Intelligent Assessment
TECHNOLOGIES

E-Assessment of Extended Answer and Essay Questions

A White Paper

'Traditional' Summative Assessment

Few paper-based summative examinations are composed of atomic, closed form assessment units, such as Multiple Choice Questions (MCQ). Rather, they typically consist of questions requiring short answer, extended answer, and essay type answers. Educators dread the marking burden such examinations impose, but they are firmly wedded to the perceived advantages of the assessment instrument in measuring a student's understanding, rather than their ability to retain data. But even for these discursive examinations, there are important drivers to move away from paper based tests and towards on-screen assessment.

Not the least of these relates to the quality and relevance of the assessment experience for students when generating extended response or essay answers without recourse to that now ubiquitous tool, a word processor. The increasingly anachronistic constraints imposed by hand written examinations (no cut-and-paste, no formatting, no spell check, etc) bring into question the very fitness for purpose of a script based examination process for an increasingly digital cohort.

Reducing or removing the more undesirable aspects of subjective marking is another driver. Blind marking, easily implementable in an electronic system, is eminently desirable, as is removing the (possibly subconscious) influence on marking of poor (and often illegible) handwriting and, increasingly, poor spelling and grammar.

The Assessment Model

Common assumptions for the traditional UK examination model are as follows.

- Examinations will generally consist of essay / extended response / short answer questions (and possibly a mixture of all three);
- Some questions will require drawings and calculations to be assessed as part of the process;
- Examinations will require detailed human marking, often involving multiple markers.

User Requirements for an eAssessment System

To successfully e-enable the traditional assessment model, the following user requirements can be identified:

- The eAssessment system should :
  - Present an intuitive and, where possible, familiar interface to students when entering extended answers / essays;

- Be both reliable and scalable – lots of students writing long essays places a potentially heavy load on an eAssessment system;
- Support secure, distributed, on-screen marking by multiple markers;
- Support secure "offline" marking such that markers can download data to laptops for marking "as and when", and support the subsequent synchronisation of data on upload;

Case Study – The ExamOnline eAssessment System

The screenshot below illustrates the ExamOnline system developed by Intelligent Assessment Technologies, and in use at the University of Birmingham since 2007. Students with various degrees of IT competence readily take to the simple word processor interface.
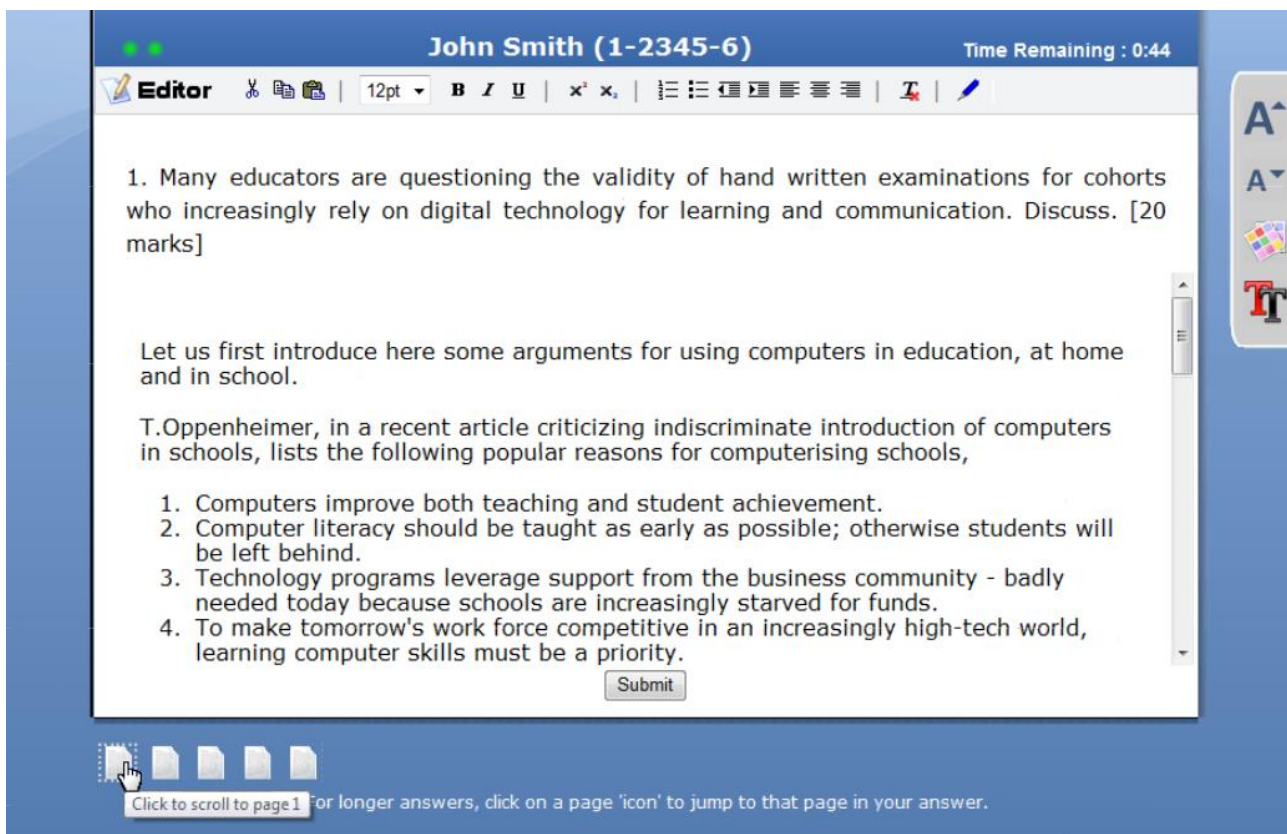

Figure 1: Students use a secure web-based word processor interface to answer each extended answer or essay question.

The ExamOnline system is designed to go beyond the capabilities of standard Computer Assisted Assessment (CAA) systems in supporting essay and extended answer questions. The key features thus include:

- Copy/cut-and-paste, and simple formatting;

- Word count;
- An "autosave" functionality, taking a back up of student responses every 10 seconds or so.

In addition, the interface has been designed to use asynchronous communication with the server. Thus it can cope with network and/or server outages, re-synchronising as and when the network comes back on-line.
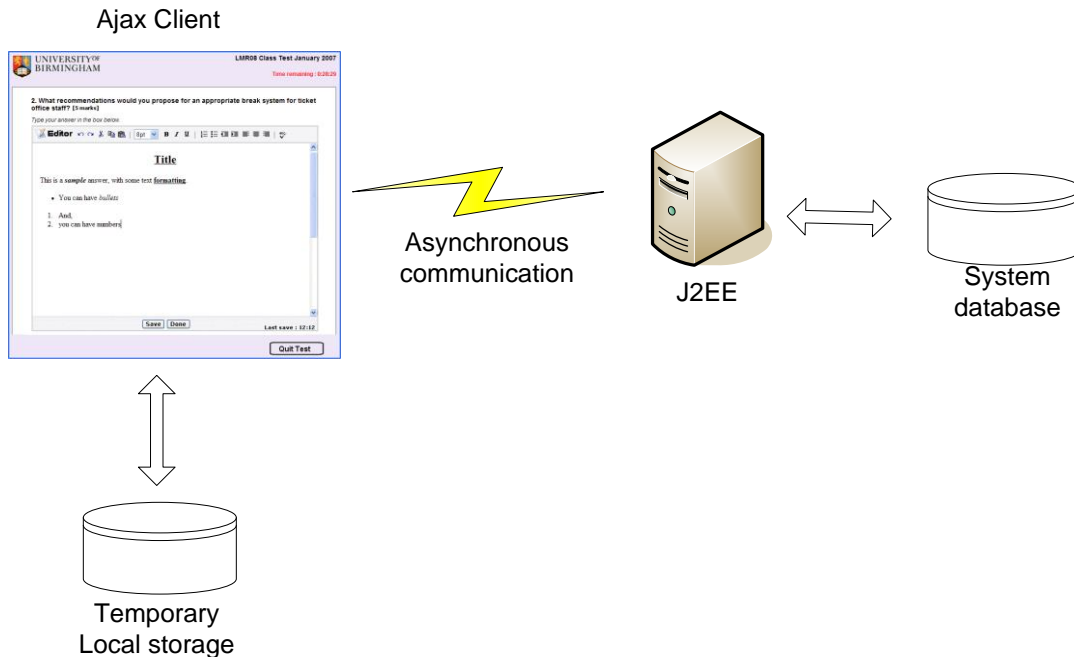

Figure 2: An Ajax client delivers the test to the student. This supports asynchronous communication with a J2EE server, as well as local storage, providing robustness when network and / or server are unavailable.

On-Screen Marking of Examinations

The designers of ExamOnline had in mind some key objectives when designing the marking interface:

- Make on-screen marking as simple and efficient as possible;
- Support existing marking practices (i.e., multiple markers);
- Support blind marking.

When markers log into ExamOnline, they are presented with a list of questions / papers to be marked. Clicking on a question brings them to the main marking interface that is shown in Figure 3.
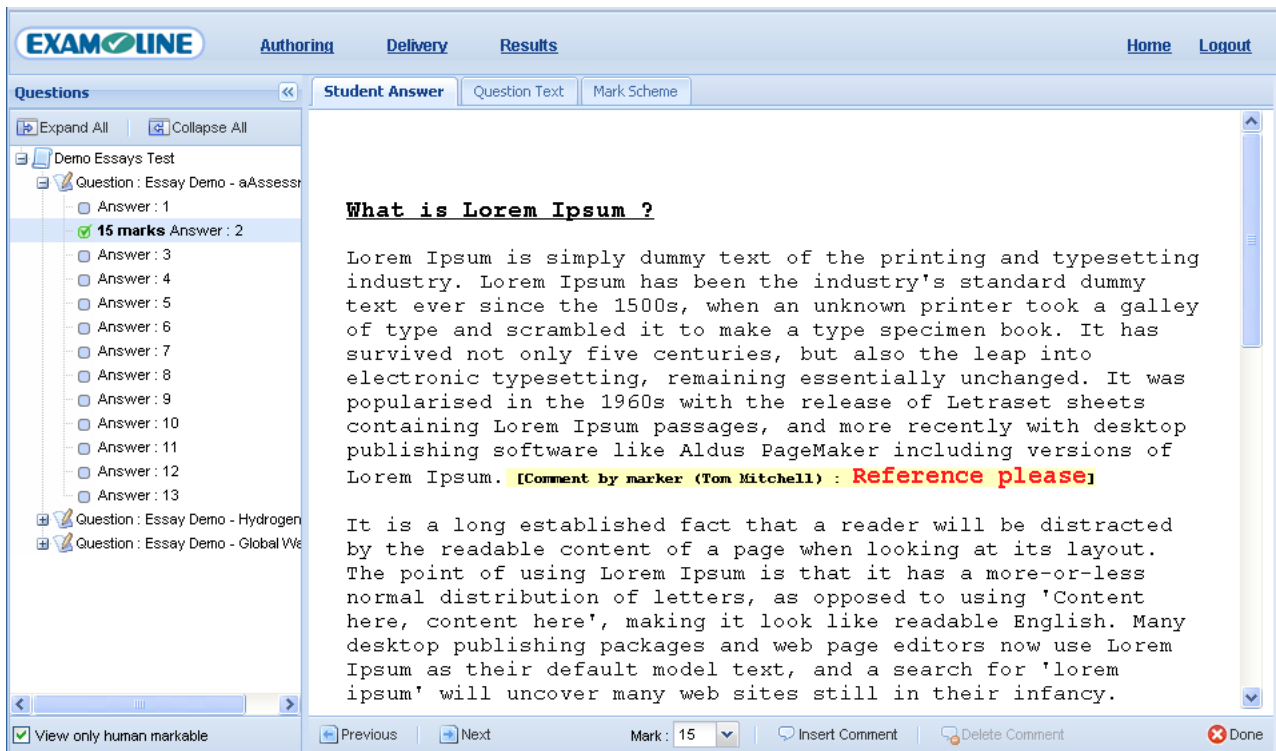
Figure 3: The markers' interface supports rapid blind marking, and also allows for the insertion of comments / feedback into student responses.

The interface has been designed to enable marking with the minimum number of mouse movements and/or keyboard input. For short or extended response questions, using the keyboard provides extremely efficient processing of responses, with no mouse usage required at all. Birmingham estimate that marking is between two and three times quicker than would be the case for manual marking of scripts and of course blind marking is supported.

Conclusions

Essays and extended answer questions provide unique challenges for eAssessment, and are best delivered using software which has been specifically designed for the task. Typically the software should support existing examination processes, but provide a better and more relevant examination experience for an increasingly digital cohort, and support efficient blind marking. It must also be able to cope with the unique characteristics of eAssessment - large amounts of textual data - ensuring reliability, robustness and scalability.

About Intelligent Assessment Technologies

Intelligent Assessment Technologies (IAT) provide innovative computerised assessment technology and e-assessment consultancy to educational and commercial markets. IAT has pioneered computerised assessment of free-text in the UK, and this is incorporated into their ExamOnline eAssessment platform. IAT's technology has won DTI SMART and SPUR awards for technology.

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