

UQ e-Exam Trial Preliminary Findings

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Get the demo and user guides

<http://transformingexams.com>



Acknowledgement

Support for this project has been provided by the Australian Government Office for Learning and Teaching. The views in this session do not necessarily reflect the views of the Australian Government Office for Learning and Teaching or participating institutions.



Targeting...

- Supervised
- High stakes
- On campus
- Large scale

(image credit: Dr Fluck UTAS)



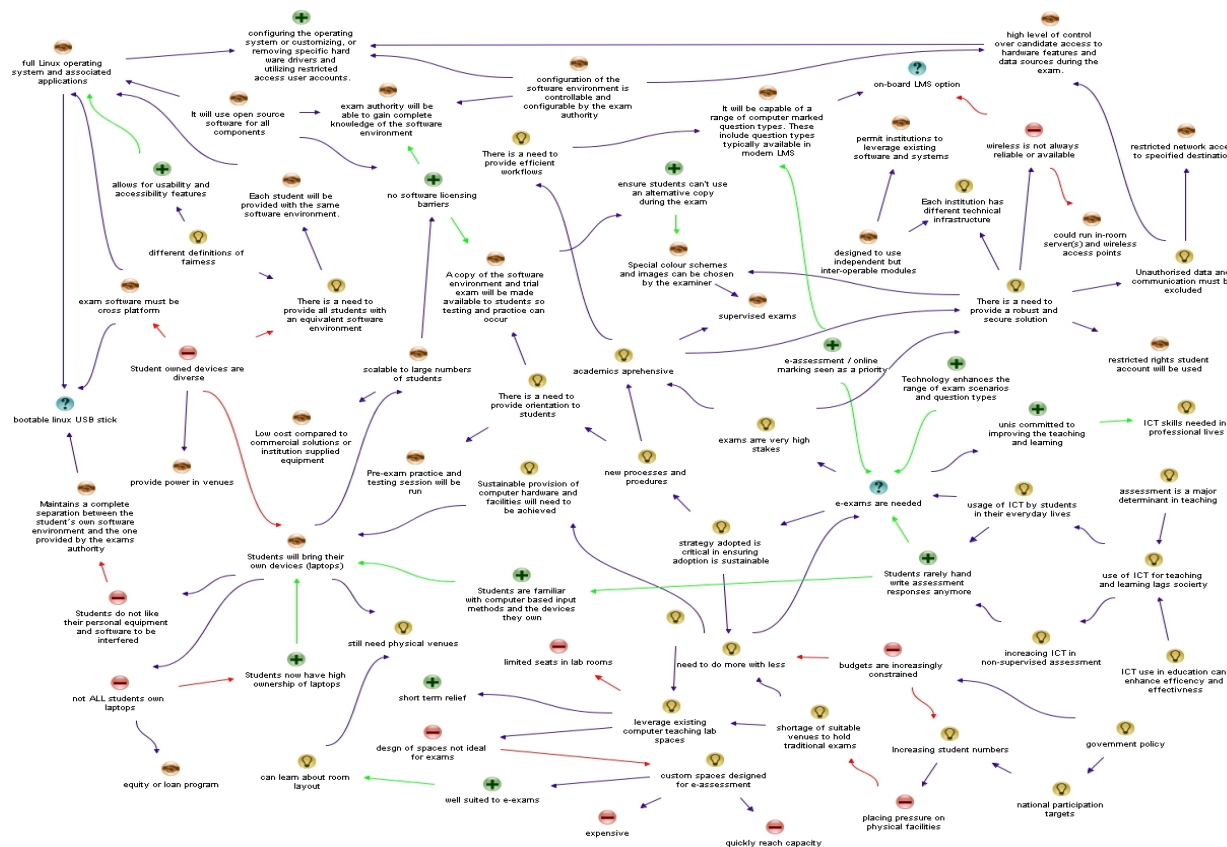
*What we are **not** specifically addressing here is off campus, online only, distance education, cross institutional students – there are some existing e-solutions to address these needs.*

Why e-Exams?

Rationale

Hillier, Mathew and Fluck, Andrew (2013). Arguing again for e-exams in high stakes examinations. In: H. Carter, M. Gosper and J. Hedberg, Electric Dreams. Proceedings of the 30th ASCILITE Conference, Sydney, Australia, (385-396). 1-4 December. <http://www.ascilite.org.au/conferences/sydney13/program/papers/Hillier.pdf>

Concerns, drivers, solutions for e-Exams (a 'wicked' problem!)



bit.ly/eexam-map



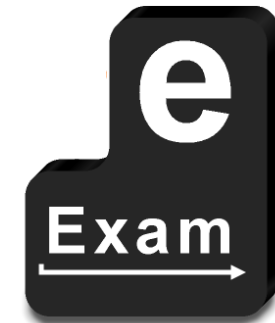
So?

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

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



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 image shows two overlapping LibreOffice Writer windows. The left window displays the exam header for 'THE UNIVERSITY OF QUEENSLAND AUSTRALIA' and a table for student information. The right window shows the exam questions and a diagram of a bottle with three numbered parts.

Table 1: All students to complete

Field	Value
Venue	Here
Seat*	1
Student Number	12345678
Family Name	Joe
First Name	Bloggs
USB number*	88

Question 6 [1 marks]: Which is the 'one-time boot key' for your computer?
Please write your answer below this line

Question 7 [4 marks]: Place a rough drawing of yourself below (you can use the drawing tools in this program, or create the image using the GIMP as described on your student eExam instruction card).
Please place your answer below this line

Question 8 [4 marks]: The following diagram has some unidentified parts indicated by part numbers.

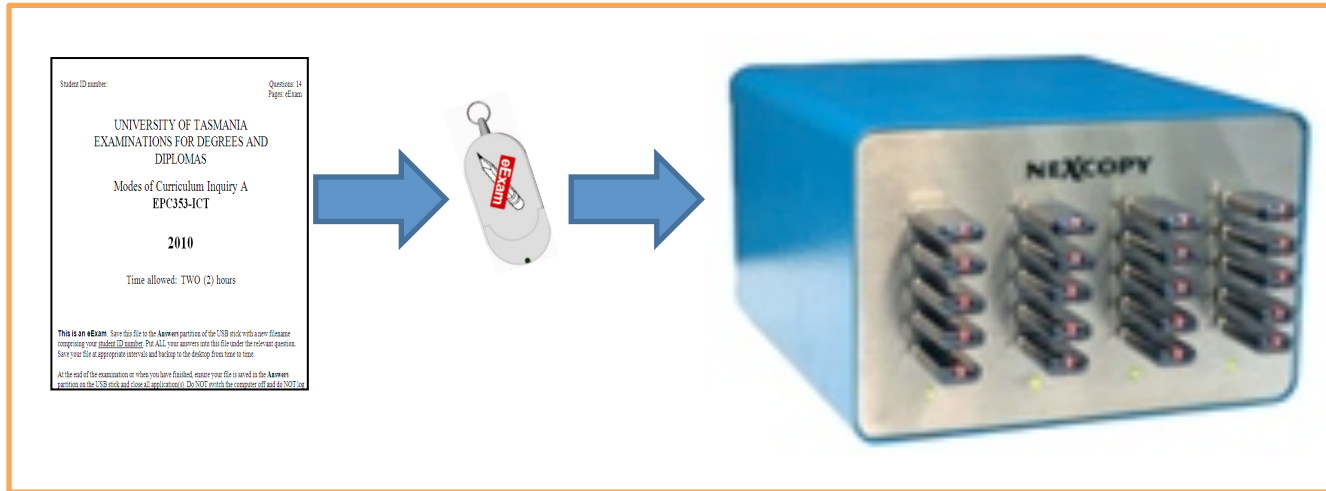
Please complete the table below to provide the label names for each part number.

Part	Labels (please enter text in each row below.)
1)	
2)	
3)	

End of Examination

The Current Process – how it works

Prep



Exam Room



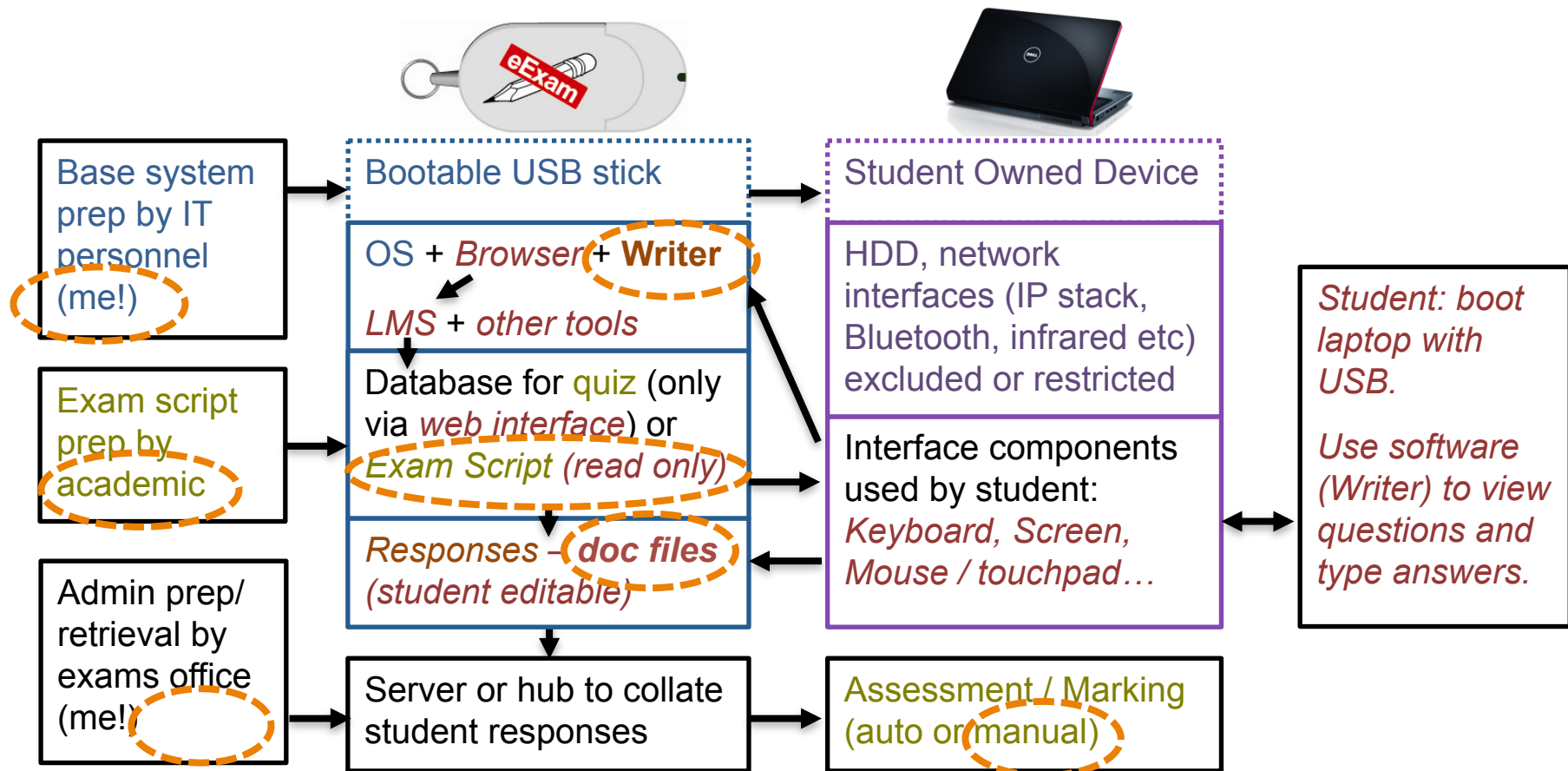
Post Exam



(credit: Dr Fluck UTAS)

Architecture of e-Exam System for BYOD

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!**



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.



Word doc exams

On-board LMs exams

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!)

The image shows a sequence of two screenshots. The top screenshot is the 'e-Exam Starter' application window. It has a title bar 'e-Exam Starter' and a background image of a bird. It contains three input fields: 'Student ID:' with the value '12345678', 'First Name(s):' with the value 'Joe', and 'Surname' with the value 'Bloggs'. A 'Start Exam' button is on the right. Below the inputs are logos for 'THE UNIVERSITY OF QUEENSLAND AUSTRALIA', 'TEDI TEACHING & EDUCATIONAL DEVELOPMENT INSTITUTE', 'UNIVERSITY OF TASMANIA', and 'Australian Government Office for Learning & Test'. A large black arrow points from the 'Start Exam' button down to the second screenshot. The second screenshot shows a LibreOffice Writer window titled '12345678_practice_examSpe.doc - LibreOffice Writer'. The document content includes the University of Queensland logo, a table for 'All students to complete' with fields for Venue, Seat, Student Number, Family Name, First Name, and USB number, and exam details for 'Semester One Mid Semester Examinations, 2014' and 'PRAC0000 Practice Course'. A table for 'For Examiner Use Only' is at the bottom right. A large black arrow points from the bottom of the document area down to the footer.

e-Exam System v5 (UQ Trial)

Responding to questions in-line in the word processor
(note – the system keeps a read-only backup of the questions!)

Type where indicated....

Question 1 [1 marks]: What is your full name?
Please write your answer in a couple of words below this line - place the cursor below this line and start typing!
Joe Bloggs Type below the line (or in a box)

Simple drawing tools...

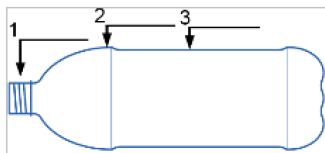
Question 2 [1 marks]: What is the Brand/make/manufacturer of your computer?
Please write your answer in a couple of words below this line
Dell

Label a diagram...

The screenshot shows the GIMP Image Editor interface. On the left, a word processor window displays Question 7: "Place a rough drawing of yourself below (you can use the drawing tools in this program, or create the image using the GIMP as described on your student eExam instruction card)." Below the text is a simple line drawing of a face with a rectangular box around it, labeled "content face!". A large black arrow labeled "Copy & Paste" points from this drawing to the GIMP window. The GIMP window shows a drawing of a face with a rectangular box around it, labeled "Draw in GIMP". Below the drawing is a table for labeling parts of the diagram.

Part	Labels (please enter text in each row below.)
1)	top
2)	widest
3)	label

Question 8 [4 marks]: The following diagram has some unidentified parts indicated by part numbers.



Fill in table rows...
Or type 'x' for MCQs

Please complete the table below to provide the label names for each part number.

Part	Labels (please enter text in each row below.)
1)	top
2)	widest
3)	label

Preliminary Trial Findings

Opinions about the e-Exam System

(Five point scale where 5 = Strongly agree, 1 = strongly disagree)

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

*Several students used a borrowed university owned laptop.

Suitability of the exam by cohort

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

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).

Preliminary Trial Findings

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.

Issue	N	Notes, Additional Observations, Suggested Solutions
Boot up/ start up	2	In reality most participants needed assistance/forgot boot key. <i>Familiarity: need to practice!</i>
Entering my details	0	All good.
Using the software	0	Some did not know how 'exit' gracefully (i.e. File save, file exit, shutdown). <i>Need to practice! Investigate an 'I'm finished' script/button.</i>
Battery	0	Most plugged in. <i>Power needs to be available.</i>
Saving files	0	All good.
Software crashed/ computer froze	1*	2 mins into a 15 min exam. Continued on paper and given 2 mins extra time. Old 2009 white Macbook. <i>Better pre-exam testing should catch. Persistent logging to be implemented. Currently has 'recovery' autosave, a 'full' autosave to be investigated too.</i> *Recorded via observation.
Touchpad/ mouse	5	Sensitivity reported by participants. <i>Some adjustments were made. USB mice recommended. Investigate drivers.</i>
Scrolling	10	Two finger scrolling opposite to OSX. Small scroll bars. Sensitivity. <i>Familiarity: need to practice. Larger scroll bars. Investigate a user selectable option for touchpad/scroll behavior.</i>

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.

The screenshot displays the e-Exam System v5 interface. On the left, a word processor window is open, showing a list of exam questions. A large black arrow points from question 7 to a video player window. The video player is titled 'Genomics Digital Lab.ogg' and shows a 3D simulation of a plant with various components labeled, such as 'PLANT PROPERTIES', 'LIGHT', 'GASES', 'LIQUID', 'CHLOROPLAST', 'LIGHT REACTION', 'SUGARS', and 'WHERE THE CHLOROPLAST THE LIGHT REACTION HAPPENS'. The video player controls show the video is playing at 0:27 / 1:18.

5. Please describe the picture shown below.
Please write your answer below this line

6. Click on [this link](#) or open the file in your Materials folder.
Please write your answer below this line

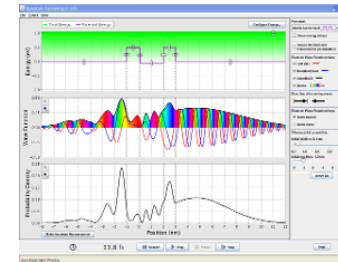
7. Place a drawing of yourself below (you can use the GIMP as described on your student eExam Materials folder).
Please put your answer below this line

8. View the video file by clicking on [this link](#) in your Materials folder.
a) Could you see the video playing on your screen?

Time: 0:27 / 1:18
Playing

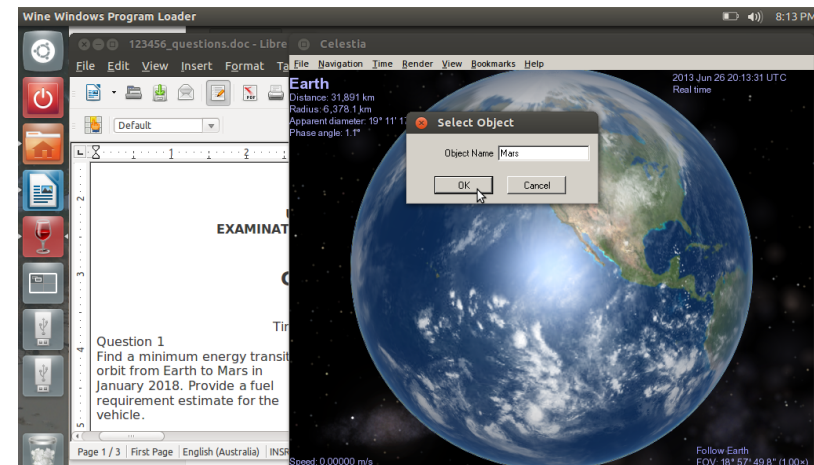
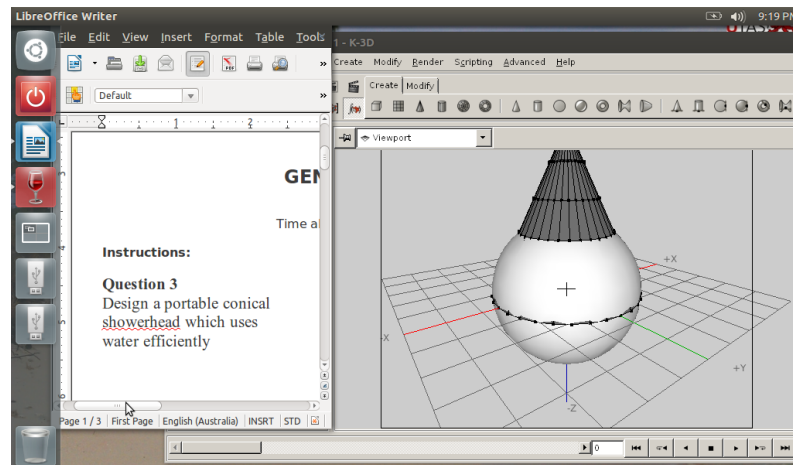
Can Include Software Tools

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



More <http://www.transformingassessment.com/moodle/course/view.php?id=38>

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

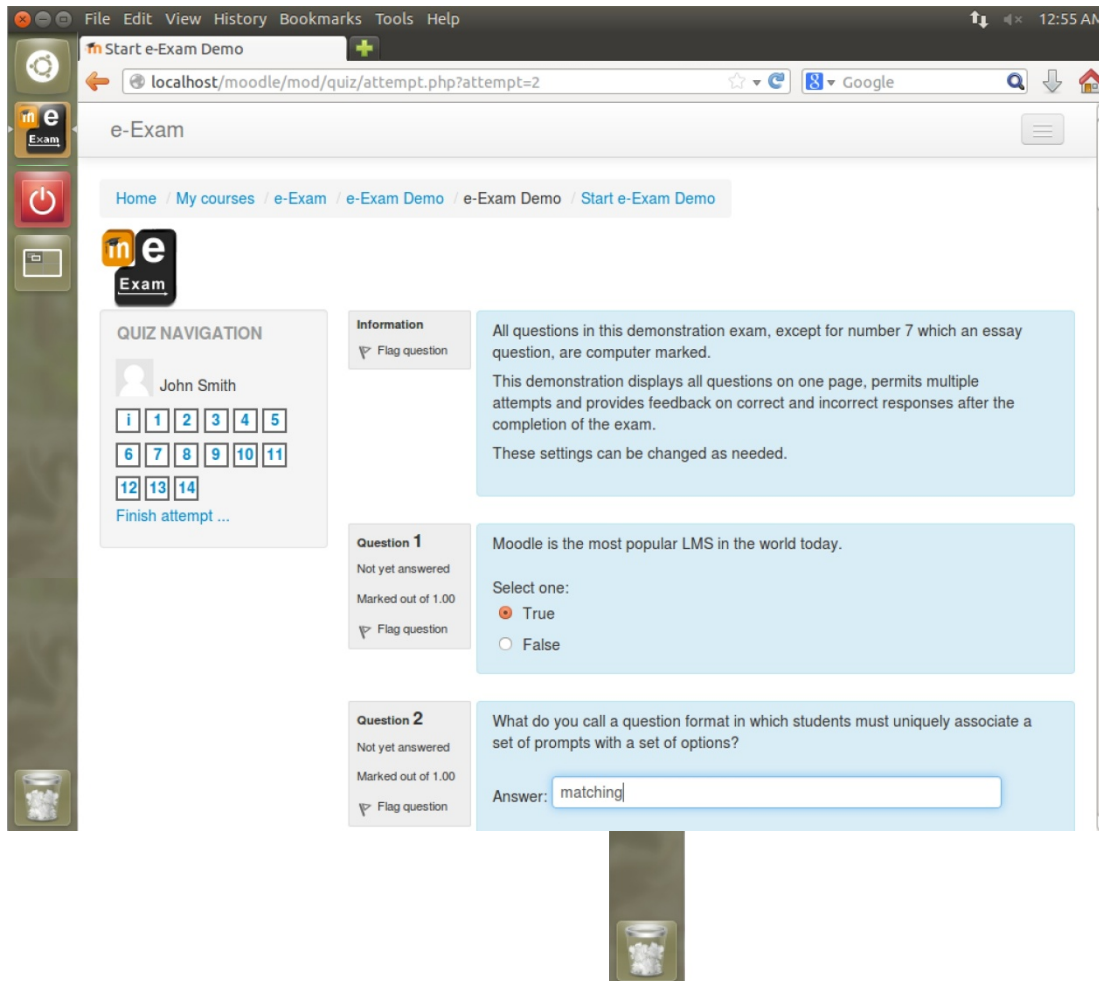


Ref: Dr Fluck, UTAS

LMS on e-Exam v5 (Demo)

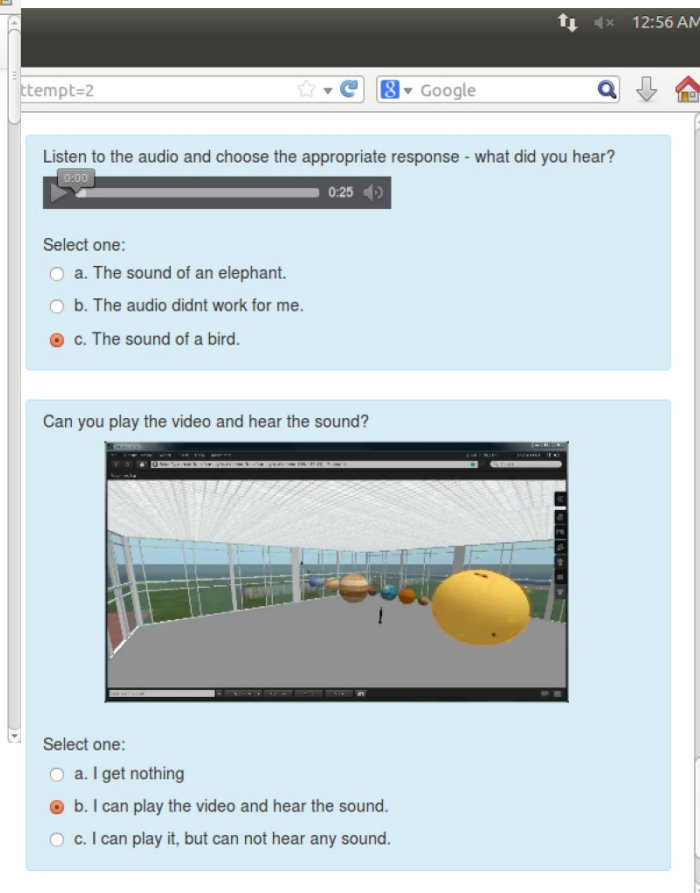
Computer marked question types via on-board LMS (new to v5) with Integrated multimedia – high def video is possible!

Trial TBA!



The screenshot shows a web browser window with the URL `localhost/moodle/mod/quiz/attempt.php?attempt=2`. The page title is "e-Exam". On the left, there is a "QUIZ NAVIGATION" sidebar for user "John Smith" with buttons for questions 1 through 14. The main content area displays "Information" and two questions:

- Question 1:** Moodle is the most popular LMS in the world today. Select one: True, False.
- Question 2:** What do you call a question format in which students must uniquely associate a set of prompts with a set of options? Answer:



The screenshot shows a question titled "Listen to the audio and choose the appropriate response - what did you hear?". It includes an audio player with a progress bar at 0:00 / 0:25. Below the audio player, the question asks to "Select one:" and provides three options:

- a. The sound of an elephant.
- b. The audio didnt work for me.
- c. The sound of a bird.

Below this, another question asks "Can you play the video and hear the sound?". It includes a video player showing a 3D scene with a large yellow sphere and several smaller colored spheres. Below the video player, the question asks to "Select one:" and provides three options:

- a. I get nothing
- b. I can play the video and hear the sound.
- c. I can play it, but can not hear any sound.

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.

The top screenshot shows the Blackboard Learn interface in Mozilla Firefox. The browser address bar displays `https://learn.uq.edu.au/webapps/portal/frameset.jsp?tab_tab_group_id=3_1`. The page header includes the University of Queensland logo and navigation links: Welcome, Courses, Community, Staff, Help, How-Tos and Tutorials, and Statistics. The main content area is titled "Preview Test: Example test - e-exam mode" and contains the following table:

Description	Example test to try marking (Normally the description of the test for students would appear here)
Instructions	Normally the instructions for students would appear here
Timed Test	This Test has the time limit of 1 hour. You are notified when time expires, and you may continue or submit. Warnings appear when half the time, 5 minutes, 1 minute and 30 seconds remain. <i>[The timer does not appear when previewing this Test]</i>
Multiple Attempts	Not allowed. This Test can only be taken once.
Force Completion	Once started, this Test must be completed in one sitting.

Below the table, there is a "Question Completion Status" section and a warning: "Moving to another question will save this response." The current question is "Question 1" with a value of "10 points" and a "Saved" status. The question text is "What is two times twenty-one?" and the answer input field contains "42".

The bottom screenshot shows the login page for "Learn.UQ" at the University of Queensland. It features a login form with fields for "USERNAME:" and "PASSWORD:", a "Login" button, and a footer with contact information for staff and students.

LMS Question Types

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.

Advanced Example – Virtual 3D Spaces

Proposal for offline e-exam use
(Virtual OSCE, practicals etc).
Tech is already working online.

1 Click on the link for Question 1 on the external web page. Use the emission and absorption spectroscopy tool below to determine the element corresponding to the colour orange-red in the gas discharge tube.
Marks: 1

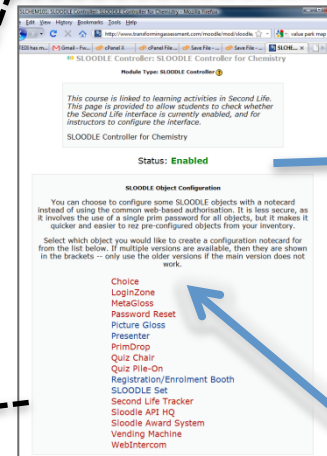
Choose one answer.

- a. sodium
- b. copper
- c. neon
- d. barium

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



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

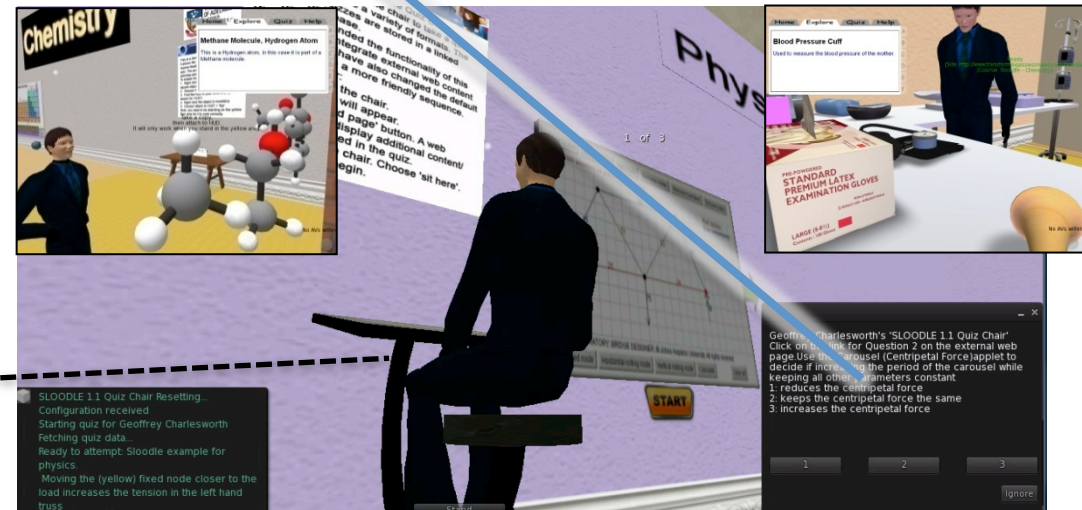


Attempts: 16

Showing graded and ungraded attempts for each user. The one attempt for each user that is graded is highlighted. The grading method for this quiz is **Highest grade**.

	First name / Surname	Started on	Completed	Time taken	Grade/10	#1	#2	#3	#4
<input type="checkbox"/>	Geoffrey Clap	5 May 2010, 06:09 PM	5 November 2010, 09:30 PM	184 days 3 hours	2.5	0/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		29 June 2010, 02:53 PM	5 November 2010, 09:30 PM	129 days 6 hours	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		4 July 2010, 02:46 PM	5 November 2010, 09:30 PM	122 days 7 hours	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		4 July 2010, 03:22 PM	5 November 2010, 09:30 PM	122 days 6 hours	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		4 July 2010, 04:16 PM	5 November 2010, 09:30 PM	122 days 5 hours	7.5	2.5/2.5	2.5/2.5	2.5/2.5	0/2.5
<input type="checkbox"/>		8 July 2010, 02:41 PM	5 November 2010, 09:30 PM	184 days 7 hours	5	2.5/2.5	2.5/2.5	-/2.5	0/2.5
<input type="checkbox"/>		9 May 2010, 09:04 PM	5 November 2010, 09:30 PM	184 days	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		4 May 2010, 10:18 AM	5 November 2010, 09:30 PM	183 days 11 hours	2.5	0/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		4 May 2010, 10:03 AM	5 November 2010, 09:30 PM	183 days 11 hours	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		4 May 2010, 12:52 PM	5 November 2010, 09:30 PM	183 days 8 hours	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		6 May 2010, 07:12 PM	5 November 2010, 09:30 PM	183 days 2 hours	2.5	0/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		7 May 2010, 12:28 PM	5 November 2010, 09:30 PM	182 days 9 hours	2.5	0/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		3 June 2010, 03:47 PM	5 November 2010, 09:30 PM	125 days 6 hours	2.5	0/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		16 June 2010, 05:25 PM	5 November 2010, 09:30 PM	142 days 4 hours	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>	Matthew Hillier	7 May 2010, 03:44 PM	7 May 2010, 03:43 PM	31 secs	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
<input type="checkbox"/>		29 June 2010, 03:56 PM	29 June 2010, 03:56 PM	26 secs	5	2.5/2.5	2.5/2.5	0/2.5	0/2.5
	Overall average				6.25	2.5/2.5	2.5/2.5	1.25/2.5	0/2.5

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



Student undertakes assessment in the virtual world



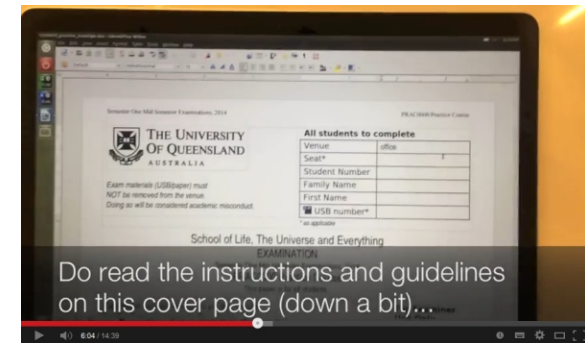
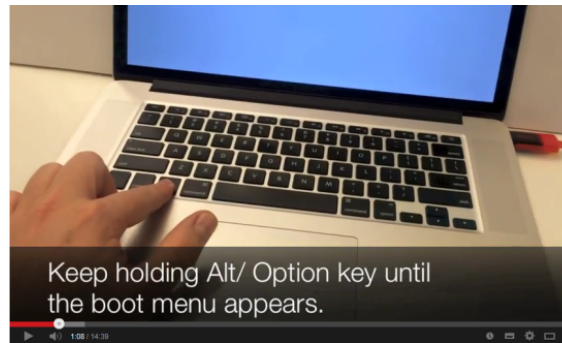
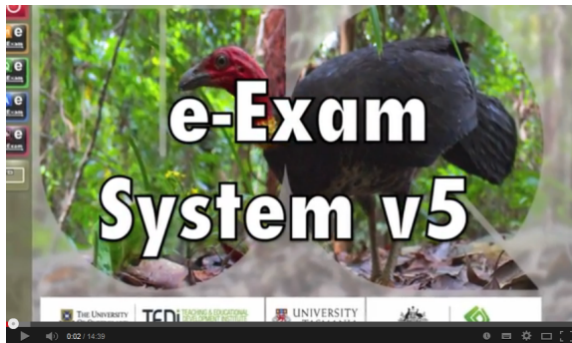
e-Exam System Guides and Videos

More information....

Demo set-up Guide,

Student Practice and User Guide

<http://transformingexams.com/guides.html>



Demo videos start-up, use and recovery examples.

Apple <http://bit.ly/eexam-demo-vid-a>

'Wintel' (Dell) <http://bit.ly/eexam-demo-vid-d>

Q & A

Questions?

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

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Please cite this resource as: Hillier, Mathew (2014), UQ e-Exam Trial Preliminary Findings, ASCILITE Live! Webinar Series, NUS, 15 May.