Perceptions of the First Year Experience of Sport Students with a Focus on Computer Aided Assessment

Kay Biscomb
Tracey Devonport
Shaun Galloway
Andy Lane
School of Sports, Performing Arts and Leisure

Introduction

The development of new computer technology appears to promise a number of benefits for education and assessment. Applying computer technology to educational assessment could provide individualised formative assessment with fewer demands on teachers (Lepper, 1988; Sewell, 1990). Computer Aided Assessment (CAA) is being implemented in various forms across the University of Wolverhampton in response to the potential benefits on offer. During the academic year 2003-4 the Centre for Learning and Teaching (CeLT) ran a project, which facilitated staff in their implementation of CAA within modules. In response to this staff members within Sports Studies decided to offer the CAA pilot to two level 1 students on core modules SR1015 (Physical Challenges) and SR1018 (Scientific Principles).

Evidence suggests that lecturing in Higher Education is an increasingly stressful occupation with increasing workloads cited as a stressor (van der Klink et al., 2001; Niven & Cutler, 1995; Thorsen, 1996). Devonport et al. (in press) evidenced academic stress in the school and reported a number of stressors. The use of CAA could provide an automated method for marking work from large numbers of students that would reduce the workload and stress for staff but, clearly, the effect on student learning and performance would have to be evaluated before making any large scale change.

Aims

Student evaluation tends to occur at the module level. Comparison between modules is difficult as data are not matched. In addition, assessment changes are often implemented without a systematic review of the impact of the change. The aims of the present study, therefore, are twofold:

1) To critically evaluate level 1 students' experience of assessment in general;
2) To explore in detail lecturers' perceptions of the impact of CAA in level 1 modules.

Method

Ethical approval was gained from the School of Sport, Performing Arts and Leisure ethics board to conduct the research. Two different stages were used to address the two aims. Quantitative data was collected for the first aim and qualitative data was collected for the second aim.

Quantitative Data Collection Method

Participants and Procedure

During Welcome Week semester 1 2004-5, level 2 students ($N = 68$) completed module evaluation questionnaires retrospectively for each module studied in level 1. These were distributed during a meeting for level 2 students but the sample did not represent the total student body of level 2 students. Students were informed that there were no right or wrong answers and encouraged to complete the questionnaire honestly. To promote honesty, participants did not have to include their name on the questionnaire.

Measure

The standard university module evaluation questionnaire was modified to include additional questions that would assess students' perceptions of their experience on level 1 modules as well as their perceptions of module assessment. For each module in level 1, students rated their agreement on a six-point scale anchored by 0 (totally disagree) to 5 (totally agree). Students were asked to rate the following aspects of each module:

1. Learning objectives clear
2. Learning materials clearly presented
3. Workload correct
4. Overall level of assignment correct
5. Grade 1
6. Grade 2
7. Tutor(s) response timing
8. University resources worked well
9. WOLF interface easy to use
10. WOLF Enhanced learning experience
11. WOLF Easy to use off campus
12. Attendance good
13. Attendance Enhanced learning

Modules

There are seven level 1 modules serving five undergraduate degrees: PE; Sports Studies; Sport and Exercise Science; Physical Activity, Exercise and Health and Sports Coaching. Four are core to all specialist degrees and the others are core to specific degree(s) or are taken as an elective. Table 1 outlines the detail of the modules in level 1 and highlighting the two modules with the CAA.

Module	Programming	CAA	Semester Delivery
SR1011 Study of Sport	Core to all	No	1
SR1012 Introduction to Investigative Techniques	Core to all	No	2
SR1014 Introduction to Coaching and Teaching	PE / Sports Coaching	No	Year
SR1015 Physical Challenge	Core to all	YES	2
SR1016 Sport in a Social Historical Context	Sports Studies	No	Year
SR1017 Personal Professional Development	Core to all	No	1
SR1018 Scientific Principles	Sport & Exercise Science; Physical Activity Exercise & Health	YES	Year

Table 1: Level 1 Modules Evaluated in the Project

Normally students complete a module evaluation questionnaire at the end of each module but, for the purposes of this research project, they were asked to rate each module at the same time on their return to university in level 2. In some cases modules had been completed four months previously and in some cases eight months.

Qualitative Data Collection Method

Semi-structured interviews were completed with the teaching team for SR1018 (n=2) and SR1015 (n=3). The schedule examined previous experiences of teaching staff (in terms of assessment) and the perceptions of teaching staff on the impact of the assessment within the specified module. Interviews were completed with members of staff from both modules and both module leaders who were responsible for the development of the CAA within the module.

Quantitative Results and Discussion

Figure 1 indicates the <u>raw scores</u> for questions 1-7 (i.e. 'Modules and learning objectives clearly explained' – 'Tutor(s) response time') for each module as measured on the modified module evaluation questionnaire.
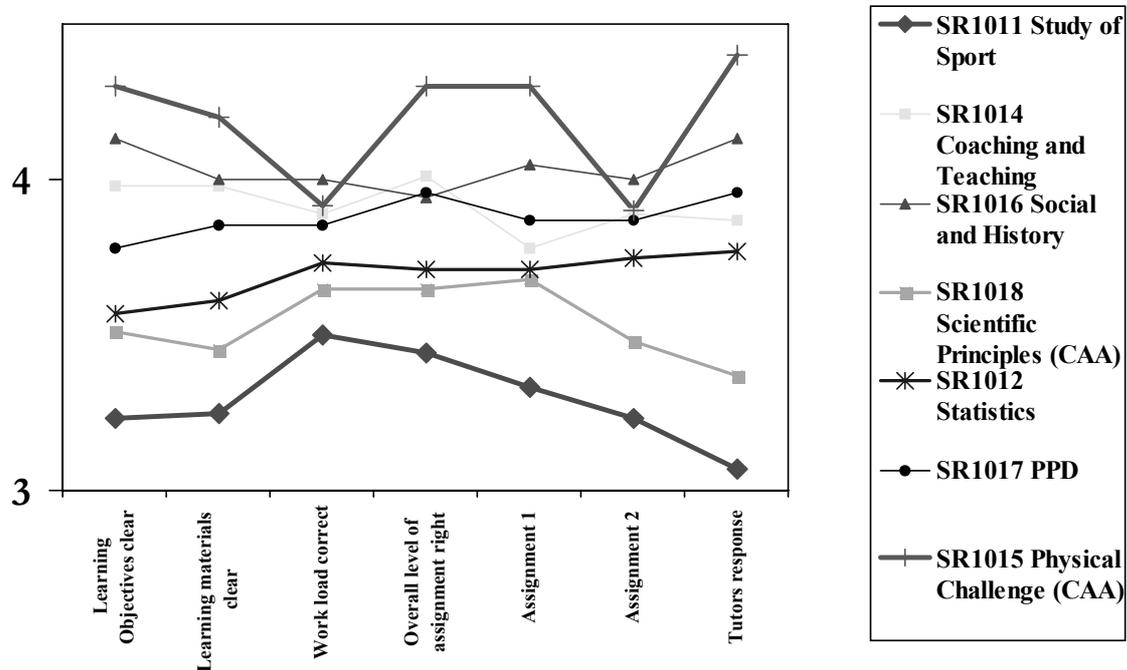

Figure 1: Ratings for each module as measured on the Module Evaluation Form

These findings indicate that the primary drivers of positively perceived modules are 'Clarity of learning objectives' and 'Tutor response'. SR1015 features strongly on both counts but SR1018 is rated lower. Bunching of scores on work load indicates that students are largely satisfied with the level of work load and suggests effective management of the level 1 curriculum. Both modules with CAA feature in the mid range. When comparing SR1015 and SR1018 with the remainder of the Level 1 modules, CAA was not perceived by students as different to other types of assessment. We can assume, therefore, that the addition of CAA has not negatively impacted upon student perception within the module.

Further statistical analysis was carried out on these data using multivariate analysis of variance (MANOVA). This revealed a significant main effect (Wilk's l (6, 297) = 0.69, F = 1.73, p < 0.001). The non-CAA module, Study of Sport (SR1011) scored significantly lower than other modules in respect of module evaluation items 1 –7:

1. Modules and learning objectives clearly explained F (13, 292) = 7.17 p < .001;
2. Learning materials clearly presented F (13, 292) = 6.61 p < .001);
3. Work load correct F (13, 292) = 2.63, p < .001;
4. Overall level of assignments right F (13, 292) = 4.47 p < .001;
5. Grade 1 F (13, 292) = 4.02 p < .001;
6. Grade 2 F (13, 292) = 5.05 p < .001;
7. Tutors response F (13, 292) = 10.51 p < .001).

A factor analysis of the results indicates two emerging factors. Factor 1 relates to the internal aspects of the modules whereas factor 2 relates to external aspects of the modules. Factor 1 is more coherent than the second factor and clearly more research is needed into these areas.

	Factor	
	1	2
The learning materials were clearly presented	.84	
The learning objectives were explained clearly	.83	
The overall level of assignment work was about right	.78	
Assessment Two	.77	
The workload was about right	.76	
Assessment One	.74	
Tutor(s) responded to my enquiries within an acceptable time frame	.67	
The WOLF interface was easy to use		.81
WOLF enhanced my learning experience		.79
Off-campus use of WOLF was satisfactory		.76
University resources, e.g. the library, worked well	.38	.63
My attendance at lectures was good		.62
Attending lectures enhanced my learning experience	.40	.56
Eigenvalue	6.11	1.74
Percentage variance explained	35.23	13.36

Table 3: Factor Analysis

With reference to the first aim of the project these data gave valuable information about the perceptions of students with regards to the first year curriculum in general. It also allowed a comparison of perceptions about modules which used CAA and those which did not. When evaluating the students' experience of assessments within a module the quantitative results indicate that the students' ratings of SR1015 and SR1018 were in line with most of the other modules they experienced during the year thus the impact of the assessment change was not perceived as negative by the students. However, it must be said that CAA was not the only form of assessment on these two modules.

Qualitative Results and Discussion

Interviews were conducted with the teaching teams of SR1018 and SR1015 to examine their experiences of the impact of CAA. In SR1018 there are three academic strands to the module (physiology, psychology and biomechanics) all applied to a sport and exercise setting. The CAA was used as part of the multiple choice question (MCQ) exam, which quizzed the students on all three academic strands. Although CAA was deemed appropriate for all sections of the exam, it was only used in the physiology section. All other sections were completed in a traditional way. This was for pragmatic reasons as explained by Sam (tutor for SR1018):

> *We (other module tutor) had tests in a different format … I didn't do mine that way because it could be that mine was before Christmas … I don't think there was ever the intention to have it in the whole module*

In SR1015 the students experienced a combination of practical sessions with the theory of motor learning and some basic psychology. The aim is for the students to put the concepts into practice so: "they know how they apply in the real world setting" (Chris, module leader for SR1015). In this module CAA constituted the second form of assessment and it covered all aspects of the module. Analysis of the interviews with staff identified three clear themes arising from the use of CAA: time, front loading and testing knowledge.

Time

The tutors and module leaders acknowledged that the main benefit gained from the implementation of the CAA was a saving of marking time. The technology assesses each answer in turn and provides every student with a score at the end of the test. In traditional methods this is a mechanistic

form of marking which consumes time. Academic staff were extremely enthusiastic about the time saved by the technological process:

> *"It saves the academic a massive amount of time"* (Sam)
> *"… the computer is marking it for you so you can use that time in better ways"* (Sam)
> *"Because of the time it would take to mark hundreds of scripts"* (Sam)
> *"It cut down on our marking time … it is a wonderful tool"* (Jon, module leader, SR1015)
> *"The thing it helps, which is a massive thing is the whole marking time issue"* (Chris)
> *"The assessment comes at a time when we are all snowed under as well …"* (Chris)
> *"Efficient time saving method of assessing the students"* (Peter, tutor for SR1015)
> *"Saves time from assessment full stop"* (Peter)

Staff were particularly enthusiastic to acknowledge that one of the additional benefits of the time efficiency saving was a reduction to stressful workloads. As stressful workload patterns (Klink et al., 2001; Niven & Cutler, 1995; Thorsen, 1996) are often cited, CAA could assist academic staff at times of increased marking demands. Marking time saved through this process could then be used for other purposes.

Front Loading

The module leaders were more conversant with the delicate balance about time and acknowledged that the use of CAA was not as simple as a time saving exercise but rather an up front investment of time at the start of the module leading to a long term saving. This early investment of time which was needed to write the bank of questions was then utilised at a later stage when the marking process was not time demanding. They referred to this process as "front loading". As Chris explained:

> *There is no getting away from it the fact that CAA is front loaded so we worked really hard on getting the MCQs in place … because there was no resource, there was nothing in existence, we didn't have that option. It was a lot of work to develop the questions and make sure they were sound … but once that's done you are saving a lot of time then.*

Testing Knowledge

Module leaders reported another advantage to the use of CAA as the ability to use the assessment method to test knowledge: "It tests knowledge … basic level of understanding is quite good … they pick bits out that they are happy with … With CAA they are forced to confront things they are not comfortable with and I think that's a good thing" (*Chris*). The staff were clear in the application of CAA for this purpose and that in the two example modules the assessment element was designed for this purpose: "But I suppose for us in SR1018 it was quite nice because we were testing knowledge" *(Jon)*.

Chris reported an advantage of CAA as being "allowed . . . to assess all of the concepts within the module" but it can be argued that this is an advantage of a MCQ assessment rather than one specific to CAA.

Tutors also discussed the limitation of CAA as just testing knowledge. They questioned whether it was suitable for a deeper form of assessment: "It is an interesting discussion as to whether we can use it for more than knowledge and I am not sure …" *(Jon)*.

Traditional versus CAA

A direct comparison of CAA to traditional paper methods of MCQ exams indicates both advantages and disadvantages.

Advantages

The first of the advantages is the efficiency created by the time usually needed for marking. This was considered by the staff and the most significant advantage. One module leader also commented on the benefits of control over the presentation of questions to students because they were given random questions so that students could not look at their neighbouring computer.

Both module leaders also commented upon the benefits of CAA for reflective practice. The technology allows for an analysis of student progression and achievement in relation to each individual question set. Chris commented that the statistics provided from the results allowed for an immediate reflection so that the module leader could: "evaluate individual questions". Jon was also appreciative of the options created for reflection:

> *The analysis sheet allowed me to analyse the questions. The output was really good"* (Jon)

Disadvantages

One of the major disadvantages noted by staff was the issue of students' levels of IT competence in which the two module leaders had differing perspectives. Chris believed that this issue was a negative aspect of the project because of the number of students that were described as "computerphobic" *(Chris)*. In contrast Jon believed that the technology was well suited to assessment for contemporary students because they are very "computer literate" *(Jon)*. As one module was core to all students and one module was core to only two programmes it is possible that these are accurate descriptions of different student bodies. Chris considered some of the finer details associated with the technology. For example, she refered to the setting up of the technology and the application to the assessment as a "scary trust process". She also considered that the use of technology might be more problematic for students with special educational needs with particular reference to dyslexic students.

The final disadvantage discussed by both module leaders was the notion that CAA was limited in its application to testing knowledge rather than deeper forms of learning. A MCQ exam was considered an ideal output for the use of CAA but they questioned whether it had any further applications beyond this.

Applications

Module reviews reflecting on course content, delivery and assessment undertaken in this way allow staff to be more critical in the changes made to the module content. It is important to avoid hasty judgements and prevent the risk of change initiated with dissatisfaction in the early stages.

Both the formal and informal reflection on modular progression used in this project was useful in the development of these modules and the holistic level 1 curriculum. It has also enabled the subject team to enhance a proactive student support system which can identify potential problems before they develop into a crisis.

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