iLectures:
A Catalyst for Teaching and Learning?

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Abstract

The University of Western Australia's "lecture recording experience" generated a lot of interest, academically and commercially, with two keynote speakers at this year's Apple University Consortium (AUC) Conference making reference to it. Whereas earlier this year only the technology and its inception was reported, the procedure and our experience has now been analysed and evaluated. This paper will focus on the university environment that necessitated the new practice, the technical developments and ramifications, responses from academic staff and students to its integration, and finally an evaluation.

Keywords

Computer facilitated learning, Evaluation, Internet, Streaming media, Lecture delivery, Equity

Higher Education Issues

In the recent past, issues relating to "Affordability and Access" have led to a rethinking in the Higher Education market while working within the parameters made possible by technological advances (Laurillard, 1993). As other universities, UWA had to assess its strategies in its approach to these issues and came up with a solution fusing "high touch and high tech" aspects (Robson, 2000).

UWA's initiatives centre around innovative and flexible teaching and learning aiming to provide educational programs in ways that meet the changing needs of learners. The new initiatives are designed to cater for a more diverse range of learners, learning styles, needs and interests than are normally catered for through conventional study programs.
The learning opportunities of students are certainly optimised by the expert shaping of learning environments within a particular course or program of study. To this end, the MMC at UWA has always regarded, not least for equity reasons, the pursuit of multiple access points to lecture content as paramount in its endeavours to improve teaching and

learning. The lecture recording system, the history of which will be discussed below, should be seen in this context.

The technology

Traditionally, the Arts Multimedia Centre (MMC) has offered a service of providing lecture recordings to students who missed lectures. Students were able to visit a listening room and borrow audio-cassettes with lecture recordings for certain units. However, most visual aids used by lecturers to convey the lecture content, like Powerpoint slides, video clips, overhead transparencies, and writing on the boards were unavailable to the students who could not attend the lecture. This proved a disadvantage especially in subjects where "the lecturer relies on sight as the dominant sense [since] over-reliance on the spoken word by the lecturer is a hindrance rather than a help." (Burley, in McNaught 1997; 31-32). Nevertheless, the service was sought after and proved invaluable in the dissemination of lecture content.

In late 1998 the Arts Multimedia Centre began a project to dramatically modify the service, allowing students to listen to lecture recordings anywhere, anytime from an Internet-able computer. This was achieved through the development of an automated lecture recording system. The following issues were identified and considered when planning for this change:

Anticipated advantages for students were:

- 24 hours / 7 days access to recordings;
- the possibility of accessing recordings from home;
- the fact that the same lecture could be listened to simultaneously by many students.

Anticipated advantages for the MMC were:

- freeing time for MMC staff distributing audio-cassettes to work on other projects;
- gaining valuable physical space by utilising the former listening room.

Anticipated disadvantages for students were:

- the need for some computer literacy and resources to access recordings.

Anticipated disadvantages for MMC were:

- the cost of the infrastructure required to develop and run system (computer hardware and software).

With these issues in mind, the MMC proceeded with the changes. In 1998, 50-60 lectures per week were recorded on audio-cassettes and housed in the listening room. The project involved developing a system capable of preparing these recordings for Internet delivery on a weekly basis.

Lecture recording system - 1999

The lecture recording system as introduced in 1999 functions as follows. Lecturers record their lectures to audio-cassette and deliver them to the Multimedia Centre Reception. A form requiring details of unit, speaker, and date is filled in by lecturers.

Six Macintosh LC475s are configured with tape players attached. Each computer runs a custom-designed application (Media Digitiser) into which lecture details are entered (see Figure 1). Once details are entered the digitisation process begins and the involvement of MMC staff is complete. The remainder of the process is completely automated, predominantly using AppleScript® technology developed by the MMC.

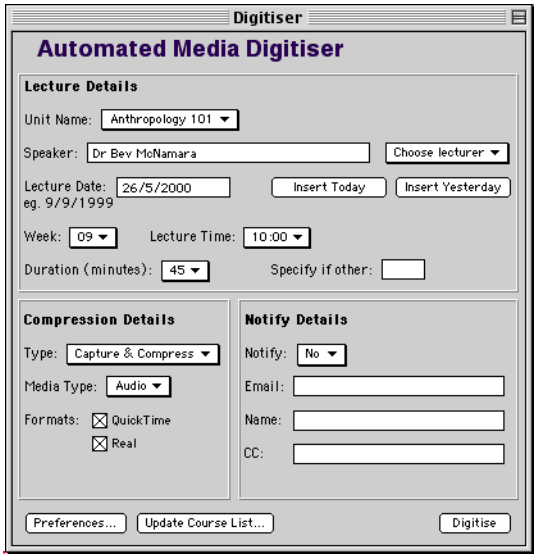

Figure 1: Media Digitiser application - used for entering lecture details for processing audio tapes

Students access the lecture recordings via a password protected web site. The web site for each unit contains recordings in two streaming formats - QuickTime and RealAudio (QuickTime format was introduced in 2000) (see Figure 2). Both these software programs can be downloaded from the Apple or Real Systems web sites at no cost to the user.

Remote learning: The Albany centre

The lecture recording project took on additional significance in early 1999 with UWA's strategic move to open a remote learning centre in Albany – the UWA Albany Centre. The project was trialed with four first year units - English, Anthropology, Biology, and Computer Science. Albany students are provided the opportunity to access all lectures via the Internet, predominantly in the form of lecture recordings. Each unit has a local tutor based in Albany conducting face to face tutorials and laboratory sessions. Over the duration of a semester, two or three video-conference sessions are usually arranged for the students to interact with their Perth lecturer.

In 1999, lectures from the four Albany units were recorded to audio-cassette and delivered to the MMC for processing. As the equipment in lecture theatres was unfamiliar to some lecturers there were a number of failed recordings. These "teething" problems were addressed by paying technical staff to record the lectures and deliver the tapes. In 2000, 17 units were offered to students in Albany, including first year units in Mathematics, Economics, and Chemistry. For these units it was essential that visual material be made available to students as well as audio. For pedagogical reasons, lecturers also considered it essential that the visual content be revealed gradually, particularly in the case of Mathematics and Economics. These issues led to further modifications to the lecture recording system. Collaboration between the UWA

Audio/Visual Unit, University Computing Services, the Albany Centre, and the MMC has resulted in a unique system of capturing lectures for Internet delivery.

Figure 2: Web page the students visit for accessing lecture recordings

Current lecture recording system - 2000

A fully automated system has been developed to capture live lectures for delivery over the Internet. The system captures the audio and visual from a document camera or visualiser. Students access the lecture recordings on the Internet via the iLecture (see Figure 3). The automated system requires a computer to be attached to each lecture venue. For first semester 2000, six major lecture venues were configured with the system. The computers automatically record audio and video signals according to a recording schedule. The recording schedule is extracted from a central database and contains information about units, speakers, venues and times. The recordings are processed immediately after the lecture is complete and are available on the Internet within a few hours. Powerpoint presentations and other material can also be attached to lecture recordings. Lecturers email or ftp Powerpoint files to the MMC. These files are automatically processed and the Powerpoint slides appear as "Related Links" for the appropriate iLecture (see Figure 3).

In first semester 2000, the automated lecture recording system processed over 50 lectures each week. In addition to this, over 70 lectures were recorded to audio-cassette and processed by the system developed in 1999. A total of around 1400 lecture recordings

were processed for the semester. The following sections deal with the evaluation of the new technology and its possibilities from both a student and staff perspective.

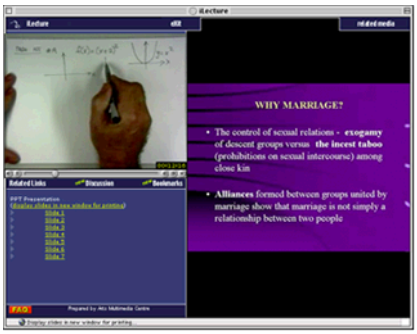

Figure 3: Students access lectures via the iLecture

The student perspective

This year the MMC has been conducting research into the acceptance of the iLecture and related technologies among students. A questionnaire was provided to students on-line as well as in hard copy through lectures and tutorials – see Appendix A. The questionnaire was provided to all lecturers of all units whose lectures were recorded, though not all lecturers distributed the questionnaire to their students.

The response in both on-line and paper surveys was positive with about 300 on-line and over 1000 paper questionnaires filled-out at the end of semester 1/2000. The iLectures would have been available to approximately 4500 students, ie. approximately 30% of students responded. In the case of the paper surveys, 48% of students indicated that they had used the iLectures. Of those students, 35% indicated they listened to the lectures "regularly" or "always". For the on-line survey, the percentages were even greater with 69% indicating they listened to iLectures "regularly" or "always". These figures alone indicate the value the students place on the ilectures.

A common concern when introducing technology into teaching relates to the ability of students to utilise the technology, ie. "ease of use". For the students completing the survey on paper, 60% rated the "ease of use" of iLectures as "good" or "excellent" (see Table 1). For the students completing the survey on-line, 78% rated the "ease of use" as "good" or "excellent" (see Table 1).

Value	Results from Paper Survey (%)	Results from On-line Survey (%)
poor	3.2	0.0
fair	10.8	5.9
satisfactory	25.8	16.1
good	45.2	78.0
excellent	14.0	0.0

Table 1: Analysis of Question 7a of student questionnaire - "ease of use" of ilectures

However it is important to recognise that students choosing to access Internet lecture recordings are perhaps more likely to be familiar with using the Internet for other activities. An analysis of surveys from students indicating they had not accessed iLectures revealed two predominant themes. Approximately half of these students indicated either they had no need to access the iLectures or they planned to access them if required for revision or if they missed a lecture. The other half cited technical issues that prevented them from accessing the recordings. Namely, "no Internet access", "having trouble downloading [QuickTime or Real Player] software, very confusing", and "I have no idea how to [access the recordings]" were representative of remarks from students in this category. There were also numerous students who indicated they had problems with their password for accessing the recordings.

This issue raises some challenges, particularly as a primary reason for the provision of lecture recordings is to provide equity in access to learning material. "The Higher Education White Paper (July 1988:53) drew attention to the matter of equity and stated that the Government will develop a long-term strategy that will make equity objectives a central concern of higher education management, planning and review". (Tinkler, et al. 1994; 14). Technology literacy among students and staff will be an issue for further action.

Another emerging theme related to the convenience of the iLectures. For students accessing the iLectures, the feedback was commensurate with the anticipated advantages mentioned earlier in this paper. Students commonly cited the flexibility of being able to access lectures at home, at a time to suit them, and at their own pace as being significant advantages. Students are empowered by the ability to control the speed/pace and place of entry (see Figure 4). The location where students choose to listen to lectures is also significant, with 65% of students accessing iLectures from home. For students with timetable clashes or who are unable to attend for other reasons, it is a new means by which they can access their lectures.

Students were asked to rate the quality of the recordings. The majority of students rated the recordings as "satisfactory" (see Table 2). This result can be interpreted in many ways. One possible explanation is that the expectations of students may exceed the technological abilities of the current system. Analysis of the actual lecture recordings, however, indicates that there is significant variation in the quality of iLecture recordings, particularly when the lectures are recorded to audio-cassette before processed for the Internet, ie. the 1999 system. Unfortunately these problems generally relate to the recording procedures rather than the processing procedures. Issues relate to the quality of

the recording, which is affected by the proximity of lecturers to the microphone, the position of the radio-microphones, the loudness of the voice, and the quality of the speakers' voice for recording. This raises another challenge involving the technical literacy of teaching staff as well as their willingness to learn from, change with, and apply new technology.

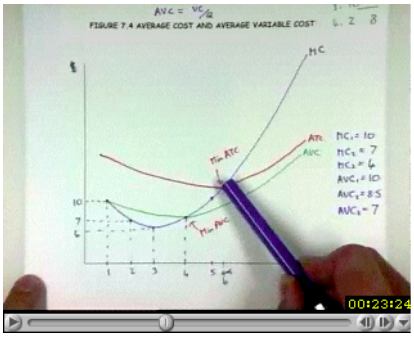

Figure 4: Students can control the speed/pace and place of entry of iLectures

Value	Results from Paper Survey (%)	Results from On-line Survey (%)
poor	6.6	4.3
fair	22.0	22.2
satisfactory	35.2	34.2
good	30.8	39.3
excellent	5.5	0.0

Table 2: Analysis of Question 7b of questionnaire - "quality of recording" of ilectures

Concluding, it is important that the lecture recording system be viewed in the context in which it has been developed and in context of the individual course structures. The iLectures do not replace the face to face interaction between students and staff as all lectures are accompanied by seminars or tutorials that are conducted in the traditional classroom environment. As Tiffin's experience indicates, the mixed-mode was a key to success. "The students became fascinated with this juxtaposition of different communication modes. [After] an intense one-to-one session with the computer they would reach out […] to be linked to humans instead of machines." (Tiffin et al. 1995; 5). What this research suggests is that there needs to be a balance of human interaction and computer aided learning. The lecture recording system was not developed to replace the traditional lecture format. It will not make tutorials or other modes of interaction obsolete, yet, as a means of providing equitable access to lecture material it has proven a great success.

The lecturer perspective

Analysis of the questionnaire distributed to lecturers (see Appendix B) reflected many similarities to the responses from the students. It was commonly indicated that the iLectures were a valuable teaching and learning resource. For students who are unable to attend lectures due to timetable clashes, illness, or other barriers, the iLectures "increase student access to course information." Many lecturers also expressed enthusiasm towards using other teaching tools such as discussion lists, Powerpoint, and web references.

Although an improvement in teaching and learning opportunities was perceived the majority of lecturers suggested they could not fully embrace the technology and its opportunities due to time and financial constraints. This correlates with findings by other scholars: "Reeves (1991) outlines several constraints on the use of computers for educational purposes in higher education. These constraints range from those associated with costs, training and infrastructure. Other fundamental issues relate to academic teachers' conceptions of teaching and learning, and their willingness to restructure both the content and their teaching methods." (McNaught, 1997; 2).

Considering these issues, and more specifically those relating to the psychology of change, it is an advantage of the lecture recording system that lectures are captured with minimal changes to the current teaching practices. Lecturers can simply choose to provide iLectures alone or can use them as a start to using other forms of technology in teaching. As mentioned above, lack of time was seen as the greatest barrier to utilising other forms of technology. In some cases, small changes in the level of student attendance were indicated. However, many lecturers indicated they did not consider the lecture recordings a replacement for their normal lectures, as "the recordings do not provide all visual material used in lectures" and "there needs to be recognition that these are teaching aids".

Summary

The analysis of the surveys relating to iLectures resulted in the identification of the following key themes:

- the level of acceptance is high among staff and students;
- the overall benefits far outweigh the concerns and problems;
- the technology literacy among students and staff remains an issue for further action.

These issues suggest staff from the MMC need to be conducting investigations in the following areas:

1. technological skills and training;
2. changing attitudes and behaviour patterns of staff and students;
3. effect on learning outcomes, ie. do the lecture recordings improve learning outcomes.

Ad 1. Overall, it needs to be stated that in "arguing the case for a new paradigm of instruction based on virtual learning environments, there is a tendency to focus on the positive possibilities. There is, however, another side to the vision. [There are] intransigent problems in the technology itself" (Tiffin et al. 1995; 17). The results of student surveys clearly indicate technology barriers preventing many students from taking advantage of the iLectures.

Ad 2. Increasing numbers of students choosing to access lectures on-line will have an affect on a lecturers attitude to face-to-face teaching and attitude of university administration. This may result in academics feeling an on-line-option alone could serve as an alternative while focussing more attention into their smaller group face-to-face teaching situations. This could in turn have an effect on university infrastructure where the emphasis on tutorial and seminar teaching may increase and subsequently the need for rooms accommodating 20-60 students.

Ad 3. If iLectures are accessed by students for review and exam preparation, the system may provide the opportunity for students to improve their results. Further research into this area will need to be undertaken to establish whether the lecture recording system introduced by The University of Western Australia enhances learning outcomes.

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Appendix A: Student Survey

Student Survey: Internet Lecture Recordings

The following survey is being conducted by the Arts Multimedia Centre. The results of this survey will help us evaluate the lecture recording service and improve it in the future. Please take a few minutes to fill in the questions below since your feedback is very valuable to us. Your comments will remain anonymous. Please complete this survey once only and return it to your tutor/lecturer.

Age:

Gender: ☐ female ☐ male

Enrolment Type: ☐ Degree ☐ Access/Audit

List the units in which you are enrolled.

Evaluation questions

1. Do you listen to lecture recordings on the Internet?

☐ Yes ☐ No. Please explain why you have not used the lecture recordings.

The remainder of the questions apply specifically to students who have listened to lecture recordings on the Internet. Students who answered "No" to Question 1 need not complete the remainder of question. Thank you for your feedback.

2. What are the units for which you listen to lecture recordings?

3. How often do you listen to the lecture recordings?

☐ Occasionally ☐ Regularly ☐ Always

4. Where do you listen to the lecture recordings? [check as many as appropriate]

☐ at University/Albany Centre ☐ at home ☐ at work

☐ somewhere else

5. Do you listen to lecture recordings...

☐ as soon as they are available ☐ immediately before tutorial sessions

☐ only towards end of semester ☐ other, please explain

6. Why do you listen to the lecture recordings?

7. How would you rate the lecture recordings in each of the following areas?

Ease of use/access: ☐ poor ☐ fair ☐ satisfactory ☐ good ☐ excellent

Usefulness: ☐ poor ☐ fair ☐ satisfactory ☐ good ☐ excellent

Quality of recordings: ☐ poor ☐ fair ☐ satisfactory ☐ good ☐ excellent

Comments

8. If the following features could be added or used better, which of them would you like to see? [check as many as you like]

- ☐ the whole text of the lecture
- ☐ a summary of the lecture in point form
- ☐ reading lists for the lecture
- ☐ bulletin board discussion about the lecture
- ☐ slides, videos and/or other visuals that go with the lecture, please specify...

9. What do you like most about accessing lecture recordings on the Internet?

10. Do you have any suggestions for changes or improvements to the lecture recordings service?

THANK YOU FOR YOUR FEEDBACK!

Appendix B: Lecturer Survey

Lecturer survey: Internet Lecture Recordings

The following survey is being conducted by the Arts Multimedia Centre. The results of this survey will help us evaluate the lecture recording service and improve it in the future. Please take a few minutes to fill in the questions below since your feedback is very valuable to us. The completed survey can be returned to any staff member in the Multimedia Centre.

1. In which unit do you lecture?

2. When did you begin recording your lectures?
☐ This year ☐ Last year ☐ Prior to last year

3. Do you perceive any changes in the student attendance to your lectures?
☐
☐
☐ No change

Comments:

4. Do you use any of the other Internet features offered through "The Forum" or otherwise in your teaching?
☐ Bulletin board discussion
☐ Chat facilities
☐ Lecture notes/powerpoint slides
☐ Other, please specify...

5. What outcomes do you expect from using "The Forum" or other such facilities in your teaching?
6. Do you feel you are using these facilities to their fullest potential for the purposes of teaching your unit(s)?

7. Do you have any suggestions for changes or facilities that you would like to see become available for you to use in your teaching?

8. What would assist you in pursuing your teaching goals?

THANK YOU FOR YOUR TIME!