TRIADS EXPERIENCES AND DEVELOPMENTS. A PANEL DISCUSSION

Don Mackenzie, Barbara Hallam,
Glenn Baggott and John Potts

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Supported by three short papers from:

Don Mackenzie
Centre for Interactive Assessment Development
University of Derby
Kedleston Road
Derby
DE22 1GB
D.Mackenzie@derby.ac.uk

Barbara Hallam
IT Adviser and Trainer Information Services,
Learning and Research Support
The University of Birmingham,
Edgbaston,
Birmingham
B15 2TT
b.hallam@bham.ac.uk

Glenn Baggott
School of Biological and Chemical Sciences
Birkbeck College
University of London
Malet St
LONDON
WC1E 7HX
g.baggott@bbk.ac.uk

John Potts
Dental School
University of Wales College of Medicine
Cardiff
pottsajc@cardiff.ac.uk

Abstract

The Tripartite Interactive Assessment Delivery System (TRIADS) is an advanced computer-based assessment system designed to provide the widest possible flexibility in assessment design and delivery. Initially developed at the University of Derby it was evaluated in some forty-five departments at twenty-seven UK universities in twenty-four disciplines as part of the HEFCE-FDTL 'Assessment of Learning Outcomes' project (Liverpool, Derby and Open Universities 1996-2001). In the three papers that follow, the outcomes of this evaluation are summarized together with subsequent developments and examples of applications of TRIADS at Cardiff Dental School and Birkbeck College, University of London.

The evaluation of the Tripartite Interactive Assessment Delivery System (TRIADS) as part of the HEFCE-FDTL 'Assessment of Learning Outcomes' project (Liverpool, Derby and Open Universities 1996-2001) has resulted in some modifications to the system. The principal outcomes of the evaluation are recorded in this paper together with information regarding the modifications and a brief description of the new tutor-friendly version of TRIADS, (QuickTRI) that is currently in development.

Introduction

As part of the TRIADS project, the TRIADSystem (Mackenzie, 1999) was evaluated in forty-five academic departments and central service units at twenty-seven UK universities in twenty-four disciplines. The implementers were mostly individual interested academics together with a limited number of central service providers who contributed invaluable feedback both from associated tutors and from students.

A full description of the TRIADSystem has been given elsewhere (Mackenzie, 1999) and thus will not be repeated here. Suffice to say that the full version is a semi-open coded toolkit for Authorware Professional (Macromedia™) that contains templates for around thirty question styles in various stages of development that are delivered by an assessment engine that calculate scores and files the results in a wide variety of configurations.

The TRIADSystem is being developed in continuous use at the Centre for Interactive Assessment Development in the University of Derby where it has delivered over 6000 student assessments in the current year covering a wide range of disciplines

Summary of Evaluation Outcomes

System outcomes

The testing of TRIADS in such a wide range of environments, both network and academic, was invaluable to ensure reliable functionality and to focus developments on user-requirements.

Interestingly, most evaluators started to use the system formatively before proceeding to summative use in some cases. This is the reverse of the situation at Derby where the system was first developed for summative use and where this still forms the majority of its application.

The evaluation group comprised in large proportion of academic tutors who were not trained in programming skills. As a result some found the system quite complex to learn initially and some fell by the wayside. The full TRIADSystem is not really designed for occasional use and its flexibility and readily customizable nature naturally incurs some overhead in terms of a steep learning curve.
If the question templates are used in their standard form, only basic IT skills are required to produce an assessment, however some Authorware proficiency is necessary to tailor the templates to local requirements.

Those evaluators who climbed the learning curve especially liked:

- the wide variety of question styles
- its readily customized and flexible nature
- the variety of feedback options
- question styles that are suitable for honours-level students
- the ease of handling questions requiring complex graphics.

Implementation outcomes

Whilst the uptake of TRIADS was successful in many evaluation sites there were a number of significant barriers encountered in others. Most of these are however applicable to the introduction of computer-based assessment in general rather than being associated with a particular delivery system.

The uptake of any computer-based assessment system demands a change in working practices and mindsets on the part of tutors. Many tutors outside the core group of evaluators found it difficult to move sufficiently beyond the multiple-choice mindset to make effective use of the full spectrum of question styles available. Others felt that they did not have time to get to grips with designing computer-based assessments while they were still marking traditional assessments even though they could see the advantages of time saving and quality enhancement in the longer term. Clearly these are staff development issues that are not specific to TRIADS.

University networks are now quite complex and mananged by teams of specialist computer scientists who sometimes erect barriers to new initiatives instigated by non-specialist academics. Many academic tutors felt that the whole process of getting software installed onto university networks was difficult and a substantial barrier to implementation. A reasonable degree of computer literacy is required on the part of the academic tutor to fully realize the benefits of the system together with good communications between themselves and their computing services departments.

However, many of the original evaluators currently use and are enthusiastic about TRIADS as exemplified by the seven papers or short contributions describing examples of its application that are included in these proceedings.

Developments in Response to the Outcomes

The principal attributes required of a computer-based assessment system are that it can:

- deliver summative assessment in a reliable and secure manner
- deliver informative and detailed feedback to the candidate
- provide informative feedback on student performance to the tutor
- provide the widest possible range of question styles so that assessment design is not compromised by the limitations of the system
- provide a wide variety of question selection and sequencing options to facilitate deployment of assessments in a wide variety of delivery environments and modes of operation.

- have the ability to deliver assessments on stand-alone machines, over local area networks and across intranets and the internet via a web browser
- provide sufficient data about questions to allow reliable item analysis to feedback into quality improvements in subsequent runs
- provide an assessment development interface that facilitates the rapid and easy production of computer-based assessments with all the characteristics listed above.

The intensive evaluations in a wide range of departments by a wide range of staff using a wide range of networks has allowed us to implement changes in the original version of TRIADS to satisfy most of the requirements listed above.

Technical developments that have been included over the past two years to enhance functionality include:

- full web functionality with ftp and php retrieval of results
- email backup of results and evaluations to tutors and optionally to candidates as feedback
- copy/paste functionality between text entry questions and external applications
- a variety of randomisation options for selection of questions including:
  - global randomization of sequence of all questions
  - global random selection of questions from a bank
  - universal presentation of key or benchmark questions within a random selection
  - randomized selection and delivery of and from groups of questions
- customisable I/O areas where assessment designers may place their own Authoware code sequences that are optionally accessed by the engine on startup, after sign-on, after each question and before shut down
- ability to change font size on in-built question styles
- new extended matching item and tutor-marked, free-text entry templates
- upgraded templates for many question styles with online help to enhance ease of production
- self-formatting screen resolution modes up to 1024x768 for engine and built-in question styles
- enhanced backup and failsafe continuous results data recording after each question.

together with a whole host of minor enhancements.

Additionally the system is currently being checked to ensure that the functionality fully meets the technical recommendations for delivery systems contained within the new British Standard BS7988 Code of practice for the

use of information technology (IT) for the delivery of assessments (IST/43 British Standards Institute,2002).

QuickTri - Addressing a Barrier to Uptake

Most of these enhancements have addressed the first seven of the attributes required of a computer-based assessment system listed at the start of the previous section. However, they do not really address one of the most significant outcomes of the TRIADS evaluation and that is the problem of ease of assessment production by the ordinary academic on an occasional basis.

One of the key barriers to the wider uptake of the system was the steep learning curve required to produce simple assessments. This, to some extent, is the function of a highly flexible system that has grown in an environment that supports the central production of computer-based assessments on a university-wide scale. Such environments mean that a full-time team of assessment programmers can be employed who rapidly develop a familiarity with the system that is not available to the ordinary academic who wishes to use it on an occasional basis.

To overcome this problem we have developed a version of TRIADS with an easy-to-use interface that promotes more rapid production of assessments on an occasional basis by the ordinary academic tutor. Because of the limitations of the interface, the range of question styles is initially more restricted than in the 'professional' version of TRIADS however it does NOT require the tutor to be familiar with the Authorware programming environment.

Currently QuickTri facilitates the rapid production of Multiple-choice and text-entry 'fill the gap' (Cloze) type questions but additional question styles are in development and will be incorporated shortly. Components of questions and tests are accessed via a standard Windows style header menu. The user interface allows the production and pre-testing of individual questions and their incorporation into and assessment together with startup title screen, results display and filing. An 'export' menu function facilitates the automatic transfer of all files necessary for the assessment to the runtime delivery folder on a network together with a runtime engine. The runtime engine has the full functionality of the TRIADS Professional engine and will deliver any assessment in the runtime folder. If more than one assessment is available in the folder it will present an assessment menu to the candidate.

The QuickTri system has recently been demonstrated to academic staff at the University of Birmingham and received a very favorable response. Tutors were able to compile their own assessments with little difficulty after the demonstration.

This success has encouraged us to develop the QuickTri system further in the coming months to include a much wider variety of question styles together with web compatibility.

TRIADS Professional – Future Developments

The full Authorware-based 'TRIADS Professional' version will be further enhanced with the provision of question review functionality for paged delivery modes, enhanced data retrieval and database connectivity.

Despite the fact that the current QTI specification covers only a small proportion of TRIADS functionality, both TRIADS and QuickTri will be developed to include import/export functionality for questions saved in QTI format.

Although QuickTri will be developed further it may never be quite as customizable as the full TRIADS Professional version that can access the increasingly open power of Authorware supported by Flash (Macromedia™) and additional software development kits for programming languages such as Delphi (Borland™). One of the powerful properties of TRIADS Professional is that it can easily incorporate courseware type tutorial, training and feedback materials at the same time as managing the delivery, scoring and recording of formative assessment data embedded in the courseware.

Conclusions

The evaluation of TRIADS during the HEFCE-FDTL project has provided an invaluable test-bed for the TRIADSystem in a wide range of environments.
It has also provided an insight into the barriers that existed to the then (1996-9) comparatively new idea of large-scale computer-based assessment in higher education. Unfortunately, many of those barriers still exist and it may require a substantial staff development push and re-organization of academic and support staff roles in order to realize the potential of computer-based assessment on a wider scale. Furthermore, whilst the functionality of assessment systems is limited to a relatively few, simple question styles then there will be skepticism amongst many academics that computer-based assessments are a valid form of testing in higher education. TRIADS developments aim to counter these arguments by continuation of research into the performance of some of the more advanced question styles that TRIADS can deliver and by continually enhancing the functionality and usability of the system.

Acknowledgements

The contribution that the Evaluation Partners in the Assessment of Learning Outcomes Project have made to the development of the TRIADSystem is gratefully acknowledged.

References

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