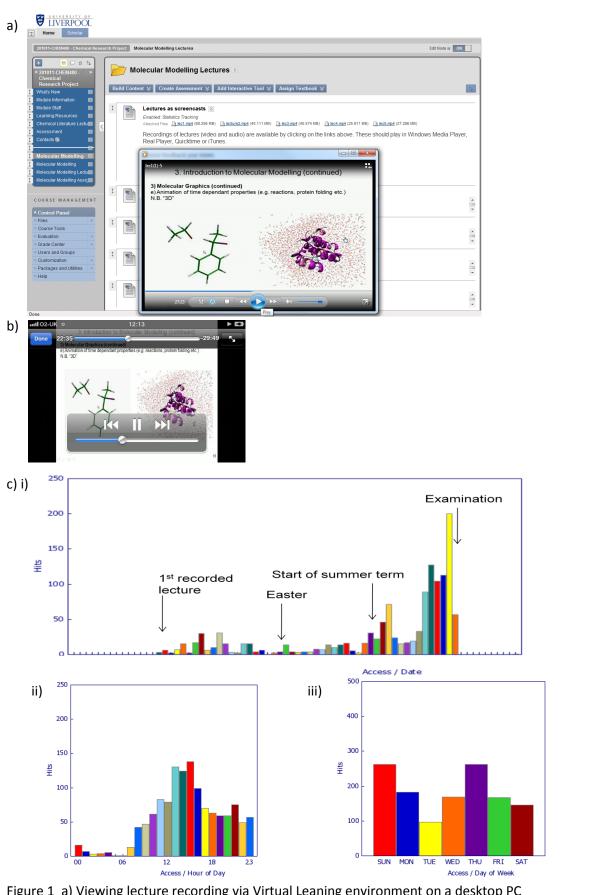
Figure 1 a) Viewing lecture recording via Virtual Leaning environment on a desktop PC
b) Viewing lecture recording on a portable media device
c) Access statistics for one module by i) date, ii) by hour of day and iii) by day of week