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An early ASEARC-taught subject: has it been a success?

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A 300-level subject covering Sample Surveys and Experimental Design has now been taught jointly to the Universities of Wollongong and Newcastle for two years, first using video-conferencing and then the Access Grid. In each year, the subject was delivered by the same two lecturers.

We provide an initial review of the subject. We discuss its organisation, the use of the technology, changes in our teaching and administrative styles needed to cope with this mode of delivery, feedback from students, and our reaction to all of these. An overview of the subject results is given.

Keywords

Access Grid, collaboration, statistics education, video-conference

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Abstract

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1. Introduction

"The Applied Statistics Education and Research Collaboration (ASEARC) is a collaboration between statisticians and universities to work together exchanging information, supporting each other, and sharing loads." The collaboration includes joint development and delivery of subjects and courses [1].

A 300-level subject covering Sample Surveys and Experimental Design has now been taught jointly to the Universities of Wollongong (UoW) and Newcastle (UoN), delivered from UoW using videoconferencing in 2009 and the Access Grid (AG) in 2010.

We provide an initial review of the subject. We discuss its organisation, the use of the technology, changes in our teaching and administrative styles needed to cope with this mode of delivery, feedback from students, and our reaction to all of these. An overview of the subject results is given.

2. Subject Description

At UoW the subject is "STAT335 Sample Surveys and Experimental Design", and at UoN, it is "STAT3170 Surveys and Experiments". In each year, the subject was delivered by the same two lecturers at UoW: Ken Russell taught the Experimental Design component in weeks 1 - 6 and Carole Birrell taught the Sample Surveys component in weeks 7 - 12. Revision material was covered in week 13. The subject

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is aimed primarily at undergraduate students undertaking a statistics major but is open to students who have second year statistics prerequisites. A set of printed notes including lecture notes and tutorial questions is available to students at a minimal cost.

UoN has 12 teaching weeks plus a revision week in which no new material is presented. At UoW, there are 13 teaching weeks plus a study week. In 2009 and 2010, the teaching weeks aligned and so the only change to the program was for the schedule to incorporate the revision week in week 13 at both sites. Classes for UoN start on the hour beginning at 9 am, whereas, at UoW, classes start on the half-hour beginning at 8:30 am. The main consequence of this is the need to ensure that students at UoN are aware of the different class times when choosing subjects.

Each component of the subject has three hours of face-to-face teaching each week. The lecturer has discretion in using classes as either lectures or tutorials. For each component, in-term assessment includes three small assignments and a project using SAS.

Collaboration between the universities included a discussion of topics to be included in each component, number of assessment tasks and the allocation of marks for in-term assessment and the final exam. Currently, the allocation is 40% in-term assessment and 60% exam.

3. Modes of Delivery

In 2009, our first delivery to UoN was undertaken with videoconferencing. The AG was available but the lecturers were apprehensive about the reliability of the technology. In 2010, we decided to trial the AG technology.

3.1. Videoconferencing

Videoconference is the technology that allows two-way video and audio communications between remote parties [2]. With videoconferencing technology, it is possible to record the videoconference and, as such, the lecturer is recorded as well as any interaction between the universities. We found that the students did not access this very much, partly because the files of recordings were very large and downloading was time consuming and used up their download allocation. The document camera was used for hand writing a solution to a problem. This was not the best quality (not as crisp as an overhead projector). We did not have access to a smartboard with videoconferencing, although it was subsequently discovered that it would have been possible. Although students could ask questions, it was not possible for them to write down anything for us to see.

A technician came to the room to connect the endpoints but left the room and monitored the connection from another location on campus during the lecture. It often took up to 15 - 20 minutes for everything to be connected properly. During the lecture, if the lecturer wanted to change from the presentation on the PC to the document camera, it was necessary to switch visuals using a remote control operated by the lecturer. If the connection between the universities dropped out, which occasionally happened, it was sometimes necessary for the technician to physically come back to the room. An obvious disadvantage was the loss of class time in connecting and reconnecting if necessary.

3.2. Access Grid

For ASEARC, the delivery of courses via media can be done through the AG using a room dedicated for the purpose, the Access Grid Room (AGR). "ASEARC's use of the AG is part of an international communication network that provides multimedia presentation to groups at different locations. The AG involves cameras, microphones, speakers, projectors, and other tools to support the presentation, such as the interactive 'whiteboard' to display lecture slides, otherwise called a smartboard. The board is also capable of receiving

handwriting and replicating this on boards located in the other AGRs". For more information on the AG see http://www.accessgrid.org/ and [1].

In 2010, we used the AG technology for the delivery of STAT335. The UoN students received three projected images: one of the smartboard, one of the lecturer, and the other of the students at UoW. At UoW, the students were in the same room as the lecturer and the smartboard, and also saw a projected image of the students at UoN. Technicians were present in the AGRs at each end for the duration of the lecture and this proved to be worthwhile as the lecturers could then focus on the subject delivery.

There were many advantages of AG over videoconferencing. Firstly, use of the smartboard enhanced delivery of lecture and tutorial material. What was written on the smartboard could be captured and saved into a PDF file and subsequently the file could be uploaded to a subject website. Both the students and the lecturers particularly liked this feature. If a student missed a lecture, they could "fill in" the lecture notes by looking at what had been written on the smartboard. Although it did not capture the audio, it proved to be very helpful and was well utilised by students.

For consultation, it was possible for the UoN students to write on the UoW smartboard and vice versa. This was helpful when trying to work through a problem, and was used effectively by a couple of the students in Newcastle in 2010.

4. Teaching style: challenges and changes

Teaching with either videoconferencing or the AG is different to teaching just face-to-face. Many factors need to be taken into account both administratively and for pedagogical purposes.

Giving students many opportunities to interact during the lecture helps to minimise the "television viewing" mentality. Looking into the camera when addressing the students at the other end, rather than looking at the screen, gives the impression of making eye-contact and helps the students feel involved. When asking questions, we found that if we just said "Are there any questions?", it was confusing as to which group of students should answer first. Instead, it was better to address the group first by saying "This question is for the Newcastle students. Can someone tell me what the next step is in solving . . . " or even to address them by name: "Peter in Newcastle, can you tell me what the next step is in solving . . . ".

Visual variety can be achieved by changing the input (Caladine, 2008). For videoconferencing, this was done by switching between the computer and the document camera. For AG, we achieved this by changing from presentation/lecture style to writing on the smartboard where students fill in gaps left in lecture notes, or by solving tutorial problems on the smartboard with input from students.

4.1. Class Website

The subject had a website on UoW's *eLearning space* (which uses the Blackboard Learning System; see http://www.blackboard.com). This site allows documents to be stored for access by students, permits the lodgment of assignments and their retrieval after marking, and provides a 'chat room'. It was used by the lecturers in exactly the same way as they would have used it to teach just STAT335 at UoW. The only difficulty experienced was in arranging access to this site for the UoN students. This is discussed later.

Administratively, organisation of lecture material is important since material is delivered electronically, requiring all lecture slides to be typed ahead of time. The use of eLearning space for everything means having a detailed schedule of dates for uploading of slides, tutorials, tutorial solutions, assignments questions and the return of marked assignments.

4.2. Assessments and Marking

Completed assignments had to be uploaded to the eLearning site by both UoW and UoN students. Requiring that all students adhered to the same process meant that UoN students were not disadvantaged. The lecturers were provided with a Toshiba Tablet PC and the PDF Annotator software (http://www.grahl-software.com). This enabled them to mark a PDF file containing a student's assignment. The lecturer had to download the assignment, mark the assignment (using PDF Annotator), and then upload the marked assignment to the eLearning site.

There were definite advantages in using this process. The students kept their original assignment, having first scanned it, and then they sent a soft copy. Students could send in their assignments from home if they had access to a printer/scanner. For the lecturers, it was possible to keep an original copy of the assignment and then use a second copy to mark and comment on. The marked assignment can also be kept for reference, which proved helpful if a student wished to discuss any comments or the marking scheme. Some students typed their assignments; however, it was not a requirement. Others typed parts and hand wrote in the equations, others hand wrote all.

The disadvantage for students was the requirement to make a PDF copy of assignments and upload to a website rather than simply handing a paper copy to the lecturer. This was especially noted by the local students, who had access to the lecturer. It is important to make the process as simple as possible by giving students access to a scanner or photocopier which can scan and email a document to the student. UoN students had access to a scanner. At UoW, administrative staff were available to scan assignments if necessary.

In 2009, the Sample Surveys component had five 'weekly' assignments and a project. This was reduced to three fortnightly assignments and a project in 2010, partly to align with the Experimental Design component but primarily to reduce the student burden, especially in regard to the scanning process.

5. Student results

The final marks in STAT335 for UoW and STAT3170 for UoN are given below for the 2009 and 2010 cohorts. The numbers of students at UoN were approximately half those at UoW although the numbers are fairly small. In 2009, UoN had a particularly strong group of students. A t-test shows a significant difference between the UoW and UoN in 2009 ($p=0.04$). In 2010, although the means are almost equal, the variation is much greater at Wollongong, mostly due to two failures. A t-test shows no significant difference between the 2 groups in 2010 ($p=0.95$).

UoN		UoW		Site	n	Mean	sd.
	3	0		UoW	11	59.5	15.0
	4	0		UoN	6	75.7	12.5
	5	2447		Total	17	65.2	15.9
940	6	8					
	7	013					
982	8	0					

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Stem width:10
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Table 1: 2009 Results

6. Student Feedback

In both years, all students were given a short questionnaire which specifically asked about the mode of teaching delivery. The main themes and number of comments (given in parentheses) are given below.

6.1. 2009 Videoconference

From UoN students:

- Lost class time due to technical difficulties (4).
- Difficulty in asking questions (3).

UoN		UoW
	2	7
	3	
	4	2
	5	
32	6	
3	7	123
0	8	56
0	9	2

`Stem width:10`

Site	n	Mean	sd.
UoW	8	69.1	22.5
UoN	4	69.9	8.5
Total	12	69.4	18.5

Table 2: 2010 Results

- Assignments tedious to hand in (2).
- Should be a cheaper course on our HECS debt (2).

In particular, from one student "*An interesting and useful subject. It was good to have lecturers teaching material from their fields so they could give real-life examples*" and from another UoN student "*There was no problem with me to use this way of communication. This is the second course for me*".

From UoW students:

- Lost class time due to technical difficulties (7).
- Assignments tedious to hand in (3).
- Prefer to have use of whiteboard (2).
- Didn't like the split screen with the UoN projected image in one corner of the presentation (3).
- Allows students to study different area that would not otherwise be available (1).

6.2. 2010 Access Grid

From UoN students:

- The Access Grid worked well (2).
- Difficulty in asking questions (1).
- The smartboard was used effectively (2), made use of saved smartboard file on eLearning (3).
- Set up consultation time over Access Grid (1).

From UoW students:

- Improve sound (3).
- The smartboard was used effectively (6), made use of saved smartboard file on eLearning (6).
- Allows students to study different area that would not otherwise be available (1).

7. Potential difficulties

There is considerable effort required to offer the subject to more than one University. A coordinator at UoN was needed to assist with this, although the number of hours required for this was not great (particularly in the second year, as we became more experienced). The two Universities have different rules for the presentation of Subject Information sheets and the cover pages of examination papers. Printed Subject Notes had to be posted to UoN. The UoN students had to be given access to the UoW computing system so that they could use eLearning space, and then had to be told how to use it. Classes could be held only when the AG rooms at both campuses were available. A common time for a final examination had to be arranged. UoN staff had to post the examination papers to UoW for marking. Final marks for UoN students were only 'recommendations' until approved by UoN.

We do not wish to overemphasize these difficulties. With goodwill, all of these potential problems were dealt with, and we are very grateful to all concerned for their cooperation. Nevertheless, it is necessary to be aware of these matters.

The cost of having a technician on hand throughout a class is considerable but small relative to the cost of running STAT335 and STAT3170 separately. It is hoped that costs can be reduced as we gain experience and the technology matures.

8. Conclusion

The small number of students at both universities suggests that running a joint subject is worthwhile.

The results from the two cohorts show that UoN students are not disadvantaged and perform as well as or even better than the UoW students. We can learn from our experiences from the last two years, given student feedback and experience of the lecturers.

8.1. What have we learnt?

- AG technology is much more reliable and conducive to learning than videoconferencing. (This contradicts our earlier expectation).

- Saving the output from the smartboard is particularly useful for students. Feedback mentioned that it assisted students to check notes taken in class, or to catch up if they missed a class.

- It is necessary to simplify the process of getting off-site students access to UoW eLearning, and to ensure that students were aware of having to change passwords within 90 days.

8.2. How can we improve?

- Make the process of asking questions more comfortable for students - give more opportunities.

- Set up a more formal consultation time for Newcastle students over AGR.

- Produce a short video or provide simple step-by-step instructions on how to upload an assignment. A practice session in scanning a document and uploading in first week may be useful.

- Provide a simple 'how to' document on getting into the eLearning site.

- Use the smartboard more for interaction.

- Capture each slide that appears on the smartboard, not just the ones annotated.

- Consider whether to hold two laboratory classes in the session. This would require a tutor for off-site students. One possibility is to get students to bring their laptops to the AGR and have a 'tutor' in the room at UoN. Students without laptops could look on with students with laptops.

References

[1] ASEARC, Interactive media, accessed 29/11/2010, http://www.uow.edu.au/informatics/maths/research/groups/asearc/nteractivemedia/index.html (2010).

[2] R. Caladine, Teaching and learning with videoconference, Tech. rep., Centre for Educational Development and Interactive Resources, University of Wollongong (2008).