

On-Line Assessment for Large Groups

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RATIONALE AND BACKGROUND

The School delivers a number of modules in Introductory Audio Systems to a range of students at HND and first year degree level. Over 200 students take these modules. For the past two years, the modules have had unstructured support material available on the web (course notes, tutorial sheets and solutions, audio demonstrations etc). This has increased student satisfaction with the modules (from student evaluative questionnaires) and improved performance in assessments.

The next stage in this development was to provide a more structured learning environment for the students. The overall project was called SLATE (Supporting Learners using Audio Tutorial e-learning). SLATE consisted of multiple strands:

1. replacement of physical laboratories with web-based experiments. This has been completed and was part of the module in 2002/2003. Papers reporting this aspect of the project have been published [1],[2].
2. development of content. This was completed as part of the University of Salford e-Learning Initiative.
3. development of computer aided assessment (CAA), the subject of this project.

2. PROJECT OBJECTIVES

The aim of this project was to investigate, implement and evaluate an on-line assessment scheme for large group assessment and to integrate it with individual modules and with SLATE. Project objectives were:

1. to produce a report describing the different CAA strategies and tools available;
2. to generate a CAA strategy for these modules;
3. to integrate the CAA strategy with the modules, redefining learning outcomes as appropriate;
4. to develop and implement an appropriate CAA;
5. to evaluate the CAA;
6. to disseminate the results of the project through the School, University and the wider community.

3. PROJECT DESCRIPTION

The following section describes the project against each of the objectives.

3.1 Objective 1 - Investigate CAA

3.1.1 CAA Strategies

There are two very useful sources of information for CAA. The first is a report from the UK Computer Aided Assessment Centre, Blueprint for Computer Assessment [3], which provides a good overview of the area.

A number of academics involved in the CAA centre moved on to a new project, GLOW (Graduated Learning on the Web). The School of Acoustics and Electronic Engineering is a partner on this project. The GLOW project has produced a series of documents that describe deliver of material over the web (Web-based learning: A guide for postgraduate tutors and lecturers [4]), academic aspects of CAA (Web-based assessment: A new conceptual framework for supporting student progression and achievement.[5]) and practical implementation issues, including an evaluation of currently available tools (Tools for Web-based Assessment[6]).

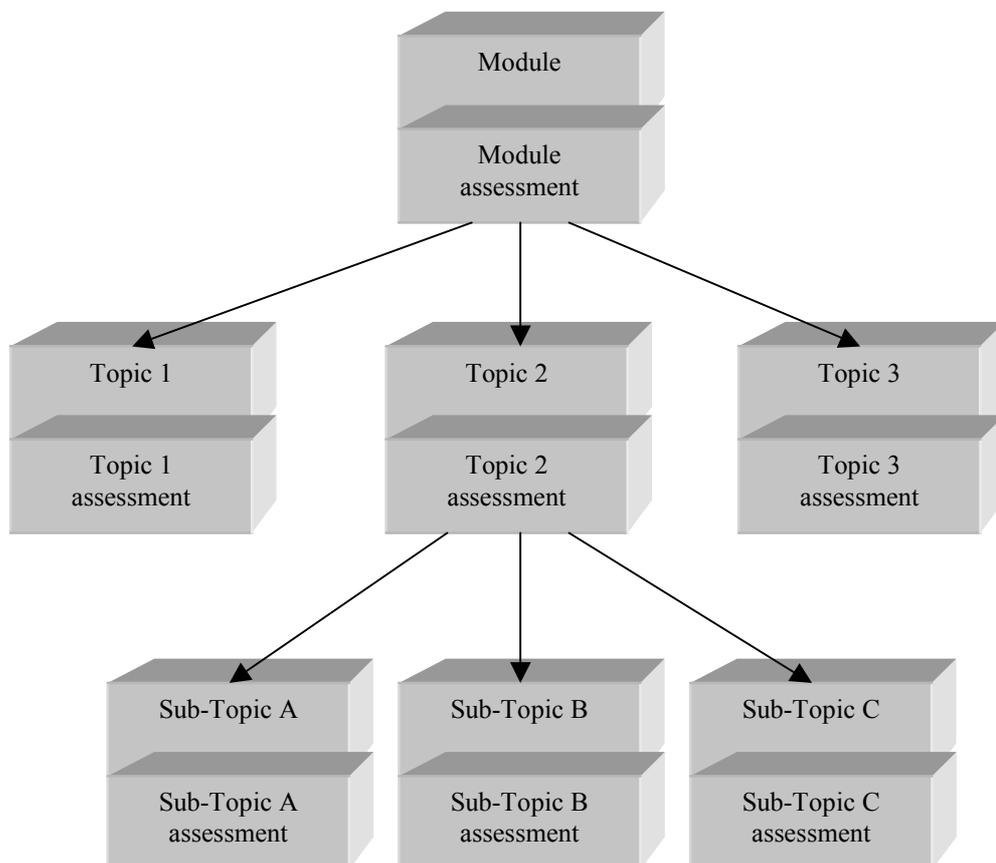
These existing documents cover objective 1 of this project.

3.1.2 CAA Tools

The evaluation of CAA tools was based on the material from the GLOW project and is discussed in the strategy document developed for this project [7]. In summary, the major assessments used the University Virtual Learning Environment (VLE), currently Blackboard. This had the advantages of integrating easily with the learning material, which is in Blackboard, providing a common interface and logon for the students and potentially, integrating with the University student records system (Banner), both for registration of students and for transfer of final marks.

3.2 Objectives 2 & 3 - Develop a CAA strategy & integrate with modules

A CAA strategy for individual module assessment has been developed [7] and is attached to this document. A summary of the strategy is shown below:



The subject material for the module was organised as a hierarchy. The top level was the complete module. Below this, there were a set of topic areas, e.g. acoustics, microphones, loudspeakers. Below each of these topics there was a set of sub-topics, e.g. for the microphones topic, sub-topics include dynamic microphones, ribbon microphones, condenser microphones, stereo microphones. The assessment strategy was to mirror this hierarchy in the assessment of the module.

The sub-topic assessment was a very short (2 to 3 minute) formative assessment of a relatively small amount of material, taken immediately after studying the sub-topic. Although there was feedback to the learner, there was no feedback to the teacher.

The topic assessment was a longer (15 to 30 minute) formative assessment of the whole topic area. Feedback was provided to the student and to the teacher. This allowed the teacher to monitor both student performance and participation rates.

The module assessment was a long (2 hour) summative assessment. Although computer-based, the assessment took place under examination conditions to help ensure the integrity of the results.

3.3 Objective 4 – Implement the CAA

3.3.1 Sub-topic Assessment

The short sub-topic assessments were implemented in the web-authoring package, Dreamweaver, using the Coursebuilder extension. This allowed a range of question types (multichoice, drag and drop etc) to be implemented in a web page. Using Coursebuilder meant that the sub-topic assessments integrated with the course material in the same format web pages. The students were able to move seamlessly between course material and these formative assessments. After submission of the student answer, the system displayed the correct answer, with appropriate explanation.

3.3.2 Topic Assessment

The topic assessments were implemented using the Blackboard assessment tools. Questions were written directly into the Blackboard system. After submission, the correct answers were displayed to the student, along with a grade for the test. The grade for each student was recorded in the Blackboard Grade Book. Although this test was purely formative, this grade information allowed the lecturer to check the progress of the students and to address any problem areas. The students were able to take this test as many times as they wanted to. These assessments were in exactly the same format as the final assessment and so gave the students familiarity with the CAA scheme used at the end of the module.

3.3.3 Module Assessment

The module assessment was implemented using the Blackboard assessment tools. Some questions were entered directly into Blackboard and others imported from a Word document. The assessment was set up in four sections. The student was allowed a single attempt at each section. Once a section was started, the student could not re-enter that section after leaving it. At the completion of each section, the student received their mark for the section.

3.3.4 Practicalities

The module assessment, which was the only summative assessment, was carried out in a suite of computer rooms under examination conditions. This avoided any problems of plagiarism and of authenticating the assessment taker.

3.4 Objective 5 – Evaluation

The project was evaluated by questionnaires at the beginning and at the end of the module. Student performance in the assessments was also evaluated.

3.4.1 Student comments

In general, the students were very positive about the CAA used in the module. The most common comment was that they liked the instant feedback that they got from the system, both in the sub-topic formative assessments and particularly in the final module assessment. With the final module assessment, students appreciated knowing their grade instantly, rather than having to wait over a month, as with the traditional written examination. Typical comments were:

'Liked the fact that you can see grade straight away'

'Excellent idea, especially marking at the same time. Although I didn't get a high % it tells you if you are on target for a pass. Great Idea.'

Many students felt that the CAA was much less intimidating than a traditional written examination and they felt much more relaxed taking the test. One reason for the students feeling more confident was that they had taken a mock examination and the end of topic tests in the same CAA format and had received their grades for these tests. With traditional examinations, although students can find past papers, it is often difficult for them to get their answers marked. Typical comments were:

'Didn't seem as formal (as written exam), was more relaxed. I had been doing lots of work on the web I knew the format and what was coming.'

'Straightforward instructions and easy to use'

'It's easier than the traditional system'

The main complaint was that the module assessment was split into four sections and that the students could not move backwards and forwards between sections. Once the student had entered a section, they could not re-enter that section if they left it. This meant that the students could not review their complete submission, as with a traditional examination. This approach was taken to ensure that if there was a system problem part way through the assessment, the students would have at least submitted some sections. On reflection, the problems associated with this approach outweighed the benefits and in future, the assessment will be formatted as a single, large section. Comments included:

'Can't re-access quizzes'

'Needed better links to other topics rather than going backwards and forwards'

The section for more general comments on the evaluation questionnaire gave extremely positive feedback of the e-learning provided on the module overall. Again, typical comments included:

'Great Idea, the whole University should do it!'

'The quizzes were a useful revision tool'

'e-learning has really helped me in my revision and overall I've found it very useful'

3.4.2 Assessment Results

A summary of student performance in the end of module examination is shown below:

Academic year	Examination Type	Average mark in examination
1999/2000	Traditional, four from six	45.9
2000/2001	Traditional, four from six	60.8
2001/2002	Multi-choice, 50 questions	63.3
2002/2003	CAA	62.0

It is interesting to note that the only significant change in student performance came between the 1999/2000 and 2000/2001 academic years, This was as a result of placing a significant amount of module support material on the web. Changing the form of the end assessment in later years had no impact on student performance, although there were significant staff benefits. Changing from a traditional written examination to a paper-based multi-choice format in 2001/2002 reduced the marking time from about four days to about 4 hours. In 2002/2003 the overall marking time remained at about four hours. Although the actual marking itself was automatic, transcribing the marks to the other electronic formats required by the different participating Schools took this time.

3.5 Objective 6 - Dissemination

Dissemination of this work has begun through a presentation in the old School of Acoustics and Electronic Engineering to interested staff. A related paper is being presented at the University of Salford Education in a Changing Environment conference in September 2003 [2]. A related paper has been published with the Institution of Electronic and Electrical Engineering Learning Technology Task Force [1]. Further papers will follow.

4 TRANSFERABILITY

4.1.1 Student perspective

From the student point of view, the introduction of CAA was relatively straightforward. Although a number of students were apprehensive at the beginning of the module, because of the many opportunities to practise before the final assessment, there were few anxieties by the final assessment.

4.1.2 Staff perspective

From the academic's point of view, the major transition in this project was from traditional, long question written examination to multi-choice format. This moved the burden of work from marking scripts after the examination to question preparation before the assessment. Different academics will take different views on this change in workload distribution. Generating 50 multi-choice questions and answers during the teaching semester was difficult and time-consuming. However, the automatic marking of the students' work significantly reduced the workload during the assessment period, leaving time for other academic activities such as final year project assessment.

4.1.3 University/School issues

One interesting difficulty in implementing CAA is how the approach fits into the School and University procedures. Ad hoc arrangements were made for this project, but a more formal approach is needed if CAA is to be used more widely. For example, the School procedure for verifying examination papers before publication requires a paper copy of the examination. A

printed copy of the examination, with worked solutions, was produced for verification purposes but this is not ideal.

In the School, there is a procedure for second marking/verifying the written scripts. With CAA this does not apply. There is little point in second marking an automatically marked assessment.

Finally, the University has a mechanism for published past examinations on the web, to aid student revision. The CAA does not allow this as there is no examination paper in the normal sense.

The main difficulty with the project was in getting the students correctly registered on Blackboard. There is currently no link between the various student records system and Blackboard. This meant that at the beginning of the module, the students had to fill in a special registration form and be manually registered on Blackboard. At the end of the module, the students' marks had to be manually extracted from Blackboard and entered on the student marks systems in the Schools. These were time consuming and error prone processes. Linkage through these various systems is vital if CAA is to be used widely in the University.

5. CONCLUSION

In this project, computer aided assessment was introduced into the Audio Components and Systems module as part of a wider programme of moving to web-based delivery for a significant portion of the module. Feedback from students was generally good. They particularly appreciated the opportunity to carry out mock assessments which were automatically marked and provided the students with instant feedback on their performance. Again, with the final, summative assessment, the students appreciated receiving their grade at the end of the test.

Automatic marking of the assessment provided a significant time saving during the busy assessment period and meant that the provision of student grades in good time for the Boards of Examiners was not a problem.

The CAA approach is certainly worth taking for large groups of students, particularly at level 1, where it is relatively straightforward to write appropriate questions.

6. REFERENCES

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