

# Computer Based Quizzes to Test Understanding of Videos on Building Construction and the BEATL Project

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## Keywords

Formative Assessment, CAL, Video, BEATL, Embedment

## Introduction

BEATL (Built Environment Appropriate Technology for Learning) is a research project based on a process of module pairing and collaboration between Built Environment Faculties. [9] It is more about how one can embed technology in pedagogically sound ways than about the technology itself. This paper describes a case study of innovative self-paced diagnostic on-line illustrated Quizzes introduced at the University of the West of England (UWE) last year and now partnered by the University of Westminster (WU). It focuses on the development of the innovation, embedding it in teaching at UWE, its transfer to WU, and the support of 'Educational Technology Officers' (ETO) in each. The methodologies used for evaluating the costs and benefits of this innovation are discussed.

## Self Paced Diagnostic On-line Assessments with Images

The UWE pilot focused on the introduction and use of self-paced on-line assessments used to reinforce the videos, book and worksheets also devel-

oped by Duncan Marshall at UWE. This first year module is intended to impart an understanding of the issues, constraints and opportunities of building construction to fields that are related to but not directly engaged in the construction process, such as Housing Management, Real Estate or Planning. It has been used in the first year of four awards at UWE for over five years, as a mix of weekly lectures and self paced material deployed in tutorials, and also for independent learning. It is based upon modern domestic construction, comprising approximately 45% of overall new construction in the UK and a major focus for maintenance. It also introduces some of the common building defects that occur through poor design and poor site practice. The self paced material is based upon: a book; twelve related Videos that each address a discrete stage of House Construction from clearance and excavation to roofing; and sets of worksheets based upon the same stages. These packs are sold and used widely in the UK. The worksheets contain sets of questions. The early questions are mainly factual, and in some cases are in true/false choice format. The later questions are more discursive and in many cases there will not be a definitive answer.

The Quiz reinforces and extends these questions

and provides immediate answers to the students at any time. The format is that of associated multi-choice on-line questionnaires with explanatory text illustrated by images, approximately 50% taken from the Videos or the Book and 50% not used elsewhere, and so new to the students. It is intended that these be initially used for student self-assessment, although further developments in security and addition of the more discursive and demanding questions in the worksheets may assist formative assessment.

The Quizzes were introduced to the students in a brief lecture during which they were explained and students invited to participate in their own time,

but less than half the students subsequently undertook the assessment. It was then decided to book a PC Lab during a scheduled lecture period for following assessments, which all who attended undertook.

## On-Line Quiz based Self Assessment

Recent changes in student numbers and reduced resources make traditional approaches to teaching more difficult. For example:

- Increasing Class Sizes have reduced time available to support individual students;

**Image or Video Clip**

**Score**

**Multi-choice**

**Expanded Answer**

**The Java Based QUIZ stand-alone Applet version**

- Less time available to mark worksheets and provide timely feedback;
- Attendance can be poor (many students now give priority to part-time jobs);
- Worksheets are paper based and easily copied from one student to another.

The videos, book and worksheets are already used by students at times and places that suit them. However use of these materials without support offered by staff during tutorial and lecture sessions puts students at risk of assuming deep understanding without confirmatory feedback. Videos reinforce visual images with sound and action but may be approached superficially. The Quizzes are intended to provide self-paced feedback to:

- Improve understanding of the videos;
- Enhance the alternatives of books, worksheets, video and lectures;
- Develop towards open and distance learning;
- Enable summative and formative assessment at times and places to suit students;
- Immediately respond to the student on completion of each set of questions;
- Encourage students to correct their own mistakes;
- Permit repeated attempts at questions;
- Monitor student performance.

There have been two modes of implementation of these assessments: The first made use of the BEATL-Q program developed at UWE which is similar to Questionmark, and collates results to a server. The second makes use of the QUIZ program, also developed at UWE, which is a standalone Java applet. Decisions about which Program to use are based on judgements about the user interface, the freedom of form with which the reply needs to be expressed, and the range of multi-choice, multi-response, numeric, text match and other formats required.

## Evaluation to date

Evaluation by ETO's has taken place both through BEATL and also CAL-Visual, another TLTP phase III project.[1] [2] A mixture of base-line and post Quiz questionnaires posing standard questions with small focus group discussion with students has taken place following each of several Quizzes at UWE. The TILT programme administered by the Robert Clark Centre for Technological Evaluation at the University of Glasgow has in turn appraised the CAL-Visual standardised evaluations as case studies.[3]

The students sat in pairs to use each Quiz during the lectures and also have begun to use them independently in preparation for examination. Dialogue between pairs of students has emerged as an important element. Student reactions have been highly positive. Videos per se and the Quizzes were found useful to highly useful compared to other resources by over 90% of students. Less than a third would prefer not to use a computer for this purpose. All students agreed or strongly agreed that images made clear what they were supposed to be learning, and some further commented that they were a good aid to learning, jogged memory, and related very well to the video series and the textbook. The suggested changes were to: make them more adaptive to student progress; embed video clips rather than static images; provide more targeted feedback suggesting further areas of study; and enable them to be used on CD or DVD at home.

## Transfer to Westminster

A twenty page illustrated document was prepared by the UWE ETO, and sent with software and sample material to WU. This included:

- An overview explaining the rationale behind the self-paced on-line assessments, with a summary of the aims, objectives and mode of use;
- A description of how the assessments were implemented, describing the problems encountered and how they were to be overcome, with ideas for further development;
- A checklist of the decisions to be made before use;
- A summary and reflection on the evaluation undertaken at UWE, and samples of the forms used.
- And a diary of events.

In practice the Module Leader at WU formulated questions but delegated input to their ETO. They wished particularly to collate results onto the server and monitor student use using Beatl-Q. Major institutional barriers and technical issues with regard to the installation of appropriate CGI modules on the server and a lack of support staff time at WU meant that an ETO went for a day from UWE to resolve these problems. The tests have now been implemented at WU but evaluation is incomplete to date.

## Conclusion

The problems experienced indicate that successful transfer itself requires major resources to create and test either a step by step learning pack and/or a basis for on-line and on-site support. Due to the

Beatl inter-faculty agreement, resident ETOs and funding the latter was possible when the transfer report in itself proved insufficient. Videos and the Quizzes themselves are highly successful with students, although there is a balance to be struck between staff time in preparation and demands for more feedback.

## Notes

- o A Roberts, J Counsell 1999 "**The BEATL Project: embedding appropriate CAL in the teaching of Architecture**"; in proceedings of ECAADE17, Architectural Computing from Turing to 2000, University of Liverpool, UK; published by eCAADe and the University of Liverpool; pp 334-340.
- 1 TLTP - Teaching and Learning Programmes Phase 3 - <http://www.ncteam.ac.uk/tltp.html>
- 2 CAL-Visual - <http://fli-nt.lboro.ac.uk/calvislimited/index.htm>
- 3 TILT - Teaching with Independent Learning Technologies - <http://www.elec.gla.ac.uk/TILT/TILT.html> administered by RCCTE <http://www.elec.gla.ac.uk/BTECHED/RCCTE/index.html>

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