Transforming Exams: Results from the 2014 BYOD e-Exam Trials at University of Queensland
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Get the demo and user guides
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Rationale: About e-Exams

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.
Why e-Exams?

Rationale


Concerns, drivers, solutions for e-Exams (a 'wicked' problem!) – a clear need to take a whole of system approach – not just software!

bit.ly/eexam-map
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 Affordances

<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>
Current e-Exam System v5 Demo

Four-in-one demo system (desktop shown below)...
1. Word document based exams (paper equivalent / intro use S1 & S2 2014)
2. Word doc + multimedia + 3rd party software tools (more trials soon...)
3. LMS (Moodle) based exams (computer marked questions - TBA)
4. Remote (serves as a restricted gateway) to networked LMS.
UQ 2014 Trial: Paper equivalent exams

First stage: Paper 'equivalent' via on-board word processor. 
*This was used for Semester 1 and 2 2014 Trials.*

**To start an e-Exam:**

1. Student boots laptop 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 could be automated too)
Note – the system keeps a read-only backup of the questions!
UQ 2014 Trial: Paper equivalent exams

UQ trials, Semester 1 and 2 2014: The aim was to explore the idea of BYOD e-exams, logistics, student impressions. Worth ~15%

- Paper 'equivalent' exams, computer optional, students choose pen or keyboard.
- Question types used: essay, short answer, limited MCQs (type 'x' in a box), matching, build table, label a diagram/image (fill table). Basic drawing features were available but not used by students. Student responses in blue text.
- All manual marking – but at least it was typed text!

---

Question 1: Those who are at risk of contracting the EOTOLA and should seek medical advice if displaying symptoms. Which of the following statements is true?

Tick or type an 'x' into the box to indicate your response.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>Rhoncus dolor arcu, cu mattis dolor vestibulum ac.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>Maecenas rhoncus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Dolor arcu, eu mattis dolor vestibulum ac.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Maecenas rhoncus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Both (c) and (d)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[1 mark]

Question 7: Some rationales for punishment are XEZRAR-oriented and some are PEDLAR-oriented. What does this mean?

Please write / type your response inside the box below.

The student types their answer here. In this example the question and response area are placed in a two row table. The response table row is created with a single carriage return inside. The row or cell has a minimum height set (by dragging the bottom border). By using a single carriage return and a minimum height cell instead of successive carriage returns to set the box height, the next question will be less likely to be disrupted when students type their responses. The initial size of the box should indicate the desired length of the response. The box will automatically expand when it gets full.

[3 marks]
UQ 2014 Trial: Paper equivalent exams

More question types used:
- matching, construct a table, label a diagram/image (by filling a table). Manual marking.

Question 2. Match the following host-MOTA relations below).

Possible descriptions:
- Mauris id mi id orci interdum semper.
- Sed eu neque ut est dignissim fringilla.
- Vivamus in dolor euismod, luctus libero vel, ph.
- Mauris vehicula eros a viverra pellentesque.
- Curabitur eu mi at nibh commodo varius non.
- Aenean eget orci porta, malesuada lorem sit.

Please write or type the letter of the descriptions listed.

<table>
<thead>
<tr>
<th>Answer a to f.</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>I. Paxogen</td>
</tr>
<tr>
<td>a</td>
<td>II. Sitabosis</td>
</tr>
<tr>
<td>c</td>
<td>III. Fakeasalism</td>
</tr>
<tr>
<td>e</td>
<td>IV. Wrongagelesis</td>
</tr>
</tbody>
</table>

Question 3.
Samuel is 5 years old and attends racing cars 5 days per week. Ramon is 10 years old and rides a superbike around the same track. It is not a selected response item so some text will be expected.
In the table below, give two (2) examples of flippant fakadism relevant to his age range (4-6 years), and describe how Samuel and Ramon differ in their abilities to perform fakadism.

<table>
<thead>
<tr>
<th>Two different examples of flippant fakadism (one per row)</th>
<th>Describe Samuel’s abilities (age 5)</th>
<th>Describe Ramon’s abilities (age 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type here</td>
<td>Minimum heights set for both rows</td>
<td>More details about setting heights appear later in these examples.</td>
</tr>
</tbody>
</table>

Question 5: For the following diagram please provide the names for THE XING in the table below.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>

A | Label goes here. Constructed response question. |
B | Blue text makes it easier to see which questions have been answered and which have not! |
C | Use minimum row heights to provide plenty of space, but don’t use double carriage returns! |
D | Doing so means the layout is less likely to be disrupted. |
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

Note: Drawing tool was available but not used.
e-Exam System Processes

Process overview: set-up, use and assessment.

**Set-up: prepare exam learning materials**
- Create master USB (tested)
- USBs duplicated per student

**Academic creates exam learning material**

**Exam room: use**
1. Students enter room.
2. Given USB.
4. Do exam.
5. Return USB.

**Post lesson: retrieve responses and assessment**
- Responses retrieved from USBs.
- Collated responses sent to academic.
- Academic manual or e-marking

(Based on the e-Exam System by Hillier & Fluck 2013)
Modular architecture so academics / institutions can choose the features and mode of operation that suit them... **For 2014 UQ trials we kept to the basic features!**

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]
UQ e-Exam Trial Outcomes 2014

Data collected from students (updated October 2014)

• Via pre-exam project online survey: See Hillier & Tran 2014.
  – UQ students surveyed about their preconceptions about e-exams.

• Via pre-exam short survey (not shown here).
  – Conducted at the pre-exam practice setup sessions.
  – Covered: technical compatibility, hardware spec lists, student preliminary impressions.

• Via post-exam extended survey (main results follow)
  – Conducted at the conclusion of the exam (in the room).
  – Covered: student exam experience, reaction to exam session conditions, e-exam system impressions, exam writing strategies and production, general non-exam writing strategies.

• Future analysis – production (words, language density, marks).
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Typed</th>
<th>Handwrote</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANIM</td>
<td>Animal Biology: 45 min mixed short answer and MCQ (type 'x')</td>
<td>5</td>
<td>109</td>
</tr>
<tr>
<td>BIOL</td>
<td>Zoology (BIOL): 50 min short answer (Multiple choice section done pen on OMR sheet)</td>
<td>10</td>
<td>81</td>
</tr>
<tr>
<td>CRIM</td>
<td>Criminology: 70 minutes. Single long essay response section (and a Multiple choice section done pen on OMR sheet)</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>OCTY</td>
<td>Occupational Therapy: 100 min mixed short answer and MCQ (type 'x')</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>PHTY</td>
<td>Physiotherapy: 15 min (watch video and write) before OSCE</td>
<td>25</td>
<td>108</td>
</tr>
<tr>
<td>VETS</td>
<td>Veterinary technology: 90 min theory, mostly short answer</td>
<td>11</td>
<td>78</td>
</tr>
</tbody>
</table>

It is important to note:
- First ‘toe in the water’ trials.
- Participation was optional.

Detailed case descriptions available:
http://transformingexams.com/uq_trials/UQ_e-exam_cases_s1_and_s2_2014.pdf
I felt the e-Exam system was easy to use
I felt the e-Exam system was reliable against technical failures
I felt the e-Exam system was secure against cheating
I liked the fact I could use my own computer
I would recommend the e-Exam system to others

Likert scale/rating: 1 = strongly disagree to 5 = strongly agree [N = 69]. Means shown.
Did typers think the exam suited the use of computers?

Those that typed the exam.
All six cohorts combined (ANIM, BIOL, CRIM, OCTY, PHTY & VETS).
Likert Scale: 5 = Strongly Agree,
1 = Strongly Disagree

Mean of 4.2 (value shown) N = 69.

Largely that was a ‘yes’.

Those that typed the exam by cohort:
Student reaction to exam conditions

**Typers (left) and Hand writers (right)**

Likert scale: 5 = strongly agree, 1 = strongly disagree. Means shown.

<table>
<thead>
<tr>
<th></th>
<th>Typers</th>
<th>Hand writers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall my experience of this exam was positive</td>
<td>4.04</td>
<td>3.76</td>
</tr>
<tr>
<td>I ran out of time</td>
<td>2.61</td>
<td>2.61</td>
</tr>
<tr>
<td>I felt more stressed in this exam than I normally do in other exams</td>
<td>2.56</td>
<td>2.69</td>
</tr>
<tr>
<td>I went back and read over my responses before submitting</td>
<td>3.48</td>
<td>3.49</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>U</th>
<th>Z</th>
<th>Sig. (2-tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall my experience of this exam was positive</td>
<td>13242.5</td>
<td>-2.132</td>
<td>0.033</td>
</tr>
<tr>
<td>I ran out of time</td>
<td>15203</td>
<td>-0.083</td>
<td>0.934</td>
</tr>
<tr>
<td>I felt more stressed in this exam than I normally do in other exams</td>
<td>14527.5</td>
<td>-0.751</td>
<td>0.452</td>
</tr>
<tr>
<td>I went back and read over my responses before submitting</td>
<td>15145.5</td>
<td>-0.394</td>
<td>0.694</td>
</tr>
</tbody>
</table>
Was the sound of typing distracting?
In each boxplot Typers (left) and Hand writers (right)

The two cohorts ANIM and BIOL were removed from the analysis because typers and hand writers sat in different rooms.

Those that could hear typing (who selected 5, 4 or 3) were included in the determination of distraction by typing sound.

Cohort exams were held in different venues.

Means 3.4 2.47
Both exhibited significant differences to >.01
Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree
Future intention to type
**Typers (left) and Hand writers (right)**


Two cohorts:
BIOL 10 typers, 75 handwrote
OCTY 3 typers, 24 handwrote

Mean shown for each.

For typers ‘yes’ (n = 13).
For handwriters ‘no’ (n = 99).

Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree
Are some students overestimating the neatness of their hand writing?!

Discomfort from using a pen increased with exam duration (below).

Sig at >.01!

* Note 20% response rate by VETS for this item. All others near 90%
Trial Technical Issues

**Issue log:** 15 of the 69 who typed reported ‘technical issues’ via the post-exam survey. 1 more was identified by observation. The majority were minor.

<table>
<thead>
<tr>
<th>Issue</th>
<th>N</th>
<th>Notes, Additional Observations, Suggested Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boot/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 ID</td>
<td>0</td>
<td>All good. (some students entered ‘s’ rather than 8 digit number but system copes fine).</td>
</tr>
<tr>
<td>Using the software</td>
<td>1</td>
<td>Some did not know how to '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>
</tbody>
</table>
| Saving files                               | 0 | All good. (noticed one student used ‘save as’ when save was ‘greyed out’)

| Software crashed/ computer froze            | 4 | 1 x Old 2009 white Macbook. Office suite quit to desktop. 3 x System drive ran out of space causing the system to crash.                                                                                                                             |

| Touchpad/ mouse                            | 7 | Sensitivity reported by participants. *Some adjustments were made.* *USB wired mice highly recommended! Investigate drivers.*                                                                                                                        |
| Scrolling                                  | 15| Two finger scrolling opposite to OSX, keyboard shortcuts. Small scroll bars. Sensitivity. *Familiarity: need to practice. Larger scroll bars. Investigate a user selectable option for touchpad/scroll behavior (and re-mapping of keyboard shortcuts).* |
Minor issues experienced during exams...

15 x Scrolling - relates to the ease/fluidity of moving up and down pages/screens. Two finger touchpad scrolling in the e-exam system was in the opposite direction to OSX but the same as in MS Windows. The size of the scroll bars may have also been an issue when targeting the cursor. (may also relate to the next item)

7 x Touchpad/mouse - the sensitivity/behaviour of the software drivers and hardware. The interaction of the touchpad on their laptop and the software may not have been smooth. This may have resulted in erratic cursor movement or overly sensitive movements. Mice were recommended/provided in semester 2 trials.

Keyboard mapping differences from OSX. E.g. short cuts such as ‘Command S’ becomes ‘Control S’ in Ubuntu.

Boot up/start up - relates to the initial boot process. * Many observed!
Issues mainly due to users forgetting the 'one time boot' key, or forgetting the key press combination on Apple laptops (i.e. holding down the power key rather then pressing and releasing it while holding down the ALT key to bring up the boot menu).

Technical boot issues were not experienced during exams. This is testament to the need to run pre-exam set-up/practice sessions.

These can be addressed though a combination of:
* use USB wired mice and/or user selectable/auto keyboard mapping upon boot.
* more pre-exam practice by students to familiarise with the software and processes,
* ensuring help/testing/set-up assistance is available to catch hardware incompatibilities before they get to the exam room (recommend mock exams too).
Major issues experienced during exams…

1 x Old 2009 white Macbook. Libre office application unexpectedly quit to desktop two mins into a 15 min exam. Continued on paper and given 2 mins extra time. *Better pre-exam testing should catch. Persistent logging to be implemented. Further work on 'recovery' autosave and a 'full' autosave is needed.* *Recorded via observation.*

3 x System drive ran out of space causing the system to crash. Behavior of auto save function identified as the cause due to recent changes. Impacted OCTY exam only. Students continued on paper. All student data was recovered following the exam. *Changes were rolled back for the next exam that had no further issues.* *To fix in the next round of updates. More extensive testing regime. A data recovery procedure/advisory has been written.*

Further development is needed to address these issues. Warnings remain in readme files available on public download sites.
Student reaction to exam conditions

**Typers (left) and Hand writers (right)**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Typers Mean</th>
<th>Hand writers Mean</th>
<th>Mann-Whitney U</th>
<th>Z</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I type faster than I handwrite</td>
<td>4.52</td>
<td>3.67</td>
<td>8213</td>
<td>-4.637</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>I type accurately</td>
<td>4.23</td>
<td>3.49</td>
<td>7551.5</td>
<td>-5.089</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>When I make errors, I am able to quickly correct them as part of typing</td>
<td>4.49</td>
<td>3.88</td>
<td>8523</td>
<td>-4.248</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>I often rely on spell check to detect errors</td>
<td>3.37</td>
<td>3.61</td>
<td>11097</td>
<td>-1.342</td>
<td>0.179</td>
</tr>
<tr>
<td>I work more efficiently when I type on a familiar keyboard</td>
<td>4.46</td>
<td>4.31</td>
<td>10917.5</td>
<td>-1.656</td>
<td>0.098</td>
</tr>
<tr>
<td>My handwriting is normally neat and legible</td>
<td>3.28</td>
<td>3.48</td>
<td>11621.5</td>
<td>-0.77</td>
<td>0.441</td>
</tr>
</tbody>
</table>
Student consideration of general exam conditions when using computer versus pen:
All six cohorts. Response pairs: those who typed (line 1) & those that hand-wrote* (line 2)

[Bar chart showing responses to various statements]

* Note - Many of those that hand-wrote their exam had no prior experience of using a computer for an exam so the results presented here are largely speculative on their part. However, it is reasonable to assume that they drew on their general use of computers.
### Writing strategies under non-exam conditions – general writing habits:
All six cohorts. Response pairs: Typers (line 1) and Hand writers (line 2)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Typers</th>
<th>Hand writers</th>
<th>Z</th>
<th>Sig. (2-tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think carefully before I start writing when using my computer</td>
<td>0%</td>
<td>100%</td>
<td>-4.25</td>
<td>.000***</td>
</tr>
<tr>
<td>I think carefully before I start writing when using pen and paper</td>
<td>0%</td>
<td>100%</td>
<td>-1.75</td>
<td>.080*</td>
</tr>
<tr>
<td>I take notes in lectures using my computer</td>
<td>0%</td>
<td>100%</td>
<td>-1.56</td>
<td>.120</td>
</tr>
<tr>
<td>I take notes in lectures using pen &amp; paper</td>
<td>0%</td>
<td>100%</td>
<td>-2.98</td>
<td>.003***</td>
</tr>
<tr>
<td>I make quick, rough notes before writing essays/reports properly using my computer</td>
<td>0%</td>
<td>100%</td>
<td>-3.19</td>
<td>.001***</td>
</tr>
<tr>
<td>I make quick, rough notes before writing essays/reports properly using pen and paper</td>
<td>0%</td>
<td>100%</td>
<td>-1.84</td>
<td>.067</td>
</tr>
<tr>
<td>I make a detailed plan before writing essays/reports properly using my computer</td>
<td>0%</td>
<td>100%</td>
<td>-2.96</td>
<td>.003***</td>
</tr>
<tr>
<td>I make a detailed plan before writing essays/reports properly using pen and paper</td>
<td>0%</td>
<td>100%</td>
<td>-1.20</td>
<td>.230</td>
</tr>
<tr>
<td>I just start writing (there is no plan!) when using my computer</td>
<td>0%</td>
<td>100%</td>
<td>-0.08</td>
<td>.934</td>
</tr>
<tr>
<td>I just start writing (there is no plan!) when using pen and paper</td>
<td>0%</td>
<td>100%</td>
<td>-0.12</td>
<td>.904</td>
</tr>
<tr>
<td>I make lots of notes using pen &amp; paper</td>
<td>0%</td>
<td>100%</td>
<td>-1.40</td>
<td>.161</td>
</tr>
<tr>
<td>I tend to go back and re-read and revise my writing quite a lot</td>
<td>0%</td>
<td>100%</td>
<td>-0.52</td>
<td>.606</td>
</tr>
<tr>
<td>I prepare most of my assignments using a computer</td>
<td>0%</td>
<td>100%</td>
<td>-1.48</td>
<td>.138</td>
</tr>
</tbody>
</table>

Nonparametric U & Z used to compare those who typed in the exam to those that hand wrote.

*Note! The September 2014 edition of this chart was incorrectly reversed against the stats.*
Did the nature of prior experience of e-exams impact on the decision to type this exam? All participants, all cohorts.

Of those with Prior exp. All
Mann-Whitney U 502
Z -2.734
Sig. (2-tailed) >.01

Looks like a ‘yes’!

Before this exam, I had used a computer to type responses to a short answer or essay style exam.

Prior exp
No prior exp

Was your prior experience positive?
Positive
Negative

I typed this exam
Yes
No

Frequency

Counts
0 100 200 300 400 500
Does the nature of prior experience of e-exams impact future intended use?

All participants, all cohorts.

Hand writers, all cohorts.

<table>
<thead>
<tr>
<th>All</th>
<th>Hand writers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney U</td>
<td>22.5</td>
</tr>
<tr>
<td>Z</td>
<td>3.262</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>&gt;.01</td>
</tr>
</tbody>
</table>

All participants: Z = -3.262, p < .01
Hand writers: Z = -2.248, p > .05

Looks like a ‘yes’!
The role of gender in exams and writing habits
All participants, all cohorts. 9 out of 52 items were significant with one coming close.
The significant items are shown below with Male (Line 1) and Female (Line 2).

<table>
<thead>
<tr>
<th>Item</th>
<th>S.Disagree</th>
<th>S.Agree</th>
<th>U</th>
<th>Z</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>My hand-writing is normally neat and legible</td>
<td></td>
<td></td>
<td>18510.5</td>
<td>-2.600</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>I felt the e-exam system was reliable against technical failures</td>
<td></td>
<td></td>
<td>510</td>
<td>-2.130</td>
<td>&gt;.05</td>
</tr>
<tr>
<td>I felt more stressed in this exam than I normally do in other exams</td>
<td></td>
<td></td>
<td>18991.5</td>
<td>-2.607</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>Overall my experience of this exam was positive</td>
<td></td>
<td></td>
<td>17904</td>
<td>-3.511</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>I tend to go back and re-read and revise my writing quite a lot</td>
<td></td>
<td></td>
<td>17660</td>
<td>-3.581</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>I make lots of notes using pen &amp; paper</td>
<td></td>
<td></td>
<td>16272</td>
<td>-4.538</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>I just start writing (there is no plan!) when using pen and paper</td>
<td></td>
<td></td>
<td>16612.5</td>
<td>-2.247</td>
<td>.025</td>
</tr>
<tr>
<td>I just start writing (there is no plan!) when using my computer</td>
<td></td>
<td></td>
<td>15602</td>
<td>-3.575</td>
<td>&gt;.01</td>
</tr>
<tr>
<td>I make quick, rough notes before writing essays/reports properly using pen and paper</td>
<td></td>
<td></td>
<td>18186.5</td>
<td>-1.897</td>
<td>.058</td>
</tr>
<tr>
<td>I make quick, rough notes before writing essays/reports properly using my computer</td>
<td></td>
<td></td>
<td>16313.5</td>
<td>-2.279</td>
<td>.023</td>
</tr>
</tbody>
</table>
The Next phase: Post-paper exams with multimedia

**UQ 2015?** TBA: Post-paper exams via word processor (used at UTAS)
Include links to on-board media, PDFs and other software tools.
The next phase: can include software tools

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


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

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

Trials TBA!
Proposal for offline Virtual OSCE, practicals etc. Technology 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
Remote connection to networked LMS

Computer marked question types via institutional LMS

Needs network. Provides a restricted gateway – e.g. demo can *only* connect to UQ Blackboard (IP address) and no other server. New to v5.

Trials TBA – dependant upon reliable/robust network connections!
More information....
Demo set-up Guide,
Student Practice and User Guide
http://transformingexams.com

Demo videos start-up, use and recovery examples.
'Wintel' (Dell) http://bit.ly/eexam-demo-vid-d
Contact: m.hillier[at]uq.edu.au
Cite this resource:
Hillier, M (2014) “Transforming Exams: Results from the 2014 BYOD e-Exam Trials at University of Queensland” [Invited presentation], Educational Innovation Through Technology conference, Brisbane, Australia. 28 October.