AN ACADEMIC APPROACHES AND ATTITUDES TOWARDS CAA IN HIGHER EDUCATION

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***Abstract*-Recent technological developments in computer aided assessment (CAA) have led to a dramatic increase in its use in higher education. Assessment is a fundamental ingredient in the teaching and learning process, yet there is an increasing body of literature expressing dissatisfaction with current assessment policies and practices in higher education that challenges the appropriateness of assessment to address the future needs of students in a rapidly changing information rich environment Whilst it is clear that many students consider that online assessment is an alternative to traditional paper-based methods, there are still genuine worries among our students that need to be addressed in planning and implementation of CAA across the institution. In this paper the participants in this study were chosen as a sample of convenience from undergraduate university students enrolled in a first year the students sat an e-Assessment which contributed 30% towards the final course grade. A survey of student perceptions of online assessment was carried out, and a report on current student attitudes and opinions of CAA was reported.**

***Keywords:* Assessment, E-Learning, Higher education, ICT**

I. INTRODUCTION

Computer Aided Assessment (CAA) is a term that covers all forms of assessment, whether summative (i.e. tests that will contribute to formal qualifications) or formative (i.e. tests that promote learning but are not part of a course's marking), delivered with the help of computers. This covers both assessments delivered on computer, either online or on a local network, and those that are marked with the aid of computers, such as those using Optical Mark Reading (OMR) [7]. The assessments can vary in different format either consisting of a pre-printed paper test on to which students mark their responses, which are then processed automatically using an optical mark reader or involving the direct input of students' responses into a computer terminal. Computer aided assessments may be stand alone and specific to certain machines within a computer lab; based on a local network (intranet); or, as is increasingly common, web based. Computer-aided assessment can be viewed in a few different ways [4]. Technically, assignments that are written on a computer and researched online are computer-aided assessments. One of the most common forms of computer-aided assessment (in terms of eLearning) is [5] online quizzes or exams this can be implemented online, and also marked by the computer.

Computer Aided Assessment (CAA) is being used increasingly to provide a quick method of marking summative assessments for large groups of students. Whilst this can be very effective in saving time for staff, it does mean that the feedback present in the more traditional coursework assignments is lost. For effective learning, it is important that students can try out their understanding and obtain constructive criticism, so that the learning cycle is complete [10]. There is, therefore, a need to provide feedback to individual students via formative assessments. However, this is an exercise that is very time consuming, especially for large classes. Various authors have attempted to address this using CAA. Whilst this can be purpose-written software for a particular course or module [9] , software suites for assessment are now available either as part of a managed learning environment (e.g. WebCT, Blackboard) or for assessment alone [8]. They can be formative and include ongoing feedback either during the assessment or after. They may be 'scored formative', allowing ongoing comparison of a student's progress over a period of time, possibly replacing an end-of-term summative assessment. Alternatively, they

may be summative, contributing to a student's end-of-year mark. Depending on circumstances, such tests can be either supervised or non-supervised, with the option of allowing students to check their own progress through self-assessment. Although more commonly used for testing lower-order skills (such as knowledge, understanding and application), when properly formulated they can also be used for testing higher-order skills (analysis, synthesis and evaluation). Their nature allows the automation of what was previously a very time-consuming task: that is, marking and monitoring progress.

II. CAA IN CONTEXT

Computer-based assessment involves a computer program marking answers that were entered directly into a computer, whereas optical mark reading uses a computer to mark scripts originally composed on paper [1]. Portfolio collection is the use of a computer to collect scripts or written work. Computer-based assessment can be subdivided into stand-alone applications that only require a single computer, applications that work on private networks and those that are designed to be delivered across public networks such as the web (online assessment). CAA tests can be supervised or non-supervised, formative or summative. There is also a diagnostic role for CAA in determining students' prior knowledge of a subject. The growing interest in online learning within tertiary education is leading to recognition that any plans to implement online learning should also include a consideration of CAA [3]. The issues around CAA are similar to those identified for other learning technologies in terms of design and delivery and associated support needs [6]. CAA has obvious similarities with the development of Managed Learning Environments in terms of the encountered difficulty of institutional implementation and wide-scale Figure 1. However, CAA differs from other learning technologies in that the stakes are much higher, particularly where it is used for examinations. Students are perceived as increasingly litigious, and the clear scoring schemes of objective tests open the results of CAA tests to scrutiny that can render deficits in practice, apparently highlighting the need for risk analysis and management strategies. The shift towards online testing is well documented [9] and different forms of CAA are illustrated in Figure 1.

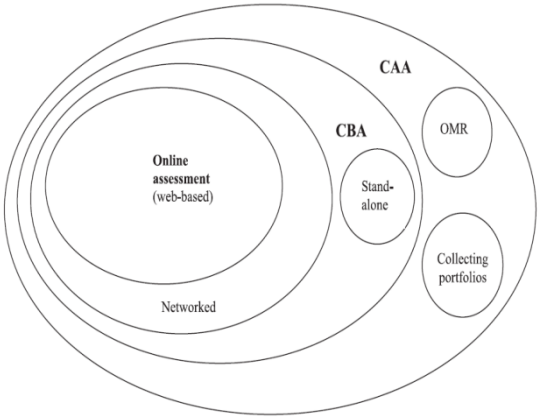

Figure 1. Different types of CAA

III. METHODOLOGY

A] Samples

The participants in this study were chosen as a sample of convenience from undergraduate university students in a first year. This study consisted of male and female students enrolled in a small, private, Catholic liberal arts institution serving approximately 2,240 undergraduates. The institution has a 12:1 student – faculty ratio. About 49% of the undergraduates live on campus. They have experience with online and computer-based assessment.

B] Study Design and Procedures

This our study tended towards a naturalistic model [14]. This programme comprised of 1009 students in 48 classes taught by ICT teachers. The student was registered through a standard course registration system. They were administered questions according to their assigned web based method. One teacher and one administrative staff were responsible for coordinating in designing and conducting the assessment. Two computer officers assisted in providing consultation and developing the IT solutions. Two researchers assisted in tracking and reviewing the study. Towards the end of the semester, all students sat an e-Assessment which contributed 30% towards the final course grade. The duration of the e-Assessment was one hour and consisted of two sections:-

Section 1 contained 60 MC questions to test students on the grammar content of the course.

Section 2 contained another 60 short-answer questions to test students on vocabulary, including verb use, phrasal verbs, extended vocabulary and word formation.

There was also consultation with teaching and learning experts within and outside the institution, six main dimensions for enquiry were agreed upon: affective factors, pedagogical benefits, validity, security, practicality and reliability. Suitable indicators were created for each of these six dimensions, and a multiple item measure drawn up, consisting of a 30-item Likert scale questionnaire [12]. This questionnaire was

delivered to a sample of 130 students who have taken online assessments. A small amount of demographic data was also collected to enable us to break down the findings by gender, age and academic subject, and opportunity was given for students to give open-ended responses where appropriate.

C] The Structure of the Web-based System

The system is built using the online quiz function of the University-supported eLearning platform, WebCT. The questions were carefully reviewed, selected and categorized by topic before input into the question database [11]. After removal of extra difficult and long questions, 376 MC questions were categorized into 26 categories, and 278 short-answer-type questions were categorized into 30 categories to form different question sets. Each of the test sets contains 80 question items of similar difficulty level to ensure fairness of the test. The questions are imported into WebCT question database, setting up the test on WebCT for conditional release during the test period, and preparing analysis reports after the tests [13]. The benefit of the WebCT University-supported eLearning platform is:-

1. For MC and short-answer questions, the platform supported auto-marking which would significantly save teachers' time.
2. It was possible to randomly select questions from a question bank and compile a different examination paper for each student even during the same examination session.
3. All answers were saved electronically into the database; it is very convenient for teachers to do item analysis and performance analysis. Teacher would be able to get a summary of all submitted answers and the corresponding frequency for revision and necessary changes for future examinations.

The examinations were conducted in four computer labs. The 48 classes were assigned to different examination time slots within one week. During the peak period, there were about 150 students working on the examinations at the same time.

IV. RESULTS AND DISCUSSIONS

Descriptive Statistics

In order to evaluate the practicality of e-Assessment, data were collected from the ICT teachers, ICT staff, and students. Individual interviews were held with the coordinators from each group, data from the computer staff members were collected from their informal conversations with the researchers. They also constantly referred to the logs and email communications they held with all the other staff involved in the project as a means to consolidate their thoughts. Lastly, data from the students were collected through an online survey administered after the exam. All students in the cohort were invited to take the survey. 183 replies were collected and the response rate was approximately 11%. As for the students, their acceptance of the new method was also not unanimous. The responses to the survey question about "I prefer the online test to a pen-and-paper test" are represented in Figure 2. In general, more students preferred e-Assessment to pen-and-paper but there are still a significant group of students who strongly favoured the traditional mode.

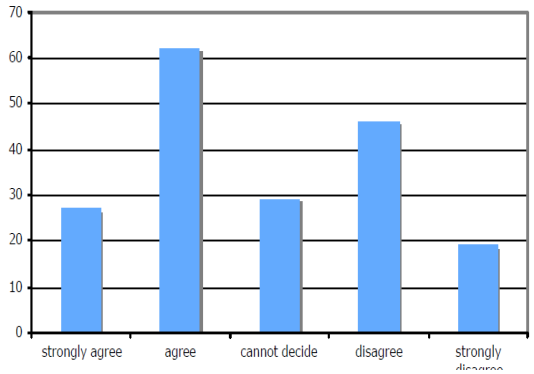

Figure 2: Students' preference for online tests over pen-and-paper

It can be demonstrated that there are significant numbers of students who are now accustomed to using technology in all aspects of their everyday lives, including their studies. This also extends to using computers in their assessed work. For example, many students feel relaxed and comfortable about using computers in exams, they do not consider it to add significant stress to the exam experience (see figure 3) and are so used to using computers in their student lives that they even expect online assessment to be used.

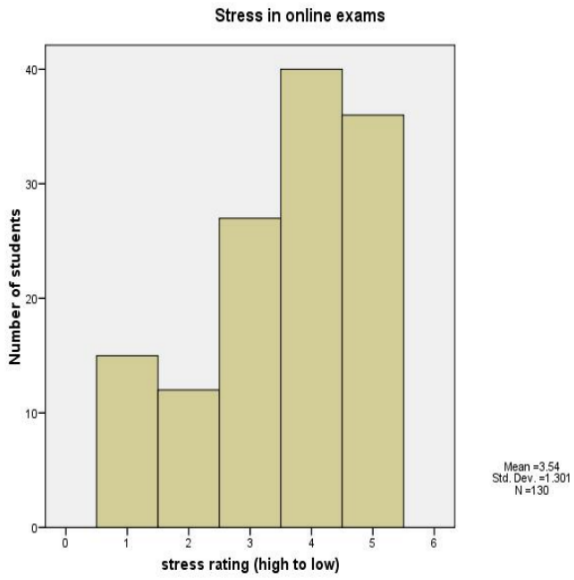

Figure 3: Histogram showing student stress levels in online exams.

At the same time, there is also a significant minority among our students who do have concerns, especially when it comes to security and practical issues.

The histogram below (figure 4) suggests that the distribution of student ratings of the practicality of online assessment is quite normal. That is to say, whilst the majority of students are to be found in the mid-portion of the graph, the number of students who have a very positive attitude (i.e. on the right of the graph) is matched by an equivalent number who have concerns (on the left).

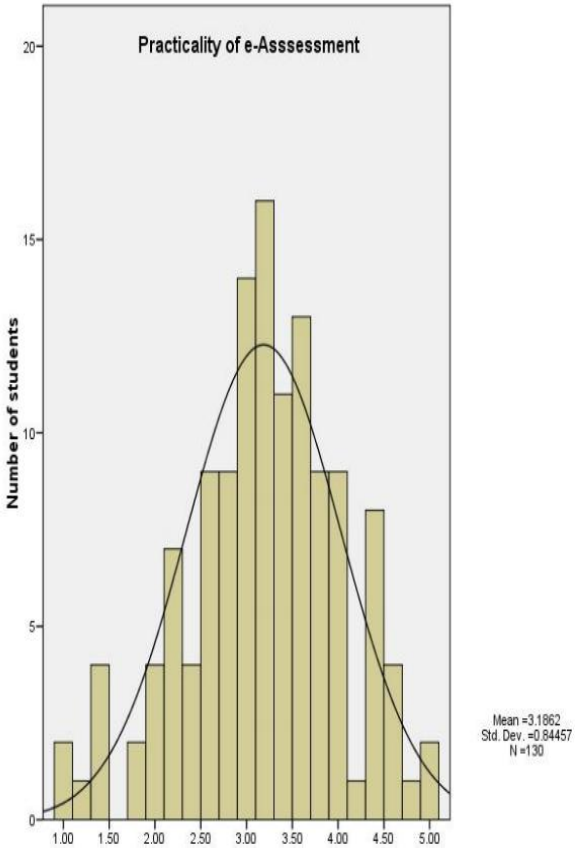

Figure 4: Histogram showing student perceptions of the practicality of online assessment.

It should also be pointed out here that this example graph is typical of the responses received across the range of different dimensions mentioned above. There can be no doubt that instructors and e-learning advisors still have some work to do to win over the 'hearts and minds' of a proportion of the student body. This is also indicated by the pie chart (see figure 5 below), which shows that whilst slightly more than half the students were positively inclined to the idea of online assessment, and a small number of students took a neutral position, the proportion of students who had negative feelings or strong negative feelings towards computer-assisted assessment was only a little less than half.

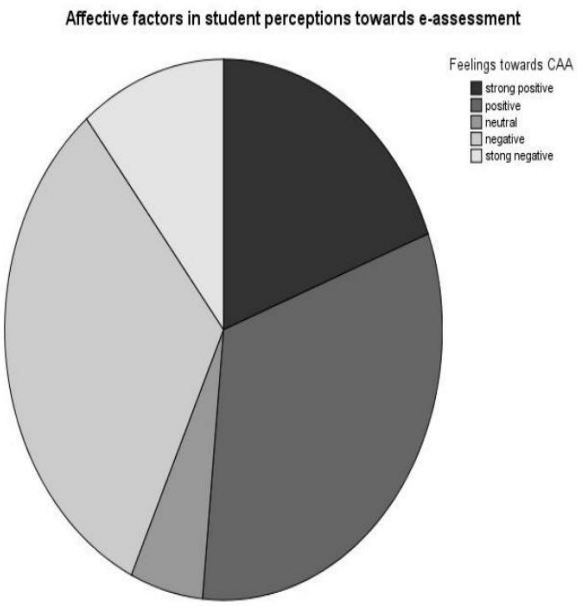

Figure 5: Pie chart showing student feelings toward online assessment

Initial analysis of the independent variables in this study reveals that there is not a significant gender difference in the ratings, and perhaps surprisingly, age does not seem to be a significant factor either.

V. CONCLUSION

Web-based submission and marking of assessed pieces of work has proved hugely successful. It has enabled better management and tracking of assignments, incorporates Turn-It-In, and has resulted in a faster turnaround of students work. Administrative workload has reduced as staff spends less time sorting paper. Online submission and grading will allow the School to effectively manage web-based courses. Our processes streamline the submission, collection, grading and return of assessed work. However, there are also advantages of using formative feedback following CAA to promote student learning. The data collected in this study indicate that providing a CAA system for self-assessment positively affects the learning of those students who choose to use it. Once the question database has been set up, no further intervention is required by staff, apart from scheduling the assessments. Given this, the time required to set up the system is more than justified by the improvement in the learning of the students. CAA benefits staff through a more manageable workload, thereby enabling the subject team to be proactive in student support systems, which can identify potential problems before they develop into a crisis. Introduction of CAA into Higher Education courses could be considered, even for only part of a course assessment, as the benefits may often outweigh any extra effort required in the implementation process.

VI. REFERENCES

[1] Boyle, A., Hutchison, D., O'Hare, D. (2002) Item selection and application in higher education, in: M. Danson (Ed.), 6th International CAA Conference Loughborough University).

[2] Gráinne Conole* and Bill Warburton (2004). A review of computer-assisted Assessment ALT-J, Research in Learning Technology Vol. 13, No. 1, March 2005, pp. 17–31 University of Southampton, UK

[3] Bull, J. (2001) TLTP85 implementation and evaluation of computer-assisted assessment: final report. Online at: www.caacentre.ac.uk/dldocs/final_report.pdf(accessed16 March 2003).

[4] Outtz, J. L. (1998) Testing medium, validity and test performance, in: M. D. Hakel (Ed.) Beyond multiple choice evaluating alternative to traditional testing for selection (New York, Lawrence Erlbaum Associates).

[5] O'Reilly, M. & Morgan, C. (1999) Online assessment: creating communities and opportunities,in: S. Brown, P. Race & J. Bull (Eds) Computer-assisted assessment in higher education (London,Kogan Page), 149–161.

[6] Pain, D. & Leheron, K. (2003) WebCT and online assessment: the best thing since SOAP?,Educational Technology and Society, 6, 62–71.

[7] Davies, P. (2002) There's no confidence in multiple-choice testing, in: M. Danson (Ed.) 6thInternational CAA Conference, Loughborough University, 4–5 July 2002

[8] Duke-Williams, E. & King, T. (2001) Using computer-aided assessment to test higher levellearning outcomes, in: M. Danson & C. Eabry (Eds) 5th International CAA Conference, Loughborough University, 2–3 July 2001.

[9] Collis., B. A., &Wende, M.C. van der (Eds.) (2002). Models of Technology and Change in Higher Education, An international comparative survey on the current and future use of ICT in Higher Education.Enschede; University of Twente

[10] Lilley, M. & Barker, T. (2003) An evaluation of a computer adaptive test in a UK university context, in: J. Christie (Ed.) 7th International CAA Conference, Loughborough University, 8–9 July 2003.

[11] Bull, J. & McKenna, C. (2004) Blueprint for computer-assisted assessment (London, RoutledgeFalmer).

[12] Christie, J. (2003) Automated essay marking for content—does it work?, in J. Christie. (Ed.) 7th International CAA Conference, 8–9 July 2001Mason, O. & Grove-

[13] Stephensen, I. (2002) Automated free text marking with paperless school, in: 6th International CAA Conference, Loughborough University, 2–3 July 2001.

[14] Mills, C., Potenza, M., Fremer, J. & Ward, C. (Eds) (2002) Computer-based testing—building the foundation for future assessment (New York, Lawrence Erlbaum Associates).

[15] Brusilovsky, P. and Pesin, L. (1998) Adaptive navigation support in educational hypermedia: An evaluation of the ISISTutor Journal of Computing and Information Technology 6 (1), 27-38.

[16] Miller, A., Imrie, B. & Cox, K. (1998) Student assessment in higher education: a handbook for assessing performance (London, Kogan Page).

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