UQ e-Exam Trial Preliminary Findings

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Get the demo and user guides
http://transformingexams.com

Acknowledgement
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Targeting...

• Supervised
• High stakes
• On campus
• Large scale

(image credit: Dr Fluck UTAS)

What we are not specifically addressing here is off campus, online only, distance education, cross institutional students – there are some existing e-solutions to address these needs.
Rationale


Concerns, drivers, solutions for e-Exams (a 'wicked' problem!)
Essentially...
We are faced with a growing disconnect between the way high stakes testing is conducted using pen on paper exams and students’ everyday experiences.
# e-Exam System

<table>
<thead>
<tr>
<th>Pertinent Features</th>
<th>Affordances</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 'Whole computer' environment (OS, LMS, applications...) on a stick.</td>
<td>Vastly expanded pedagogical scope over that of a browser window.</td>
</tr>
<tr>
<td>Typed student responses via Word processor, constructed via apps (human marked) or on-board learning management system quiz (computer marked).</td>
<td>Caters for introduction to advanced uses. Components added/removed to suit. Electronic collection facilitates analytics, item response analysis...</td>
</tr>
<tr>
<td>No live network required during exam, even for LMS questions.</td>
<td>Robust. Greater control. (network could be used for admin)</td>
</tr>
<tr>
<td>Student owned equipment used as host and left untouched.</td>
<td>An ethical approach to scalability (no invasive software to install)</td>
</tr>
<tr>
<td>Modular, open source code base and commodity 'off the shelf' components.</td>
<td>Leveraging popular and sustainable projects for better efficiency. Fully 'known' (no 'blackbox'). Available!</td>
</tr>
<tr>
<td>One version works on most Intel based laptops - Apple, 'windows', Linux, that have a USB port.</td>
<td>One software version can serve all. Streamlines development and maintenance.</td>
</tr>
</tbody>
</table>

Bootable ‘live’ USB drive
First ‘toe-in-the-water’ trials at UQ

Paper 'equivalent' exams – computer optional.
Mid term exams ~ 15% of grade.
Question types used: essay, short answer, limited MCQs (type x in a box), label a diagram/image (fill in a table; basic drawing features were available but not used). All manual marking.
The Current Process – how it works

Prep

Exam Room

Post Exam

(credit: Dr Fluck UTAS)
Modular architecture so academics / institutions can choose the features and mode of operation that suit them... For UQ trials we kept to the basic features!

Base system prep by IT personnel (me!)

Exam script prep by academic

Admin prep/ retrieval by exams office (me!)

Bootable USB stick

OS + Browser + Writer

LMS + other tools

Database for quiz (only via web interface) or Exam Script (read only)

Responses - doc files (student editable)

Server or hub to collate student responses

Student Owned Device

HDD, network interfaces (IP stack, Bluetooth, infrared etc) excluded or restricted

Interface components used by student: Keyboard, Screen, Mouse / touchpad...

Assessment / Marking (auto or manual)

Student: boot laptop with USB.

Use software (Writer) to view questions and type answers.

Current OLT project adds these features to v5 (not used in UQ trial):
• On-board LMS for computer marked question types (Moodle) [demo available]
• Improved answer reticulation/workflows [TBA – in progress]
Current e-Exam System v5 Demo

Four-in-one demo (desktop shown below)...

For real exams... Choice of modes via '.config' file. An 'e-Exam Starter' dialog for specific modes. Irrelevant buttons are hidden. A unique background image used for each exam for added security.
e-Exam System v5 (UQ Trial)

Real midterm exams - Paper 'equivalent' via word processor.
UQ Semester 1 trials ~ Students had a choice of pen or keyboard.

To start an e-Exam:
1. Student boot with USB
2. Students type ID, name & click 'Start Exam' button
3. Student can now start typing

Note: Automated background processes...
The system copies Question file and renames it with the supplied ID.
File is opened ready for the student to start
(cover page info to be automated soon too!)
Responding to questions in-line in the word processor (note – the system keeps a read-only backup of the questions!)

Type where indicated....

Simple drawing tools...

Label a diagram...

Fill in table rows...

Or type ‘x’ for MCQs
Opinions about the e-Exam System
(Five point scale where 5 = Strongly agree, 1 = strongly disagree)

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>I felt the e-exam system was easy to use</td>
<td>4.5</td>
<td>54</td>
</tr>
<tr>
<td>I felt the e-exam system was reliable against technical failures</td>
<td>4.2</td>
<td>54</td>
</tr>
<tr>
<td>I felt the e-exam system was secure against cheating</td>
<td>4.3</td>
<td>54</td>
</tr>
<tr>
<td>I liked the fact I could use my own computer</td>
<td>4.4</td>
<td>47*</td>
</tr>
<tr>
<td>I would recommend the e-exam system to others</td>
<td>4.3</td>
<td>52</td>
</tr>
</tbody>
</table>

*Several students used a borrowed university owned laptop.

Suitability of the exam by cohort

<table>
<thead>
<tr>
<th>'This exam suited computers' – by cohort</th>
<th>Rating</th>
<th>N</th>
<th>Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Veterinary technology: 90 min theory, mostly short answer</td>
<td>4.6</td>
<td>11</td>
<td>89</td>
</tr>
<tr>
<td>Criminology: 70 minutes. Single long essay response section (and a Multiple choice section done pen on OMR sheet)</td>
<td>4.4</td>
<td>17</td>
<td>67</td>
</tr>
<tr>
<td>Physiotherapy: 15 min theory before OSCE</td>
<td>4.2</td>
<td>25</td>
<td>113</td>
</tr>
<tr>
<td>Animal Biology: 45 min mixed short answer and MCQ (type 'x')</td>
<td>TBA</td>
<td>6</td>
<td>115*</td>
</tr>
</tbody>
</table>

Rating given of five point scale by N = number of typers. Cohort = number of returned surveys (typers and handwriters). *Estimated based on course enrolment (cohort data still being processed).
What are your main concerns at this time regarding the use for computers for exams?

Self reported via post-exam survey - Open text response item.

Criminology cohort. Both typers (17) and handwriters (50) responded...

- Technical failure and battery (commonly expressed by those who handwrote but not as much by those that typed) and the subsequent stress this causes.
- Behavior of software e.g. scrolling, touchpad sensitivity, different ‘short cut’ keys, presentation of questions (only expressed by those that typed)
- Speed (slow at typing but also typers commented they felt faster, less time stressed).
- Flow of production (thinking easier when hand-writing, working with text easier when typed, felt ‘natural’ – aligned with mode chosen).

Preference for handwriting was expressed by many that chose this mode with some justification but also just because “I am used to it”.

- Less common comments
  - Equipment availability
  - Sound of typing distracting (handwriters)
  - Cheating prevention
  - Handwriting is less hassle to organise than a laptop.
**Preliminary Trial Findings**

**Issue log:** 9 people of the 53 who typed reported ‘technical issues’ via the post-exam survey. Notes below supplemented by observation.

<table>
<thead>
<tr>
<th>Issue</th>
<th>N</th>
<th>Notes, Additional Observations, Suggested Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot up/start up</td>
<td>2</td>
<td>In reality most participants needed assistance/forgot boot key. <em>Familiarity: need to practice!</em></td>
</tr>
<tr>
<td>Entering my details</td>
<td>0</td>
<td>All good.</td>
</tr>
<tr>
<td>Using the software</td>
<td>0</td>
<td>Some did not know how 'exit' gracefully (i.e. File save, file exit, shutdown). <em>Need to practice! Investigate an 'I’m finished' script/button.</em></td>
</tr>
<tr>
<td>Battery</td>
<td>0</td>
<td>Most plugged in. <em>Power needs to be available.</em></td>
</tr>
<tr>
<td>Saving files</td>
<td>0</td>
<td>All good.</td>
</tr>
<tr>
<td>Software crashed/computer froze</td>
<td>1*</td>
<td>2 mins into a 15 min exam. Continued on paper and given 2 mins extra time. Old 2009 white Macbook. <em>Better pre-exam testing should catch. Persistent logging to be implemented. Currently has 'recovery' autosave, a 'full' autosave to be investigated too.</em> <em>Recorded via observation.</em></td>
</tr>
<tr>
<td>Touchpad/mouse</td>
<td>5</td>
<td>Sensitivity reported by participants. <em>Some adjustments were made.</em> <em>USB mice recommended. Investigate drivers.</em></td>
</tr>
</tbody>
</table>
Where to next ... e-Exam System v5

Post-paper exams via word processor.... (used at UTAS)
Include links to on-board media, PDFs and software tools.
Can Include Software Tools

Simulations, tools, virtual experiments, serious games...
Business, history, language/communication, science labs...


Including 'Windows' software; CAD / 3D modeling, Celestia etc

Ref: Dr Fluck, UTAS
Computer marked question types via on-board LMS (new to v5) with Integrated multimedia – high def video is possible!

Trial TBA!
Current e-Exam v5 Demo

Computer marked question types via institutional LMS

Needs network. Restricted connection – e.g. demo can *only* connect to UQ Blackboard (IP address) and no other server. New to v5.
Computer marked question types (Moodle)

**Standard [already in the demo]:**
- Calculated (Wildcards and datasets, calculated MCQ)
- Matching
- Embedded Answers (Cloze Test / Gap Fill – text with multiple choice, short answers and numerical answers)
- Short Answer (sentences)
- Numerical
- True/False
- [Short essay - with response template - human marked]

**Custom types:**
- Algebra, Multinumerical, Spreadsheet,
- Chemistry Molecular editor questions,
- Music (key signature, scales, intervals)
- Hot spots, drag and drop (labels, text, images),
- Set splitting,
- Missing words, Gapfill,
- Regular expression...

**Marking:** delayed, Certainty-Based Marking... manual override.
Proposal for offline e-exam use (Virtual OSCE, practicals etc). Tech is already working online.

Set up Quiz in the LMS. Results are stored in the in grade book.

A set of scripts for Moodle and VW that acts as a bridge.

Student undertakes assessment in the virtual world.

Data flows as if the student was doing the activity in the LMS.

Online (Second Life) examples see http://www.transformingassessment.com/secondlife.php
More information....
Demo set-up Guide,
Student Practice and User Guide
http://transformingexams.com/guides.html

Demo videos start-up, use and recovery examples.
'Wintel' (Dell) http://bit.ly/eexam-demo-vid-d
Questions?

Download the demo ISO from
http://transformingexams.com

m.hillier[at]uq.edu.au

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