WADING THROUGH TREACLE: CAA AT THE UNIVERSITY OF BRISTOL

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Abstract

Over the past few years, like many universities the University of Bristol has been considering the way forward with regard to CAA. Also, like many universities it faces the sticky challenge of accommodating very specific and different needs from CAA systems according to academic subject alongside the clear pragmatism and economies of scale gained by supporting one system rather than many university-wide.

The University already has several in-house systems including TAL (Test and Learn) and CALNet, both born out of subject specific need, with other departments experimenting with other packages available for example Questionmark and TRIADS. The choice of strategy is further complicated by the emergence and more common use of Virtual Learning Environments (VLEs) which include CAA features, and the impetus to 'tie-in' all University systems into a Managed Learning Environment (MLE).

Short-term strategy currently takes a pragmatic stop-gap approach and doesn't commit to any one system in the long-term pending results of further evaluation. The outcome may involve the adoption of one or more CAA systems in the longer term, as well as one or more VLE system.

Evaluation of the CAA systems and assessment components of the VLE systems is to take place over the next few months. The evaluation will take the form of student and staff interviews, questionnaires and focus groups. A major part of this analysis will be an assessment of the needs of key institutional stakeholders. A survey of academic staff addressing teaching, learning and assessment needs has already been rolled out and analysed. A new survey is now focusing on the needs of students with respect to online learning, including assessment.

This paper reports on the evolution of strategy to date and on the progress of the evaluation studies. It will also provide an overview of the emerging issues and how these apply to other HEIs.

Keywords

Strategy, university-wide, evaluation, user-needs, survey, Virtual Learning Environment, Managed Learning Environment

University of Bristol context

Historically the University of Bristol has relied on individual enthusiasts to develop technical innovations for learning, teaching and assessment. These have been encouraged through special initiatives such as the Teaching Initiative Fund or catalysed by timely external influences (funded from national initiatives like JISC and TLTP) or major technological advances (wide-scale uptake of email, the arrival of the web). In terms of CAA these developments have often been subject-based and as such have failed to become part of the mainstream activities across the University. Widespread take-up and scaling up of good practice has been further inhibited by (until recently) lack of strategy concerning, or strategic awareness of these developments.

Current CAA being used around the University includes:

University of Bristol developed

CALScribe – a non-web based authoring template developed in Asymetrix Toolbook which allows creation of media-rich tutorials including a range of self-assessment facilities. The two main areas of take-up are Languages and Dental education.
CALNet – a web-based authoring system originally developed for the Vet School to accommodate its lecturers' preferences for using case studies within teaching. This enables self-assessment and limited summative assessment (results get emailed back to the tutor). This is well used within the Vet School and the Medical School.
TAL (Test and Learn) – a web-based system developed within Engineering Maths generally focused on Maths-based needs, allowing lecturers to run cumulative and diagnostic Mathematics tests. The system is used within Engineering Maths and Chemistry as well as in other Institutions across the UK.
Computer based tutorials developed in Toolbook specifically for the Physiology department containing a significant element of self-assessment.

Non-Bristol developed

TRIADS (Tripartite Interactive Assessment Delivery System) – a non-web based system developed in Authorware by the University of Derby. The system is very sophisticated and particularly lends itself Geology and related subjects. It has been trialled in the Department of Earth Sciences.
WebCT – a Commercial Off The Shelf (COTS) VLE software which is web-based. This has been taken up by the Vet School and some Engineering departments.
Questionmark Perception – COTS web-based software. This is being trialled in the Medical School.

Blackboard – a COTS web-based VLE system. This has been used via its commercial site by the Graduate School of Education.

The take-up of CAA generally and a CAA system in particular has very much been based upon subject specific needs and preferences in teaching and assessment at Bristol. However, the conflicting demands of supporting many systems across the University means the costs of not taking a more coherent and strategic approach to CAA across the University have become increasingly critical and include:

- Not being able to effectively provide the service faculties and departments are demanding of central support services
- Increased fragmentation. Departments and individuals are already implementing and planning to implement different CAA systems, paying for separate licences and incurring the associated costs of diseconomies of scale ie hugely scaled up costs of technical, training and administrative support for the University as a whole.

VLEs and VIOLET

The emergence and more common use of VLEs (such as WebCT and Blackboard) which include assessment facilities and the growing tendency for departments to commission bespoke V/MLEs systems has further complicated strategic thinking. Much discussion and debate over the last year or so has focused on whether a COTS product (which may benefit from a dedicated team and large investment and support, but may be more difficult to integrate with existing systems) can adequately meet the organisation's needs, or whether it is preferable and cost effective to develop a homegrown product (which often suffers from under-investment but may be easier to integrate) which is tailored precisely to local conditions (Lewis, 2001).

In response to such unresolved issues, and an increasing pressure to ‘join up’ or integrate systems across the University a project called VIOLET (Virtual Integrated OnLine Environment for Teaching) is currently underway at Bristol. The project aims to explore the issues around an appropriate V/MLE for the University and to make recommendations for the future. One of the main themes of the project is CAA. The project has three strands:

- To implement a COTS VLE (Blackboard) across the University, and support Blackboard for a minimum of three years. Support for WebCT is scheduled to cease in 2002.
- To develop the DataHub (a stable database that can be accessed and manipulated via the web containing data from a variety of sources including the student record system Dolphin) and ensure it is populated by authoritative student and curriculum information.
- To create a bespoke V/MLE (building on previous departmental Intranets) that uses the DataHub information to provide a framework into which learning resources may be added.

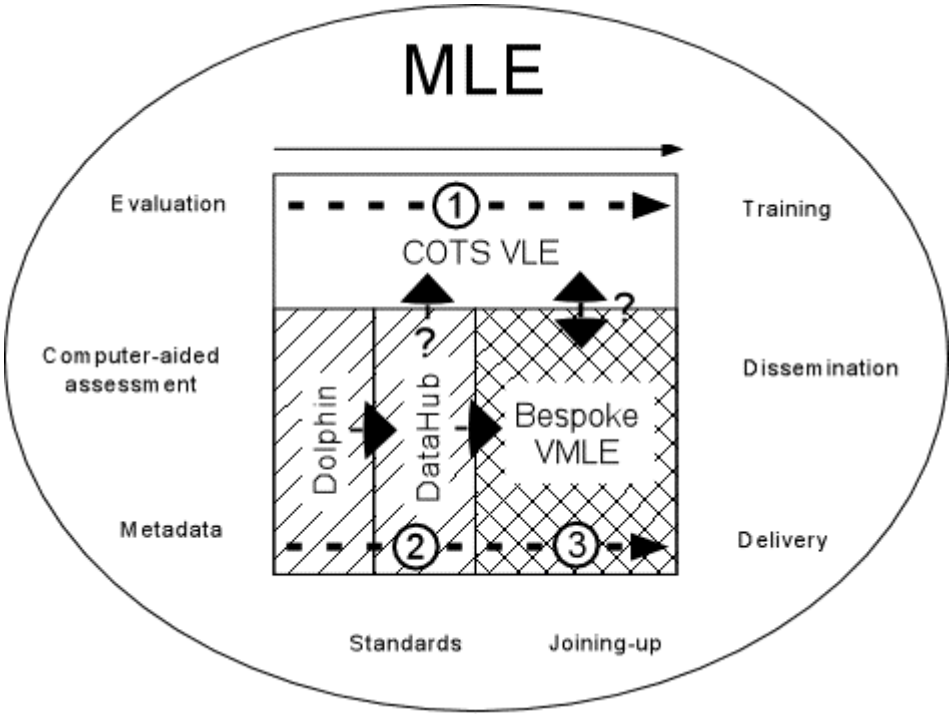

Figure 1: VIOLET project model

The project commenced at the beginning of May 2001 and aims to report back to the University by September 2001 to inform the way forward in terms of CAA and V/MLE strategy. The overall intention is to develop a bespoke V/MLE (Browning, 2000) for the whole University in the longer term, which could incorporate further separate CAA or VLE systems.

Evaluation

CAA strategy therefore over the next few months is a pragmatic stop-gap approach to allow for further evaluation which will encompass TAL, Questionmark, Blackboard and a bespoke V/MLE. It will also draw on results from University-wide staff and student Learning Technology surveys, an evaluation of the Physiology computer base tutorials and a CALNet evaluation.

Following evaluation, recommendations will be made alongside the V/MLE recommendations. These will include:

- Which system or systems fit best with the University's CAA needs (and how they might be integrated)
- How this fits in with longer-term University strategy to provide a Managed Learning Environment or 'portal' for the University
- How to address issues such as portability of content, usability, access, feature set, robustness, scalability, and sustainability (Brown, 2001)

It is by no means clear that only one system will be recommended at the end of the process in September. It is likely that more than one CAA system or set of tools may be needed to best support academic needs in the medium term.

Staff survey

The current Learning and Teaching Strategy at Bristol (Clarke, 1999) aims to go beyond local innovation, in order to ensure the use of technology, including assessment, becomes mainstream across the Institution. To enable this, a cross-Institutional audit, (based upon a survey developed by the Scottish Higher Education Funding Council initiative TALiSMAN (Tomes, 1997)) revealed the following key factors which feed into CAA considerations:

- **Infrastructure**. Suitably equipped computer labs and associated computer support varies widely across the University and has becomes a 'sticking point' for many departments considering using CAA at any level. Student access to computers has improved, particularly with a recent initiative to provide student access to the University web from halls of residence. This increased access particularly influences the use of TAL at the University which allows first year students to sit their formative tests anywhere at anytime within 2 weeks (Barry et al, 1999).
- **IT training**. Staff recognise they need more training in order to use IT more effectively in teaching, learning and assessment but are most constrained by time (Jones, 2000). Lecturers already receive little reward for innovations in teaching (Beetham, 2000) and have little time to devote to this area devote to this area generally.
- **Communication and obtaining information** in teaching and learning were regarded as benefiting more highly from IT than **assessment** (Jones, 2001). Recent developments, for example an increase of medical students planned for September 2001 have further highlighted the requirement of CAA, in this case to reduce the time spent by staff setting and marking exams (Pollock, Whittington and Doughty, 2000).

Student survey

Also as a result of the Learning and Teaching Strategy the LTSS, in conjunction with the Student Union has just rolled out a student survey. The survey queries current usage of technology in learning and assessment as well as attitude towards its effectiveness. The results will be available in July.

Physiology computer based tutorials

An evaluation has been carried out of two computer based tutorials written in Toolbook by the Department of Physiology, both of which involve a substantial element of computer based self-assessment. The aim is to determine the potential for replacing some face to face tutorials with a computer based alternative. Feedback suggests that students find this a helpful revision tool but still place great importance on the presence of a human tutor. There is also an unresolved trade-off between allowing students to see the feedback for every option in the questions without encouraging them to guess the answers at random.

CALNet evaluation

An evaluation of CALnet was carried out in the Spring of 2000. This started with a survey of who was using CALnet at Bristol, and five users were interviewed about the extent to which CALnet met their needs. The remaining users were also surveyed with a questionnaire.

CALnet was being used in the Vet School; Computer Science; Medicine/Dentistry; Physiology; Anatomy; French; and Social Medicine. Its main attraction was that it was free and locally produced. Additional features that users wanted were: random test generation; automatic emailing of quiz results to the tutor; summative assessment features; and greater ease of use.

VIOLET evaluation

The main body of CAA evaluation is currently taking place alongside VLE evaluation and involves focus groups, interviews with key staff and users, and a survey. The survey will be developed using information gathered from focus groups and research in the earlier stages and will also looking to draw from, with the writers' permission, the work done at Heriot Watt University (Crofts, Foster, McAlpine, Rist, and Tomes, 2000) to assess user needs in relation to CAA. The Heriot Watt team used a Criteria Importance Quantification schedule to assess key stakeholders' different priorities and needs, and to assess perceptions in a wider sample. The eventual aim of the evaluation exercise is to generate a profile of user group needs, which can then be compared to the different systems available.

The primary theoretical frameworks to be used in the analysis include: distributed cognition (Salomon, 1993) activity theory (Nardi, 1996), cultures of computer use (Selwyn, 1999), the use of values in educational software development (Shabajee, 1999) and evaluative frameworks for VLEs (Britain & Liber, 2001).

Issues to date

Although at the initial stages of the main body of CAA evaluation some key issues are already emerging:

Portability of content

This has been the key concern of academics so far. With a variety of systems already being used, the migration of materials from several systems to one is seen as problematic and undesirable. Tools to migrate question sets from CALNet to WebCT have already been developed. Similarly tools to migrate questions sets from WebCT are currently being developed.

Usability by staff

This has been a major focus and has largely influenced strategy to date – the choice of Blackboard as a VLE was seen as most appropriate, for example, as it is considered easy to use (Brown 2000) with therefore lower staff training and support costs. The usability in terms of authoring of locally developed assessment tools such as TAL and CALNet is less intuitive.

Feature set

Desirable assessment tool capability include many features (O'Leary and Browning, 1999) such as formative and summative assessment, timed tests, student usage logs, diagnostic tools, large question type range, question database, auto test generation, classification of questions. In order to facilitate integration of assessment into the e-curriculum and to fully gain benefits of building up of large question banks over time question databases and classification of questions are seen as particularly desirable at Bristol. For example, the Medical MeSH classifications have been integrated into TAL, and an ability to classify questions in any future is viewed as particularly desirable by the Medical School.

Intellectual Property Rights and copyright

A complex and dynamic issue raised early on by academics and common to most institutions. This area is particularly problematic for digital material as law hasn't kept up with technological developments (JISC, 2001).

Quality Assurance

In terms of consistency, level and presentation of learning materials and assessment there are large concerns at department and faculty level. There has already been moves to set in process the development of subject-focused academic guides and templates in an attempt to ensure quality and consistency of learning and assessment materials for students.

Technical/Security Issues

Technical problems and issues have been prevalent and often complex, particularly at installation stage. For example, Bristol has experienced problems exporting questions from the Questionmark Perception authoring tool to the web using different sub-nets/LANs. Also the version of Apache supported by Blackboard for use with its product is not recent enough to ensure the level of security Bristol desires. Support from other institutions has been particularly helpful with installation problems but this does not diminish that fact that many COTS systems that presumably benefit from larger investment than universities into such developments still lack the technical advances demanded of them.

Subject specific needs

The single largest factor that has prevented Bristol from rolling out a common system across the University is the difference in teaching and assessment between different subjects. For example, the Medical and Vet Schools favour case studies and the heavy use of images, whilst the Mathematical subjects often require limited multiple choice type questions but also need to easily use mathematical notation when authoring questions. Language departments have made heavy use of word match type questions.

Conclusions

It is clear that whatever CAA path Bristol follows it will not be one that meets all key-stakeholder needs in the medium term. There will have to be a compromise in terms of meeting academic and user needs in assessment and having a manageable and coherent CAA strategy that involves one or more integrated systems. The introduction of Blackboard at Bristol may meet many user CAA needs and be advantageous in being able to provide an easy mapping of learning materials to assessment (for example, assessment can be created in the course documents areas). However issues such as portability, robustness and security remain uppermost, and given the need to integrate all University systems in the longer term, the viability of current or future locally developed CAA systems or tools continue to look attractive.

Continued and increased collaboration with other institutions presents itself as one pragmatic path to follow in order to better develop our own systems, whilst keeping an eye on the dynamic and ever-changing technology market: it may not be before long that a new or existing product is developed that is technically more stable and scaleable **and** better meets the divergent needs of Bristol's academic community. Whatever the choice of system or combination of systems in the short term, longer-term strategy at Bristol needs to balance the costs and benefits of sticking to this choice against the costs and benefits associated with change. Bristol is addressing the migration of assessment materials in and out of systems early on in this project and will be looking closely at its exit strategies at the outset.

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