Transforming Exams into e-Exams
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Get the demo and user guides http://transformingexams.com

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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 possible e-solutions to address these needs.
Rationale: Concerns, drivers, possible solutions for e-Exams

A truly 'wicked' problem and a long road to get it right!


bit.ly/eexam-map
We are faced with a growing disconnect between the way high stakes testing is conducted using pen on paper exams and students’ everyday experiences of study and life.
Where we are going: Post-paper exams

We need greater pedagogical flexibility and more authentic assessments in the exam room. ... re alignment!

Simulations, tools of the trade, virtual experiments...

'Windows' software via WINE. E.g. CAD / 3D modeling, Celestia.

Moodle quiz with media (auto marked).
Where we are now: Paper Equivalent

Question types used: short answer/essay, matching, construct a table, label a diagram/image (by filling a table). Manual marking.

Question 2. Match the following host-MGTA and end products (as below).

Possible descriptions:
  a) Mauris id mi id orci interdum semper.
  b) Sed eu neque ut est dignissim fringilla.
  c) Vivamus in dolor euismod, luctus libero.
  d) Mauris vehicula eros a viverra pelentes.
  e) Curabitur eu mi at nibh commodo varius.
  f) Aenean eget orci porta, malesuada lorem.

Please write or type the letter of the descriptions listed above.

<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. Fakasaalism</td>
</tr>
</tbody>
</table>

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

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

Question 3.
Samuel is 5 years old and attends racing cars 5 days per week. Eamon 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 fascadism, relevant to his age range (4-6 years), and describe how Samuel and Eamon differ in their abilities to perform fascadism.

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

Question 7: Some rationales for punishment are XEZT does this mean?

The student types their answer here. In this example a two row table. The response table row is created.

- The cell has a minimum height set (by dragging the border) 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.
**e-Exam Trials Workflow**

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

**Pre-session: Student laptop setup & practice.**
- e-Exam system takes over laptop.
- Ubuntu Live USB.
- Libre Office.

**Exam room use**

**Post session: retrieve responses and assessment**
- Collect USBs (responses)
- Responses retrieved from USBs.
- Collated e-responses sent to academic.

1. Students enter room.
2. Given USB.
4. Do exam.
5. Return USB.
First and Most Recent e-Exams

VETS2100 S2 2014

Used standard teaching rooms, sought rooms with tables and power sockets.

DENT4092 S1 2015

← VETS: hand-writers sat in rows. Attempted to separate typists and hand-writers where possible. DENT: typists at the back, → hand-writers at the front.
Data collected from students (opt-in S1 & S2 2014)

- **Via pre-exam project online survey (UQ wide):**

- **Via pre-exam short survey (six courses – typists only - next).**
  - Conducted at the pre-exam practice setup sessions.
  - Covered: student preliminary impressions, technical hardware compatibility.

- **Via post-exam extended survey (six courses – all – later this session)**
  - Conducted at the conclusion of the exam (in the room).
  - Covered: rationale, 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).**
  - Further Dentistry and Criminology exams conducted April 2015.
Impressions of the e-exam system

Data collected from students (S1 & S2 2014) at pre-exam set-up/practice sessions.

- I now feel relaxed about the idea of using the e-Exam system for my upcoming exam
- The software within the e-Exam System was easy to use
- I feel confident I will be able to do these steps in a real exam
- It was easy to start my computer using the e-Exam USB stick
- It was easy to learn the necessary technical steps
- The written instructions were easy to follow
Number of typists at each stage of the trial (Survey responses)

<table>
<thead>
<tr>
<th>Steps of trial</th>
<th>Yes will type</th>
<th>Maybe type</th>
<th>Total typists</th>
<th>Attrition</th>
<th>No (hand-write)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 EOI</td>
<td>201</td>
<td></td>
<td>201</td>
<td></td>
<td>361</td>
</tr>
<tr>
<td>2.1 Pre - before try</td>
<td>94</td>
<td>16</td>
<td>110</td>
<td>91</td>
<td>10</td>
</tr>
<tr>
<td>2.2 Pre - after try</td>
<td>86</td>
<td>15</td>
<td>101</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>4 Exam (after)</td>
<td>71</td>
<td></td>
<td>71</td>
<td>30</td>
<td>450</td>
</tr>
</tbody>
</table>

- Not all respondents completed every question.
- A number of students electing to hand-write did not fill in the EOI and the post-exam survey so are slightly under represented.
- Similarly not all attendees at the pre-exam set-up session returned a survey (~90%+ did).
Data collected from students (S1 & S2 2014) at pre-exam set-up/practice sessions.

Before trying e-exam

<table>
<thead>
<tr>
<th>Count</th>
<th>Yes</th>
<th>Maybe</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>20</td>
<td>0</td>
</tr>
</tbody>
</table>

Prior to trying the e-Exam System with my laptop I intended to type my exam

After trying e-exam

<table>
<thead>
<tr>
<th>Count</th>
<th>Yes</th>
<th>Maybe</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>80</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

After trying the e-Exam System with my laptop I am going to type my exam
Pre-exam Survey

Open text comments – concerns and praise

- fear of technical failure/crash
- remembering procedures/use difficulties
- scrolling/touchpad use
- power/battery
- fear of data loss
- drawing/diagram difficulty
- fear of computer damage
- newness/unfamiliarity
- security
- panic
- eye strain
- fail the exam
- rules/contingency
- general positive/praise
- good ease to use
- convenient
- fence sitting
So... we had a pool of loan laptops.
Upgrade to next version of OS will help too.
UQ e-Exam Trials 2014

Data collected from students (opt-in S1 & S2 2014)

• Via pre-exam project online survey (UQ wide):
  

• Via pre-exam short survey (six courses – typists only).
  
  – Conducted at the pre-exam practice setup sessions.
  – Covered: student preliminary impressions, technical hardware compatibility.

• Via post-exam extended survey (six courses – all students – next)
  
  – Conducted at the conclusion of the exam (in the room).
  – Covered: rationale, 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).
  
  – Further Dentistry and Criminology exams conducted April 2015.
### Participation across the six 2014 courses in the trials

<table>
<thead>
<tr>
<th>Course</th>
<th>Type</th>
<th>Duration/Format</th>
<th>Typed</th>
<th>Handwrote</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal Biology</td>
<td>Typists</td>
<td>45 min mixed short answer and MCQ (type 'x')</td>
<td>5</td>
<td>109</td>
</tr>
<tr>
<td>Zoology (BIOL)</td>
<td>Handwrote</td>
<td>50 min short answer (Multiple choice section done pen on OMR sheet)</td>
<td>10</td>
<td>81</td>
</tr>
<tr>
<td>Criminology</td>
<td>Typists</td>
<td>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>Occupational Therapy</td>
<td>Handwrote</td>
<td>100 min mixed short answer and MCQ (type 'x')</td>
<td>3</td>
<td>24</td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>Typists</td>
<td>15 min (watch video and write) before OSCE</td>
<td>25</td>
<td>108</td>
</tr>
<tr>
<td>Veterinary technology</td>
<td>Handwrote</td>
<td>90 min theory, mostly short answer</td>
<td>11</td>
<td>78</td>
</tr>
</tbody>
</table>

| Total                |                      |                                                      | 71    | 450       |

### Gender

- **Typists**
  - Male: 27 (40%)
  - Female: 41 (60%)

- **Hand writers**
  - Male: 139 (38%)
  - Female: 231 (62%)

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**It is important to note:**
- First ‘toe in the water’ trials.
- Participation was optional.
- Mid term exams worth an average of 15% of the course grade.

**Detailed case descriptions available:**
http://transformingexams.com/uq_trials/UQ_e-exam_cases_s1_and_s2_2014.pdf
Reasons for typing the exam

(added 30 October 2014)

- More time because of good typing skills
- Poor hand writing skills, legibility for examiners
- Editing potential
- I think best when I type
- Don’t get writer’s cramp
- Saves paper
- Prefer a screen
Reasons for handwriting the exam

(added 30 October 2014)

- Computer issues/Fear of technology failure
- Prefer handwriting, familiarity
  - Poor typing skills
- Connect and collect my thoughts using handwriting
  - Handwriting is faster
  - Typing is more stressful
  - The noise from typing
- Need to draw diagrams and scribble
- Actual problems typing exam
  - No laptop
- Don’t want to bring laptop to university
- Formatting answer on paper
  - Not registering for session
- Don’t like working on screens
  - Want a choice
  - Lack of experience
- Previous poor experiences
  - Forgot to attend session
  - Health issues using screens
Those that used the system said...

Typer's perceptions of the e-Exam System (post exam survey)

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)**

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

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

U

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>13242.5</td>
<td>15203</td>
<td>14527.5</td>
<td>15145.5</td>
</tr>
<tr>
<td>Z</td>
<td>-2.132</td>
<td>-0.083</td>
<td>-0.751</td>
<td>-0.394</td>
</tr>
<tr>
<td>Sig. (2-tail)</td>
<td>0.033</td>
<td>0.934</td>
<td>0.452</td>
<td>0.694</td>
</tr>
</tbody>
</table>
Are some students over estimating 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>
<tr>
<td>Saving files</td>
<td>0</td>
<td>All good. (noticed one student used ‘save as’ when save was ‘greyed out’) now fixed</td>
</tr>
<tr>
<td>Software crashed/ computer froze</td>
<td>4</td>
<td>1 x Old 2009 white Macbook. Office suite quit to desktop. (pre-setup to catch these!) 3 x System drive ran out of space causing the system to crash (now fixed).</td>
</tr>
<tr>
<td>Touchpad/ mouse</td>
<td>7</td>
<td>Sensitivity reported by participants. <em>Some adjustments were made.</em> <em>USB wired mice highly recommended! Investigate drivers.</em></td>
</tr>
<tr>
<td>Scrolling</td>
<td>15</td>
<td>Two finger scrolling opposite to OSX, keyboard shortcuts. Small scroll bars. Sensitivity. <em>Familiarity: need to practice. Larger scroll bars. Investigate a user selectable option for touchpad/scroll behavior (and re-mapping of keyboard shortcuts).</em></td>
</tr>
</tbody>
</table>
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

Feedback Survey
http://ta.vu/eexamsurv