Video Conferencing in Actuarial Studies - A Three Year Case Study

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Abstract

This paper reviews the three year history of teaching actuarial studies in live time by video conferencing from The University of Melbourne to students at The Australian National University, Canberra. The paper discusses the practicalities of this programme including aspects relating to students, staff and the technology. In particular, the perspectives from students and staff are discussed, as well as some limitations that have been discovered.

Background

The teaching of actuarial studies within Australian universities is not widespread due to the specialised nature of the program and the small numbers involved. It commenced in the late 1960s at Macquarie University, Sydney and this was the only course available in Australia until 1988 when Macquarie offered a distance education program (through the provision of written material and regular visits) to The University of Melbourne and subsequently to the Australian National University, Canberra.

In mid 1992, The University of Melbourne appointed its own actuarial staff and the Macquarie-Melbourne distance education link was broken. As a result of this development, Macquarie also ceased offering the course to the ANU. However, the ANU was very keen to continue its actuarial offerings but were unable to mount their own program and therefore approached the newly formed Centre for Actuarial Studies at Melbourne. Due to the small staff numbers at Melbourne and the availability of new technology, the concept of video conferencing the actuarial lectures was explored and subsequently developed.

The first lesson to be learned from our experience is that one critical element of a successful program is that there must exist strong enthusiasm and support for the program from the receiving institution. Video conferencing requires extra resources, at both the technical and administrative level, and this support must be available from the receiving institution. This level of commitment must also be present in the students at the external site. In the case of the actuarial students, most of the students are both very capable (generally with TERs well in excess of 90, placing them in the top 10% of school leavers) and highly motivated as they have a clear objective to receive professional actuarial qualifications. It is also noted that the only alternative for actuarial education for these Canberra based students is in a written form of correspondence study form the United Kingdom. Hence, the video conferencing option is attractive.

It must be stressed that without a strong commitment from both the receiving institution and their students, the video conferencing of education programs will have difficulties.

The Program in detail

The program commenced with a first year undergraduate subject in the second semester of 1994 and has developed to six undergraduate subjects in 1996. In 1997, two honours subjects will be added. Hence, in brief, the Canberra students receive all their specialised actuarial lectures from Melbourne as part of their ANU economics degree. The non-actuarial subjects (including mathematics, statistics and economics) are taken as regular subjects. From an ANU perspective, the program has been successful and they remain keen to continue offering an actuarial stream.

Each subject in the program comprises 2 or 3 hours of lectures each week plus a one hour tutorial. The lectures are provided through video conferencing but the tutorials are held locally, either in Melbourne or Canberra. The Canberra tutorials are given by actuarial staff from the Australian Government Actuary's Department in the Insurance and Superannuation Commission. This represents an added bonus for all parties as the ISC is the major employer of actuarial graduates in Canberra.

In addition to the live video conferenced lectures and the 'local' tutorials, each lecturer-in-charge visits the ANU campus for a day in the middle of each semester. This personal contact with the Canberra students has proved to be very beneficial for both staff and students. These visits have also enabled the Canberra students to ask questions and to feel more confident in communicating with the staff during the course. In essence, a personal relationship has commenced. The visits also provide the Melbourne lecturer with valuable feedback on the students' progress.

All the students (in both Melbourne and Canberra) are fully assessed by the Melbourne staff. Hence, essays, major assignments, mid term tests and the final examinations are marked at Melbourne. However, in courses where there are non-assessable assignments as part of the learning process, these are marked by the local tutor. This Melbourne control of assessment is critical to ensure that the same standard is applied to all students. This is particularly relevant in this program where professional accreditation is given for students performing at prescribed levels.

Some results from the students' perspectives

As noted above, the first cohort of actuarial students commenced in second semester 1994 and have now completed their third year. Table 1 compares the Melbourne and ANU results for each subject since 1994. For ease of comparison between the two cohorts, the percentage of each group who obtained the equivalent of a Melbourne grade has been shown.

Table 1: A comparison of results

Subject	Number enrolled	Percentage of students in each marking band				
		≥80 (H1)	70-79 (H2)	65-69 (H3)	50-64 (P)	≤50 (F)
1st year '94						
Melbourne	44	11	32	11	39	7
ANU	18	11	39	11	17	22
1st year '95						
Melbourne	63	10	24	19	41	6
ANU	24	13	21	0	42	25
1st year '96						
Melbourne	74	11	34	18	32	5
ANU	40	10	33	20	30	8
2nd year '95						
Melbourne	39	21	23	8	41	8
ANU	18	17	33	11	28	11
2nd year '96						
Melbourne	57	16	47	9	26	2
ANU	24	17	29	8	38	8
3rd year '96 (A)[1]						
Melbourne	23	13	48	9	22	9
ANU	17	24	24	12	35	6
3rd year '96 (B)						
Melbourne	26	35	19	4	31	11
ANU	16	19	13	6	38	25
3rd year '96 (C)						
Melbourne	23	9	48	9	30	4
ANU	16	12	44	19	12	12
3rd year '96 (D)						
Melbourne	19	5	37	26	26	5
ANU	15	7	27	27	27	13
Total						
Melbourne	368	13.9%	33.7%	13.0%	33.4%	6.0%
ANU	188	13.8%	29.3%	12.8%	30.3%	13.8%

1 There are two third year subjects in each semester.

The following comments can be made in respect of these results.

- For each subject, and in total, there is very little difference between the results achieved by the Melbourne and ANU students.
- In some subjects, and particularly at the first year level, the ANU results show a higher failure rate. This is not a surprising result, for as noted above, external students must show a greater level of commitment than local students. It is likely that some first year ANU students did not have this commitment to actuarial studies. In addition, the ANU entry mark into the program is lower than at Melbourne, resulting in a tail of weaker students.
- The grading in each subject was carried out on the combined cohort, so that any similarities in the percentages are purely coincidental. There is no deliberate policy to keep the distributions close to each other.
- The proportion of first and second class honours may appear high. However, it must be recognised that actuarial students are amongst the best students in each university and these results are consistent with their other results within and beyond the faculty.

A second way of reviewing the two groups of students is to consider the results from the standard University questions in the end of semester questionnaires. Table 2 show the mean result for the two cohorts to the following two statements.

Q2 The subject was well taught.
Q3 The subject was intellectually stimulating,

These results apply for the two subjects taught in 1995 and the six subjects taught in 1996. (A mean score of 1.0 means that all students strongly disagree with the statement whilst a mean score of 5.0 means that all students strongly agree.)

Table 2: A comparison of the results to two standard questions[1]

Subject	Q2 (Melb)	Q2 (ANU)	Q3 (Melb)	Q3 (ANU)
A	4.1	3.7	4.2	3.8
B	4.0	4.2	4.3	4.3
C	4.0	3.3	4.5	3.8
D	3.9	3.6	4.2	3.8
E	3.8	4.4	3.9	3.9
F	3.8	3.4	4.0	3.4
G	3.7	4.0	4.1	3.9
H	3.5	3.5	3.4	3.7
Average	3.85	3.76	4.08	3.83

1 To preserve confidentiality, the order of the subjects have been changed from Table 1.

For five of these eight subjects, the Melbourne students ranked the subject higher than their ANU counterparts. There were one or two ties (depending on the question) and the ANU average was higher in the other cases. Overall, the ANU results are slightly lower which is not unexpected due to the medium. Nevertheless, the similarity of the results also suggests that, in broad terms, the quality of education provided to the ANU students is similar to that provided to the Melbourne students.

It is also very important that the quality of education provided to the Melbourne students is not reduced due to the introduction of video conferencing. One way of assessing this issue is to compare the Melbourne responses to these questions with those achieved in the year before the introduction of video conferencing. Where possible, this has been done and the results are shown in Table 3. In each of these cases, the content of the subject was broadly unchanged between the years and the lecturer was the same person for most of the course.

Table 3: Comparison of Melbourne questionnaire results: before and after

Subject	Q2 (before)	Q2 (after)	Q3 (before)	Q3 (after)
a	4.5	4.0	4.6	4.3
b	4.1	4.1	4.3	4.2
c	3.6	4.0	4.1	4.5
d	3.6	3.5	3.7	3.4

Again, there is no overall trend in the results. The results to Question 2 show two similar results, together with one increase and one decrease, albeit from a very high previous result. Whilst this study is not comprehensive, it does suggest that from the Melbourne students' perceptions, the quality of education has not deteriorated significantly.

One final comment from students. During each semester, a small group of Melbourne actuarial students in each subject meets with the relevant lecturing staff to discuss the operation of the subject. When asked about the impact of video conferencing, the local students tend to respond: "What video conferencing!" In other words, the students are focussing on the material and not the technology. That is the way it must remain.

It is critical that the introduction of technology does not decrease the quality of education. From this experience, it is suggested that these students remain focussed on the subject and the quality of the education has been maintained.

Practical issues for the lecturing staff

There is no doubt that video-conferenced lectures require much greater preparation than other lectures. This preparation includes both the material that is to be presented, which must be converted into an appropriate format, and the delivery of material to the external site well in advance of the lecture. This distribution of any material to the external site also means that the lecturer is relying on support staff at the external site and, is therefore, in less control. It also means that the lecture preparation must be more planned and, to an extent, cannot respond as easily to new issues.

It should also be realised that video conferenced lectures tend to be less dynamic as the lecturer has additional responsibilities during the lecture. These include operating the technology, monitoring students at more than one site and ensuring that s/he keeps within appropriate camera range. Another result is that some lectures lack the same level of spontaneity due to some additional limitations. This is particularly true for mathematically based lectures where the lecturer does not have the full size of the white board to adjust and comment on previous equations as there is a limited amount of mathematical material that can be presented on a single slide. In addition, the previous slide is no longer visible to the students, unlike in a traditional board-based lecture. This means that some lecturers have been required to adapt their teaching techniques.

In addition, video conferenced lectures can appear slower due to the fact that it takes time (even if it is only a few seconds) for material to be sent to the external site. Hence there are delays and other restrictions in the lectures which limit the presentation by some lecturers.

From the academic's perspective, it is critical that video conferenced lectures do not become a "performance". It remains education and must be seen as that. There can be a tendency for some technology staff to want to turn the lecture into a performance. This must be resisted. The lectures must remain a vehicle for education, for both the local and external students.

Interaction between the lecturer and two groups of students is more difficult than in a face to face context. It is possible and should be encouraged, but a protocol must be established unless the groups are very small. One method is to stop lecturing (say, every 10-15 minutes) and ask for questions from each site. To ensure equity, the first site can be alternated.

The audio links between the two sites do not always make communication easy. At one stage, the microphones from the external site picked up all the coughs and paper shuffling which was distracting to local students. However, when the audio volume is turned down, it can then be difficult to hear the external site, depending on the location of external microphones and the local speakers. Again, these limitations restrict the spontaneity of the lecture. Some lecturers have found it preferable to deal with questions from external students at the end of the lecture after most of the local students have left the theatre as fewer noise problems then exist.

Video conferenced lectures require considerably more preparation. However, it is also desirable that they be as natural as possible. There will be pauses and delays but these also occur in other lectures. Interaction, particularly with larger groups, is more difficult but needs to be encouraged.

Practical issues for administration

The following practical issues have arisen during the three year period:

- The lectures must be timetabled to fit in with the timetables of two universities. This can be very difficult! It should also be realised that the starting times for lectures and vacation periods differ between universities. We have adopted the principle that the lecture timetable is based on the Melbourne dates and the ANU students fit in.
- Video conferencing to different states also means that there will be difficulties with different public holidays, time zone differences and even daylight saving problems. In one instance, a 9am lecture became an 8am lecture. The existence of different public holidays and vacations also means that external students will not necessarily receive the lectures in order, as some lectures have to be taped.
- Examination dates and times can also present problems due to different examination periods. During the examination the examiner must also be able to be contacted from all sites.
- Each institution is an autonomous educational body. Hence, each university has its own entry standards and its own approach to pre-requisites, policy to 'students at risk' etc. It is probable that institutions will vary with entry standards, thereby creating a difference in quality between the two cohorts of students. This can create problems as there may be different failure rates between the institutions.
- The marking scale for each institution is different. Hence a 70% mark for a Melbourne student is not the same standard as a 70% mark for an ANU student. This difference can cause problems but is a natural consequence of operating within the marking scales of two institutions.

The practical issues should not be underestimated. They are important and should be resolved before a video conferencing program commences.

Technology issues

Technology is the key to video conferencing. However it must be recognised that the technology does not always work perfectly. A range of problems can and do occur and the lecturing staff need to be sufficiently flexible to respond to these issues. These technological problems are accentuated when new equipment (hardware or software) has been installed at either end. It is absolutely essential that the technology staff work in cooperation with the academic staff.

Some of the problems that have arisen during our experience include:

- The dropping out of the ISDN lines during the lecture. Clearly this event disrupts the flow of the lecture. In some cases, these lines have not been able to be restored easily or quickly. As a back up, we tape all our lectures.
- Delays in establishing the links. This is a particular problem where there are more than two sites but has occurred on a number of occasions between Melbourne and Canberra. A ten minute delay is disruptive to students and staff and tends to result in a lower quality lecture as the lecturer is then rushed.
- The quality of the image at both sites. It is critical that the material can be easily read at both sites. On occasions, this has been a problem and it is not always solved with larger print. Mathematical material also presents an additional problem due to the presence of subscripts and superscripts. This means that any prepared slides must be of at least 26 point which limits the amount of material on one slide.
- The audio links between the sites are important. It is important that the students at the external site can ask questions but, on many occasions, these are difficult to hear due to the location of the microphones or speakers.
- Using more than one method of transmission has presented problems. For instance, moving from a computer spreadsheet to a document camera and then to a live session has difficulties and provides extra pressure for the lecturer. In practice, most lecturers prefer to use one method of transmission but this does limit the presentation.
- The use of two screens at the external site, with one screen showing the lecturer and the other screen showing the material, **is essential**. In effect, this provides the external students with a choice of viewing during the lecture. However, it is also essential that the image of the lecturer is sufficiently large for facial images to be seen. In some instances, the inbuilt software has automatically shown the lecturer in a distant shot with the natural reaction being that students switch off.

In summary, it is absolutely essential that technology must be fully tested and experimented with by the teaching staff well in advance of the commencement of teaching. It is also essential that good support be available from technicians at both ends. Without this experimentation and support, there will be major difficulties.

Conclusion

The offering of actuarial studies from The University of Melbourne to the Australian National University through the medium of video conferencing has been a success. The student groups at both centres have accepted the introduction of this technology with relatively few problems. Indeed, students have been surprisingly robust in their reactions to certain difficulties. On the other hand, there is no doubt that this technology provides extra work for both the academic and general staff. There is need for more planning and regular communication. Lectures must be better prepared and there are limits placed on the spontaneity of the lecturer. Difficulties with technology present further problems. However, it is expected that as staff become more familiar with the equipment and various problems are resolved, then the technology will be used to enhance the educational value of the lectures.

Technology will play an important role in our education development. However, it must always serve the presentation of quality education and never become the master. Our experience has also reminded us that students enjoy the opportunity of face to face contact. This personal interaction must remain an important part of our future education.

Finally, the success of this video conferencing program would not have occurred with the strong support from many staff within both The University of Melbourne and The Australian National University. This support includes senior management at both universities, the ITS staff at both sites, the administrative staff in both departments and, most of all, the academic staff who have found it necessary to adjust their preparation and lectures to fit in with these new developments.

There is no doubt that the use of new technology requires a much greater team effort than is necessary in traditional forms of education. We must recognise that all parts of the team play a critical role in the provision of this form of education.

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