Transforming exams: stories from across Australia

Dr Mathew Hillier, Monash University
Dr Andrew Fluck, University of Tasmania
Dr Michael Cowling, Central Queensland University
Mr Kenneth Howah, Central Queensland University
Associate Professor Matthew Bower, Macquarie University
Mr Scott Grant, Monash University
Dr Amy Hubbell, University of Queensland
Ms Vilma Simbag, Monash University / University of Queensland

Panel session. ASCILITE 4-7 Dec 2017, USQ Toowoomba.

Transforming Exams Across Australia

TransformingExams.com

Acknowledgements - The views expressed do not necessarily reflect the views of the Australian Government Department of Education and Training or participating institutions.
Project Partners

- Monash University: Dr Mathew Hillier (PI), Prof. Marilyn Baird, Scott Grant
- University of Tasmania: Dr Andrew Fluck.
- Central Queensland University: Dr Michael Cowling, Kenneth Howah, Mary Tom.
- Australian National University: Brandon Colquhoun, Beth Harris
- Edith Cowan University: Assoc. Prof. Paul Newhouse
- Macquarie University: Assoc. Prof. Matthew Bower, Prof Dominic Verity
- RMIT University: Assoc. Prof. Shona Leitch
- University of South Australia: Dr Ruth Geer, Bruce White
- University of Queensland: Dominic McGrath
- University of New South Wales (Canberra)/ ADFA: Dr David Meacheam, Emma Betts

Academics hosting trials

- Monash college: Nathaniel Lyons (Globalisation + Geography)
- Monash Uni: Dr Shani Tobias (Translation), Dr Charanjit Kaur (Bus Stats).
- UQ: Dr Amy Hubbell (French language).
- CQU: Dr Rahat Hossain (KM in IT).
- UTAS: Dr Wendy Balassa (Education)
- ECU: Dr Jeremy Pagram (Programming/Python)
- UNSW/ADFA: Andrew Gilbert (Air Power).

Project staff

Martin Coleman (lead software developer)
Vilma Simbag (project manager/admin)

Former staff: Lubos Rendek (software dev).

Students (summer/winter projects and casual RAs):
Ms Chao Wang, Kim Martinow, Sayumi Umeda,
Annie (Yunyi Yang), Yi Zheng.
Our Project

Moving from this >>>>>>>>>>>> towards to this!

Paper exams at Monash Caulfield (image: Mathew Hillier, Monash)

e-Exams at University of Tasmania (image credit: Andrew Fluck, UTAS)

Towards authentic assessment in exams using e-tools of the trade.
Panel session - sequence

Introduction: Dr Mathew Hillier, Monash University

Case stories (8 mins each):

① Dr Andrew Fluck, University of Tasmania
② Dr Michael Cowling and Mr Kenneth Howah, Central Queensland University
③ Mr Scott Grant, Monash University
④ Dr Amy Hubbell, University of Queensland
⑤ Associate Professor Matthew Bower, Macquarie University

[via Zoom!]

Open Q & A to the panel and next steps... Dr Mathew Hillier.
## Progress - Phased implementation strategy

<table>
<thead>
<tr>
<th>Start</th>
<th>&gt; &gt; &gt;</th>
<th>&gt; &gt; &gt;</th>
<th>&gt; &gt; &gt;</th>
<th>&gt; &gt; &gt;</th>
<th>&gt; &gt; &gt;</th>
<th>&gt; Future &gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Get Ready</strong></td>
<td><strong>Phase 1</strong></td>
<td><strong>Phase 2</strong></td>
<td><strong>Phase 3</strong></td>
<td><strong>Phase 4</strong></td>
<td><strong>Phase 5</strong></td>
<td></td>
</tr>
<tr>
<td>Institutional approvals, research ethics, hardware and infrastructure.</td>
<td>Paper equivalent small scale.</td>
<td>Post-paper small to medium.</td>
<td>Medium to large scale.</td>
<td>Whitelisted and logged Internet</td>
<td>Open but fully logged Internet</td>
<td></td>
</tr>
<tr>
<td><strong>Crawling</strong></td>
<td><strong>Walking</strong></td>
<td><strong>Running</strong></td>
<td><strong>Jumping</strong></td>
<td><strong>Flying!</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Basic doc exams to begin.</td>
<td>Expanding the landscape with apps and media.</td>
<td>Adding the power of an LMS (Moodle).</td>
<td>Network BYOD exam.</td>
<td>Network mixed mode BYOD exam.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

e-Exam Trials: Towards ‘post-paper’ (phase 1 to 2)

Start simple and build up!

- Scratch SDK
- Video
- Start! Exam doc

Spreadsheets as ‘forms’ or as calculation and analysis.

Specialist applications

PDF

Sims
A student’s exam desk

- eExam Candidate instructions
- Plastic ziplock bag
- USB stick contains the eExam
The admin desk

Prototype using commodity components.

Computer and large USB hub (19 port USB3 hub now recommended.)

Graphical helper tool to:

1. Initial ‘burn’ OS to each USB.
2. Place exam materials.
3. Retrieve exam materials.
4. Set-up for the next exam (recycle).
Doing e-Exams – Typical process overview

**Pre-exam:** prepare learning materials

1. Teacher creates exam, media, Moodle content, apps, etc

2. Create master USB (configure, load and test)

3. USBs duplicated (or files copied)


5. USBs sent to exam venue

6. Exam venue:
   a. Students enter room
   b. Given USB
   c. Start laptop from USB
   d. Do exam
   e. Finalise and shutdown
   f. Return USB
   g. Leave room

7. Manual return

   OR

   7B* Use network sync

8. Responses retrieved from USBs.


10. Return feedback to student.

10B*. e-Feedback via network

11. USB recycled for next exam. Go to step 1

**Post-exam:** assessment

8B* Files to server


10. Return feedback to student.

10B*. e-Feedback via network

**Future development**

Linux Live USB. Libre Office, apps, Moodle, SDK, sims, exam questions, PDFs, media…
Our e-Exam trials from 2010 to 2017...
31 courses/units, 24 academics, over 4 grants.

<table>
<thead>
<tr>
<th>Typists</th>
<th>Hand-writers</th>
<th>Exam Weighting</th>
<th>Exam Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1545</td>
<td>1304</td>
<td>~</td>
</tr>
<tr>
<td>Mean</td>
<td>40</td>
<td>37</td>
<td>33%</td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
<td>~</td>
<td>5%</td>
</tr>
<tr>
<td>High</td>
<td>166</td>
<td>~</td>
<td>50%</td>
</tr>
</tbody>
</table>

Refer to our summary of trials handout for details!
Cases

Case stories (8 mins each):

① Dr Andrew Fluck, University of Tasmania (IT in Ed)
② Dr Michael Cowling and Mr Kenneth Howah, Central Queensland University (IT)
③ Mr Scott Grant, Monash University (Chinese)
④ Dr Amy Hubbell, University of Queensland (French)
⑤ Associate Professor Matthew Bower, Macquarie University [via Zoom!] (ICT in Ed)

Open Q & A to the panel and next steps... Dr Mathew Hillier
Q: Write a program in Scratch using Felix the cat and a blank stage that:

a) Allows Felix to be moved by pressing arrow keys on the keyboard.

b) Allows the user to draw a simple picture as they move Felix around the stage.

Save your program in the Answers section of the USB [Computer > media > answers], then close the Scratch.
eExam users:

![Bar chart showing the distribution of responses to the statement: I would recommend the e-Exam system to others.]

I would recommend the e-Exam system to others

Number of users

0 2 4 6 8 10 12 14

Strongly Disagree Disagree Neutral Agree Strongly Agree

eExam neighbours:

85% were very satisfied, satisfied or neutral about sitting in the same venue as students sitting an eExam.

91% experienced no, some or a little interruption as a result of sitting in the same room as students sitting an eExam.
Olari high school students taking Abitti test in Finland.

Alpen-Adria University, Austria.
CQUniversity

Doing E-exams – the CQU experience
CQU context

- Multiple campuses across all States
- Multiple exam centres – typically there are more exam centres than campuses
- Some exam centres hosted by other institutions
- USBs prepped in Melb; shipped to Rockhampton; allocated to exam centres & shipped there.
- USBs returned to Unit Coordinator, not to tech guy due to internal workflow limitations
Internal objections - 2015

• Concern with providing equitable exams facilities for all students. E-exams makes this difficult to provide
• Any trial must demonstrate complete scaleability – no trial to date has done this
• Managing Opt-in/opt-out options would involve too much administrative work
• BYOD increases exam costs due to the need to mitigate the risks of technology failure
• Uncertainty about how easy it would be to train existing invigilators in overseeing e-exams.
Term 1: 80 students.
30 sat e-exam (34%) – typing optional

Term 2: 166 students.
140 sat e-exam (85%) – compulsory typing
Supp exam: 19 re-sitting e-exam – compulsory typing
## T1: The stats story...

<table>
<thead>
<tr>
<th>COIT12205 Perf Analysis</th>
<th>E-Exam</th>
<th>Paper</th>
<th>Excl A.F.</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD</td>
<td>7</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>D</td>
<td>7</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>C</td>
<td>7</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>P</td>
<td>6</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>AF</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>30</td>
<td>58</td>
<td>54</td>
</tr>
</tbody>
</table>

| Success Rate            | 90.0%  | 82.8% | 88.9%    |

<table>
<thead>
<tr>
<th></th>
<th>E-Exam</th>
<th>Paper</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg exam</td>
<td>32.9</td>
<td>33.6</td>
<td>-0.7</td>
</tr>
<tr>
<td>Avg ass1</td>
<td>16.0</td>
<td>13.2</td>
<td>2.8</td>
</tr>
<tr>
<td>Avg ass2</td>
<td>21.9</td>
<td>18.2</td>
<td>3.7</td>
</tr>
<tr>
<td>Avg unit total</td>
<td>68.8</td>
<td>61.7</td>
<td>7.1</td>
</tr>
</tbody>
</table>
CQU team
Michael Cowling
Mary Tom
Kenneth Howah

...Any questions?
## School
Languages, Literatures, Cultures and Linguistics

### Level
Undergraduate, First year

### Class size
73 students enrolled; 30 typed and 50 handwrote.

### Class details
On campus with average four class hours and two hours online activities per week.

### e-Exam
In-class, typing optional. Spreadsheet as a 'form'. BYO and university laptops. Partial automatic marking.

### Assessment
One hour examination worth 16%. Mix of multiple choice, true/false, fill-in-the blank questions and short text responses.

### Monash University – Chinese language

---

### I would recommend the e-Exam system to others

<table>
<thead>
<tr>
<th>Number of users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>Disagree</td>
</tr>
<tr>
<td>Neutral</td>
</tr>
<tr>
<td>Agree</td>
</tr>
<tr>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

- Strongly Disagree: 0
- Disagree: 1
- Neutral: 5
- Agree: 7
- Strongly Agree: 5

---

- I would recommend the e-Exam system to others
  - Strongly Disagree: 0
  - Disagree: 1
  - Neutral: 5
  - Agree: 7
  - Strongly Agree: 5
Le Mali, des dunes sableuses du Nord aux savanes arborées du Sud, est un dégradé de paysages superbes, avec des villages traditionnels camouflés dans la brousse, des mosquées en banco, dites de style soudanais, à l'architecture sobre, souvent majestueuse. Sans oublier ce fleuve fascinant, le Niger, qui parcourt généreusement le pays, en donnant vie aux terres arides.

L'étonnement est permanent, le quotidien vibre au rythme des marchés animés et colorés, des rencontres amicales et du sens de la fête de ses habitants.

Autre atout du Mali, on peut s'y déplacer facilement grâce aux nombreuses compagnies de bus et à l'état correct des principales routes et pistes. Quant aux structures d'hébergement, si elles restent modestes dans l'ensemble, elles sont de mieux en mieux tenues, disposent d'un confort suffisant et se prêtent parfaitement à la convivialité, aussi bien entre les voyageurs qui se refilent des infos qu'avec les Maliens du voisinage.

Malheureusement, la reprise de la rébellion touarègue1, début 2012, et ses conséquences (putsch militaire en mars, partition du pays au même moment) font du Mali un pays plus que difficile à visiter tant que les conditions de sécurité ne sont pas rétablies.

---

1 Tuareg: a Berber ethnic group living in the Sahara region.
UQ French to English Translation

I would recommend the e-Exam system to others

<table>
<thead>
<tr>
<th></th>
<th>Number of users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
</tr>
<tr>
<td>Disagree</td>
<td>2</td>
</tr>
<tr>
<td>Neutral</td>
<td>4</td>
</tr>
<tr>
<td>Agree</td>
<td>6</td>
</tr>
<tr>
<td>Strongly Agree</td>
<td>8</td>
</tr>
</tbody>
</table>
EDUC261

Examination 2017 Session 1 – Version 9

MACQUARIE UNIVERSITY

Exam materials (USB/paper) must NOT be removed from the venue. Doing so will be considered academic misconduct.

For types:
Remember “File > Save” often. Shortcut “CTRL S”

If this page is too big or too small for your screen please use View > Zoom > Page width.

EDUC261 Examination 2017 Session 1

This page is for all students.

Examination Duration: 80 minutes
Reading Time: none

Exam Conditions:
This is an in-class examination.
This is a closed book examination (no reference materials permitted).
This examination paper must be returned at the end of the examination.

Materials Permitted in The Exam Venue:
- All students: No other electronic aids/devices are permitted e.g., phones, tablets, papers, image/audio/video/record devices, calculators, internet connection devices etc.
- Transit only exemption: 1 x authorised, fully charged laptop is permitted (during the exam the laptop must only be running the supplied e-Exam System USB stick and supplied software in its authorised state. No other software or electronic resources are permitted.

Materials To Be Supplied To Students:

<table>
<thead>
<tr>
<th>Question</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
</tr>
</tbody>
</table>

Examiner Use Only

24
Q & A

Questions... discussion....

Our next steps:

- More trials in 2018!
- Client/server Moodle exams resilient to network outages.
- Full background automatic Save for office documents has been implemented!
Project information....

http://transformingexams.com

Demo videos and user guides.

e-Exam project contact:
   mathew.hillier[at]monash.edu

Workshop 2: (free!)
“Transforming exams: hands on with the technology”
Friday 10am-1.30pm
Room T125.

Cite this resource
Hillier, M. et.al. (2017) Transforming exams: Stories from across Australia, ASCILITE conference, 4-7 Dec, USQ, Toowoomba.