

COMPUTER-ASSISTED ASSESSMENT CENTRE UPDATE

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Introduction

The Computer-assisted Assessment (CAA) Centre provides a national centre for advice and support for those wishing to use computers for assessment in higher education. During its final year of funding the centre has undertaken a range of activities, further research and has published the draft Blueprint for CAA. Further research has been conducted on the survey of computer-assisted assessment carried out in 1999. Analysis of focus groups and interviews has revealed that there are a variety of challenges which faced those introducing CAA. The Centre has also been engaged in a number of associated projects, including an investigation of plagiarism detection software and the Fund for the Development of Teaching and Learning funded Graduate Learning On the Web (GLOW) project, which seeks to provide tools for postgraduate teaching and learning on the web (<http://www.glow.ac.uk>). Our role as a central point for CAA knowledge and expertise has led to involvement in the British Standards Working Group, developing a code of practice for the delivery of computerised examinations, and also with the Question and Test Interoperability working group (<http://www.cetis.ac.uk/>).

Blueprint for CAA

The Blueprint for CAA was made available for evaluation early this year. The level of interest in the Blueprint was higher than anticipated, with requests for copies received from examining bodies, training organisations, businesses and overseas institutions. Eventually access had to be restricted in order to ensure the collection of evaluation data could be managed. Evaluation forms returned to date have been largely positive and so far indicate that:

- in general the Blueprint is clear, unambiguous and easy to navigate,
- the level of detail appears to meet the needs of experienced practitioners as well as novices,
- the most common usage of the Blueprint is to find out both general and specific information and to corroborate current practice.

We asked users to identify how they would wish the Blueprint to be improved. The most frequent requests to date suggest that more detailed information about scoring and combining CAA with traditional assessment results would be valuable, as would further examples of question types and case studies in a range of subject areas.

It is planned to produce a final version in the autumn. Further developments may include a greater variety of example question types, a section specifically addressing the issues of delivering of mathematically-based questions using CAA and further enhanced chapters concerning the strategic aspects of implementing CAA and investigation into measures of cost-effectiveness.

Pilot Projects

Pilots at all consortium universities have been undertaken, and some are reported elsewhere in the conference proceedings. At Loughborough University the pilot in European Studies has developed a bank of around 1500 questions. The University of Glasgow pilot is deconstructing the models of CAA presented in the Blueprint as the basis of conducting a cost-benefit analysis. In addition a joint pilot being conducted with the Scottish Computer-assisted Assessment Network (<http://www.scaan.ac.uk/>) project is examining assessment outputs and analysing results from item banks. At Luton large scale summative testing using Perception software has been piloted, involving the conversion of materials from Question Mark Designer and including approximately 200 undergraduate and postgraduate students.

One of the pilots held at Luton was in a level 1 course on Information Systems with nearly 200 students. The module leader, Mr Andrew Tinson, is an experienced CAA user with a large number of items in Question Mark Designer format. The question management elements of Perception were seen as a significant improvement by staff, although the publication of tests was problematic due to the different server operating systems in use (Luton is Unix based, Perception requires NT/2000 Server) which exhibited some connectivity issues when working across network subnets. In response to this conversion of test items for delivery was carried out by designated CAA Centre and Luton's Information Services Directorate staff with access to third party server control (Virtual Network Control). Question and Session databases were then FTP'd to a specified server where efficient publishing to live server directories could be assured. This mechanism also required transfer of additional resources such as item graphics. Whilst effective, this diminished ownership of a larger part of the assessment process than desired. The conversion process worked very well for the majority of questions, although hotspot questions and differential scoring in multiple response questions did not convert easily.

The pilots at Luton used a question by question delivery template, as this was closest to the interface students are currently exposed to, with questions arranged in blocks of five to ten items. Within this template students can only review and change their answers to block items before formal submission. There is no option to review all answers at the end of the test. This concerned both staff and students and while the number of items could be expanded to cover all test items the impact on server load and data loss needs careful consideration.

Elsewhere, consortium members at Oxford Brookes, have been involved in the use of Mindtrail to aid the marking of free text assignments in a module entitled Biomedical Perspectives on Childbearing. Currently, essays and reflective work are submitted for assessment. Proforma's are provided which require considerable input from the marker. Recreating the assessment 'knowledge tree' within Mindtrail has

saved marker time allowing frequently used comments to be automatically generated with some statistical tools available. Student reports can now be e-mailed directly and the possibility of generating output directly to appropriate university administration departments is being investigated. The use of Mindtrail may be extended to the marking of dissertations if the pilot is successful.

There have been a number of planned pilots which have been unable to take place for a variety of reasons. The CAA Centre had initiated further pilots at Luton including one with Dr Martin Gray, Head of the Department of Literary Studies. This led to some interesting uses of the multiple hotspot question to assess students analysis of poetry. Unfortunately, due to organisational repositioning, this pilot was unable to continue to its natural conclusion. The Centre was also involved in the initial stages of course development in a professional level nursing management course with Ms Lynne Wybrew. The course was to be delivered over the internet with large elements of its assessment also being we-based. However, the wheels of validation can sometimes turn slowly and attention needed to be shifted. This project which has a lot of potential is held in abeyance.

Both the pilots that that progressed and those that did not have highlighted the importance of the role of the individual enthusiast and the need for a variety of support mechanisms in the successful implementation of CAA. The Centre would like to extend its thanks to all of those involved in the pilots at consortium universities as well as software providers who have offered us the opportunity to pilot a range of CAA software and tools.

Plagiarism

The CAA Centre, in collaboration with the Information Services Directorate at the University of Luton, recently conducted a review of plagiarism detection software and service for the JISC. The main aim of the project was to evaluate the effectiveness of the software and services for detecting various kinds of plagiarism in text-based assignments and compare performance of the detection tools. The review comprised three parts:

- A technical review of a selection existing software and services
- A user review of software and services
- A survey of academic experiences and perceptions of Internet plagiarism.

With reference to available detection software, two main types of plagiarism can be identified: collusion (between peers) and cutting and pasting material from the Internet. The study identified that there is not a single service or software tool that will detect all sources of plagiarised material encountered by academics.

Results from the academic users review indicated that most of the software and services available were relatively effective at detecting the types of plagiarism which they sought to identify.

Findings from the survey show that plagiarism is considered to be a significant problem. Academics reported that the primary source of plagiarised material was work copied from textbooks and theses. The second most common source was

material cut and pasted from the Internet. The most common trigger that arouses academics' suspicions of plagiarism in assignments is a change of writing style within text and differences in syntactic structure and in the use of terminology.

The project was one of a series of projects funded by the JISC to investigate the impact of and solutions to what is increasingly perceived as a problem in higher education. The growing availability of essay banks and papermills on the Internet offer students the opportunity to cut and paste and download material from a vast array of resources. Other projects involved trialling an Internet detection service at five institutions, a review of source code plagiarism detection software and the production of a guide on good practice and policy.
(See <http://www.jisc.ac.uk/mle/plagiarism/> for further details.)

The JISC are disseminating the results of the projects through a series of workshops and reports taking place over the next month (July).

Student Evaluation

In June 2000 an evaluation of students experience of computer-based assessment (CBA) was undertaken by the Centre at the University of Luton. The survey evaluation involved students from across the institution during one day of their end-of-module examinations. The students who took part in the survey completed a computerised questionnaire immediately following their examination. The questionnaire sought to explore student perceptions of and attitudes towards CBA, particularly focusing on test anxiety and preference for assessment methods and question types. 108 responses were collected out of a possible 274, and represented students from all academic levels in the institution, though the majority were studying at level one.

A brief summary of the results indicates that:

- Female students did not report higher levels of anxiety than male students – unlike previous findings (Brosnan, 1999).
- 46% of female and 60% of male respondents considered that the assessment method used impacted on their examination results.
- Over half the respondents expressed that they would like more CBA, while the majority of the remaining respondents thought the balance between CBA and other assessment methods was about right.
- Respondents were evenly split between those who considered CBA easier than paper-based assessments, those who did not and those who were uncertain.
- The majority of respondents (80% male and 62% female) considered that they prepared differently for CBA as opposed to more traditional assessments. One student commented '*I try to learn a wider range of material in less detail, rather than a lesser amount of material in greater detail*'.

In the open-ended question responses there was evidence that students most common experience of CBA is through multiple-choice questions (MCQ) with only a rather limited experience of other question types. In addition some students identified that MCQ provide them with prompts. This clearly raises issues about the range and variety of question types used in CBA.

National Survey

Further analysis of the national survey data has been taking place. Focus groups and interviews were conducted to follow up on the survey questionnaires. A report is currently being drafted which draws together the quantitative and qualitative data of the survey to provide an overview of the findings.

Two focus groups were conducted at Loughborough University and Glasgow University, as well as 10 interviews with practitioners and 2 interviews with non-users of CAA. The focus groups sought to explore some of the issues raised in the questionnaire. In relation to pedagogy and question design, questions were posed concerning:

- the suitability of CAA to different disciplines and levels, and
- the process undertaken when writing questions and tests.

The focus group discussions raised concerns about the difficulty of writing good questions and this was expressed in terms of a learning curve where effort and time were front loaded. It was felt that early in the learning curve, the time saved by marking was equal to that taken to develop new tests. However, once academics became competent at writing questions and constructing tests it was generally felt that time savings were made, depending on the class size. Typical comments on time savings included *'The class sizes of over 100 mean there is a substantial saving in time. However, this is offset by doing more and better things'* (for example diagnostic testing and monitoring student performance).

The focus groups also highlighted the importance of CAA leading to the development of new types of questions, not merely being used as a mechanism for translating paper-based assessments to screen. With few exceptions the discussions about CAA and question design appeared to be based on the assumption that CAA equated with MCQ. This raised issues of flexibility and the perceived limitations of MCQ. Both the focus groups and the interviews revealed concerns about the limitations of MCQ tests to test beyond basic knowledge and understanding. Although it was generally accepted that CAA enabled testing the breadth of a course and helps to sustain and motivate student learning over a prolonged period, enhancing basic skills, knowledge and understanding it is rarely used at higher academic levels. A minority of the interviewees and focus group members were open to the idea that CAA could be used to create *'more sophisticated questions'*. Although it was identified that CAA could be used to test higher order skills, some of those who identified this went on to express concern over its use in this way –

'Above all we've got to be careful that we really do take seriously the fact that exams set standards and they impact on learning patterns...it's got to be a quality question and what's going on in the student's mind has got to be quality thinking'.

In addition, the role of academics in the test design process was discussed by both groups, with debate concentrating on whether academics should only be responsible for the supply of questions and feedback, or whether it was important that they also be responsible for the computerisation of tests. The quantitative data from the survey indicates that the availability of existing computerised tests, or appropriate support to undertake computerisation is a key factor in motivating use with current non-users. Only 10% of non-users who responded to the survey were very likely to create and computerise their own tests, but 24% would be likely to use CAA if they created the test and someone else computerised it for them.

Further analysis of the interviews and focus groups is currently being undertaken and will form part of a report on the national survey, which draws together both the quantitative and qualitative data.

Summary

The Centre has engaged in a wide range of activities and research over the last year. The publication of the draft Blueprint has generated a great deal of interest and indicates that there is clearly a need for resources which address CAA from both a generic and subject discipline perspective. The analysis of the focus groups and interviews highlights the need for further research to identify the potential for CAA to assess different levels of learning and mechanisms to support its integration with existing assessment methods and strategies. Exemplars of sophisticated questions which test higher order learning in a range of subject disciplines are greatly needed. The pilot projects have helped to identify some of the technical and operational issues of introducing different types of CAA, as well as identified the need for further pedagogical development for a greater understanding of the potential of CAA. Student evaluations have been valuable in gaining a particular perspective on the use and impact of CAA and have also led to the identification of further work needed in terms of student support for CAA, test anxiety and the role of formative feedback to support learning. The plagiarism project has highlighted the broader aspects of CAA and growing impact of the utilisation of the technology for teaching and learning.

References

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