e-Exam Examples:
From paper-equivalent to post-paper.

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Transforming Exams
Updated 31 May 2019
Adoption roadmap: towards authentic e-assessment

<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; Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Get Ready</td>
<td>Phase 1</td>
<td>Phase 2</td>
<td>Phase 3</td>
<td>Phase 4</td>
<td>Phase 5</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>
</tr>
<tr>
<td>Crawling</td>
<td>Walking</td>
<td>Running</td>
<td>Jumping</td>
<td>Flying!</td>
<td></td>
</tr>
<tr>
<td>Basic doc exams to begin!</td>
<td>Expanding the app and media landscape.</td>
<td>Adding the power of an LMS.</td>
<td>Network BYOD exam.</td>
<td>Network mixed mode BYOD exam.</td>
<td></td>
</tr>
</tbody>
</table>

http://ta.vu/e-exam-roadmap

Extension work: An offline e-learning platform see moleap.org

We are here! Moodle resistant to network outages.
Paper equivalent e-Exam using word documents

Make format adjustments to cater for both paper and screen.

• Have students type their identification information on the first page.

• Use tables where complex layout is required e.g. questions and responses in designated areas (avoid ‘drawing objects’ to position text. Graphics because these tend to move unpredictably).
  • Selected response items – type ‘X’ to select in left column.
  • Ordering – add sequence labels in left column.
  • Labelling tasks – complete a table or add labels to descriptors.

• Use standard fonts (e.g. Times New Roman) to avoid substitution when placed into e-Exam system.

• Use different colour text in areas designated for responses. E.g. Ariel blue. This allows students to quickly see which questions they have answered when scrolling up and down the page.
Replicate the coversheet used at your institution.

Make adjustments for typists in a manner that hand-writers can use the same paper.

Test the document in the e-Exam system to ensure formatting appears as desired.

Common hints for typists.

| Table to type identify info, seat number, USB number as applicable. |
| Label conditions for typists |
Word documents
Question formats
Short answer or essay length questions

1. What is your name? [1 mark]

*Please write your answer below this line (example of typing below a regular carriage return).*

**Type here.**

- Place instructions for each question
- Show the mark for each question

Pre-format the area where a response will appear such that when students type a response it should appear in a different colour. This helps students quickly see which questions they have answered when scanning up and down the document.

Be sure to provide adequate white space between questions for hand-writers to respond as well. (Note: placing ‘type here’ is not required).

2. What is the make/manufacturer of your computer? [1 mark]

*Please write your response inside the box below. (example of typing into min height box)*

**Type here…**

Response area can be defined using a min-height single cell table. Using min-height provides better stability in terms of layout and pagination. The min-height can be set to provide an indication as to the expected length of the response. The table will expand if additional text is entered. Table borders can be solid, dotted or hidden as may be appropriate.
Word documents

Question formats

Selected response, sorting, matching and diagram labeling.

7. Into which drive is the e-Exam response file saved? [1 mark].

<table>
<thead>
<tr>
<th>Response</th>
<th>Please type an x into only one ‘response’ box to indicate your answer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) System</td>
<td></td>
</tr>
<tr>
<td>b) eExam</td>
<td></td>
</tr>
<tr>
<td>c) Answers</td>
<td></td>
</tr>
</tbody>
</table>

5. Please label the parts of the picture shown below. [3 marks]

A two column table works for typists and hand-writers. Several question types can be done using this structure.

Use a two column table with matching letter labels. Students place their responses into the right-side column.

Adjust diagram to remove text. Replace with numbered/letter labels. Use single image or ‘group’ the drawing objects.

Min-height rows can be used to provide more space. But do not pad cells with carriage returns!
Paper equivalent using word documents

Question formats: Further examples – matching, labelling, completing a table or matrix, and extended text response.

### Question 2.
Match the following host-MOTA names (below).

**Possible descriptions:**
- a) Mauris id mi id orci interdum semper
- b) Sed et necque ut est dignissim tringilla
- c) Vivamus in dolor euismod, luctus libero
- d) Mauris vehicula eros a viverra pellentesque
- e) Cura bitur eu mi at nibh commodo vari
- f) Aenean eget orci porta, malesuada lorum

Please write or type the letter of the descriptions listed.

<table>
<thead>
<tr>
<th>Answer</th>
<th>Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>f</td>
<td>I. Paxogen</td>
</tr>
<tr>
<td>a</td>
<td>II. Siabosis</td>
</tr>
<tr>
<td>c</td>
<td>III. Fakesalism</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>Label goes here. Constructed response question.</td>
</tr>
<tr>
<td>B</td>
<td>Blue text makes it easier to see which questions have been answered and which have not!</td>
</tr>
<tr>
<td>C</td>
<td>Use minimum row heights to provide plenty of space, but don’t use double carriage returns!</td>
</tr>
<tr>
<td>D</td>
<td>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 [fadism](#) relevant to his age range (4-6 years), and describe how Samuel and Eamon differ in their abilities to perform fadism.

<table>
<thead>
<tr>
<th>Two different examples of flippant fadism (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 heights 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 XEZA. Does this mean?

Please write / type your response inside the box below.

The student types their answer here. In this example a two row table. The response table row is created cell has a minimum height set (by dragging the bottom) 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.
Word documents
Question formats
Diagram and drawing responses

8. Draw your face below using the drawing tools [View > Toolbars > Drawing]. [2 marks].

Please put your answer below this line (you may make more space as required).

Diagrams in the e-Exam system (Libre Office)
1. In Libre Office Writer: upper right toolbar and select (or use the top menu bar View > Toolbars > Drawing).
2. The Drawing toolbar will appear at the bottom of the window.
3. To draw use tools: Pencil 'Free-form Line' for free hand lines, 'line' tool for straight lines, shape tools to draw shapes, and 'text box' to type labels.
4. To edit an object, select it with from the drawing tool bar. Then
5. Use the 'Properties' tool bar at the top of the window.
Paper-equivalent student’s choice

Macquarie University. Paper equivalent in-class exam. ICT in Education, 80 min 40% Final exam. Word document: 10 x MCQ and 1 x Essay.
Phase 1 ~ toe in the water.
BYO laptop, offline (no network).
Paper equivalent language exam

University of Queensland. French language. 120 min 30%. Article translation and response essay. LOTE selection during start up \(^1\). Word document with two column (table) layout to facilitate ease of translation \(^2\). Type English and French using QWERTY \(^3\) with accents or AZERTY layout.

Example: Accent agiu é: type a 'single quote' then type the letter e.
Paper equivalent language translation exam

NAATI certification at Monash University 2016-2018. Multiple languages and input methods available. LOTE selected at system startup.
Towards ‘post-paper’ (phases 1 to 2)

Start simple and build up!

- Scratch SDK
- Start! Exam doc
- Video
- PDF
- Sims
- Spreadsheets as ‘forms’ or as calculation and analysis.
- Specialist applications

Towards ‘post-paper’ (phases 1 to 2)
Word documents

Post-paper features can include multimedia and additional software tools.

*Recommended*: Use embedded links within the document to point to media resources or software tools (when these are ‘portable’ apps). Do not place multimedia objects directly into the document because these tend to break.

Links must be ‘relative’ within the e-Exam USB. See example hyperlink below.

Provide instructions for alternative access e.g. Students can find the resource using the File manager.

9. View the video file by clicking on [this link](file:///localhost/mnt/eexam/Materials/CelestiaPortable/CelestiaPortable.exe), or double-click on the file Genomics Digital Lab.ogg in the Materials folder. [2 marks].

10. Open the CelestiaPortable application file by clicking on [this link](file:///localhost/mnt/eexam/Materials/CelestiaPortable/CelestiaPortable.exe) or go to the Materials/CelestiaPortable folder and open CelestiaPortable.exe. After the software opens a planet appears on the screen. Write the name of the planet you see below [Type here...].
Word documents

Mathematics example. Use third party software to answer questions. In the case of installed applications users will need to locate the software via the launcher.

3. **Scilab** will be required for the following question.

To open this application, click on the circular icon on the top left of the screen, and then type ‘Scilab’ into the search box that appears.

What are the results of the following Scilab program? [1 mark]

Please put your response inside the box below.

```
Use this program:
function f = myquadratic2arg ( x1 , x2 )
    f = x1**2 + x2**2;
endfunction
xdata = linspace ( -1 , 1 , 100 );
ydata = linspace ( -1 , 1 , 100 );
contour ( xdata , ydata , myquadratic2arg , 10 )
```

How do you interpret this chart?
Student uses software tool to explore and construct a response.

The output of the software - in this case a chart. This can be copy-pasted back to the word document.

Provide space for responses in the word document. i.e. the student can paste the chart here!

The chart shows that

How do you interpret this chart?

$$f = x1^{*2} + x2^{*2};$$
endfunction
xdata = linspace (-1, 1, 100);
ydata = linspace (-1, 1, 100);
contour (xdata, ydata, myquadratic2arg, 10)
Candidates can access wxMaxima, SciLab, GeoGebra, GNU Octave (like MatLab), R (statistics package) to interrogate questions. Data sets can be provided for analysis. A standard LibreOffice suite (word processor, spread sheet etc), media, plus programming tools such as Python, Scratch can also be made available as separate modules. Responses can be made via world document or Moodle LMS.
Spread sheet as a Form

Monash University 2017
Phase 2.5!
A form - but with no network.
Multiple components:
1) Student XLS file (contains questions and response fields – given to students).
2) Collation utility (to merge student response files into single marking file. Not given to students).
3) Marking XLS file (contains assessment logic and answers. Not given to students).
### Spread sheet as a Form

**Language tools available according to LOTE selection**

<table>
<thead>
<tr>
<th></th>
<th>Rewrite</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>你好</td>
<td></td>
</tr>
</tbody>
</table>

(2) 你 得 好听 朋友 唱歌 非常 唱 女
Rewrite: 你好
English:   

(3) 我 他 例 见
Rewrite:   
English:  

Respond in designated cells (other cells are locked).
e-Exam Trial - Chinese language (Monash 2017)

2017 example: 1st year Introduction to Chinese - 1hr, 16% in-class test. 73 students enrolled; 16 typed and 57 handwrote.

“I would recommend the e-Exam system to others”:

- Strongly Disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

![Image of students using laptops]
**Feedback - Selected 2017 trials. Those that typed the exam:**

“I would recommend the e-Exam system to others”

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monash: APG5048 Advanced Translation S2 2016 mock exam</td>
<td>5.0 (SD: 0.6)</td>
<td>4.4 (SD: 0.6)</td>
<td>4.1 (SD: 0.8)</td>
<td>4.2 (SD: 0.7)</td>
<td>4.3 (SD: 0.7)</td>
</tr>
<tr>
<td>Monash: APG5690 Applied Translation S1 2017</td>
<td>4.9 (SD: 0.6)</td>
<td>4.4 (SD: 0.6)</td>
<td>4.1 (SD: 0.8)</td>
<td>4.2 (SD: 0.7)</td>
<td>4.3 (SD: 0.7)</td>
</tr>
<tr>
<td>UQ: FREN3113 French Language S1 2017</td>
<td>4.9 (SD: 0.6)</td>
<td>4.4 (SD: 0.6)</td>
<td>4.1 (SD: 0.8)</td>
<td>4.2 (SD: 0.7)</td>
<td>4.3 (SD: 0.7)</td>
</tr>
<tr>
<td>Monash: ATS1002 Chinese Language S1 2017</td>
<td>4.9 (SD: 0.6)</td>
<td>4.4 (SD: 0.6)</td>
<td>4.1 (SD: 0.8)</td>
<td>4.2 (SD: 0.7)</td>
<td>4.3 (SD: 0.7)</td>
</tr>
<tr>
<td>Monash: APG5048 Language Translation S2 2017</td>
<td>4.9 (SD: 0.6)</td>
<td>4.4 (SD: 0.6)</td>
<td>4.1 (SD: 0.8)</td>
<td>4.2 (SD: 0.7)</td>
<td>4.3 (SD: 0.7)</td>
</tr>
<tr>
<td>UQ: FREN3113 French Language B S2 2017</td>
<td>4.9 (SD: 0.6)</td>
<td>4.4 (SD: 0.6)</td>
<td>4.1 (SD: 0.8)</td>
<td>4.2 (SD: 0.7)</td>
<td>4.3 (SD: 0.7)</td>
</tr>
</tbody>
</table>

- **N:** 15, 30, 15, 16, 22, 6
- **Mean:** 4.6, 4.4, 4.1, 4.2, 4.3, 4.5
- **SD:** 0.6, 0.6, 0.8, 0.7, 0.7, 0.8
Post-paper e-Exams with media and apps

Word document question and response space – links to e-tools

University of Tasmania. ICT in Education. Final exam 47%, 2 hours. Word doc with short and long text. Constructed response tasks.

Critique student understanding (video)

Solve a problem in Scratch (block programming for primary school students)

Multimedia video prompts.

Scratch programming task

Chemistry education software evaluation
Example Media (video) prompt: Critique student understanding

Teaching Secondary Mathematics. Example question: Comment on the child’s understanding of symmetry based on her response to this task.
Solve a problem in Scratch

Digital Technologies Education

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 picture of a house as they move Felix around the stage.
Programming e-Exam
Edith Cowan University. Teaching Python Programming exam.
Offline word document + Python IDLE

Q1: [5 points]
A program requires user input to calculate the number of times a coin is flipped. If the coin is flipped 3 times, the user should enter the number of times it is flipped. The program should then count the number of times the coin is flipped and output the number of times it is flipped. Write a Python program for this task. Use an appropriate algorithm.

Q2: [5 points]
A program is required that receives input of five numbers one by one and then prints out the numbers sorted alphabetically:
   a) Draw a flowchart to represent the algorithm for your program (5 points)
   b) Write a Python program for this problem (5 points)

Q3: [5 points]
A program is required to store a list of tools and their hire rates in dollars per day. Write a Python program to insert, update, and delete the list of tools and their hire rates.

Q4: [5 points]
A program is required to store a list of tools and their hire rates in dollars per day. Write a Python program to insert, update, and delete the list of tools and their hire rates.

Q5: [10 points]
Create a program to simulate an automatic teller machine. The program should:
   a) Set up the accounts for 3 people and store their four-digit pin number and their initial balance in a text file (5 points).
   b) Allow a user to login using their pin (1 point)
   c) Allow a user to see the balance of their account (2 points)
   d) Allow a user to deposit and withdraw money (5 points)

End of Exam

```python
# Define a function to display data
def displayData():
    print(f.read())

# Create a text file to store tools and hire rate
with open("tools_sheet.txt", "w") as f:
    print("tool1: " + tool1 + " hire rate: " + price1)
    print("tool2: " + tool2 + " hire rate: " + price2)
    print("tool3: " + tool3 + " hire rate: " + price3)
    print("tool4: " + tool4 + " hire rate: " + price4)

# Retrieve data from the text file
```
Robust Moodle

Monash University 2018. Chinese language – two units (1\text{st} year and 3\text{rd} Year). Listening test.

Moodle quiz question/response medium Selected 3\text{rd} party software included.

Robust Moodle worked to rescue network outages (double layered backup!).

Audio data files cached at the start of the exam. Students used headsets to listen. Responses via Moodle.
Third party software included

LMS questions in Safe Exam Browser

This is an offline dictionary tool ‘Dim Sum’
My hand writing is neat

- Strongly Agree: 45%
- Agree: 44%
- Neutral: 8%
- Disagree: 2%
- Strongly Disagree: 2%

My typing is fast enough for exams

- Strongly Agree: 33%
- Agree: 23%
- Neutral: 17%
- Disagree: 7%
- Strongly Disagree: 19%
## Student Findings Pre and post survey (Moodle 2018)

<table>
<thead>
<tr>
<th>Written instructions were easy to follow</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was easy to start my computer using the e-Exam USB stick</td>
<td>121</td>
<td>122</td>
<td>120</td>
<td>102</td>
<td>75</td>
</tr>
<tr>
<td>I can use the e-Exam system just as well as my own laptop system</td>
<td>128</td>
<td>129</td>
<td>127</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>It was easy to use the office suite (word processor/spread sheet)</td>
<td>124</td>
<td>125</td>
<td>123</td>
<td>104</td>
<td>77</td>
</tr>
<tr>
<td>It was easy to use software applications beyond the word processor</td>
<td>126</td>
<td>127</td>
<td>125</td>
<td>106</td>
<td>79</td>
</tr>
<tr>
<td>It was easy to save my response files into the correct place</td>
<td>129</td>
<td>128</td>
<td>126</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>It was easy to answer multiple-choice questions in the e-Exam system</td>
<td>122</td>
<td>123</td>
<td>121</td>
<td>103</td>
<td>76</td>
</tr>
<tr>
<td>Overall, I feel the e-Exam System is easy to use</td>
<td>125</td>
<td>126</td>
<td>124</td>
<td>106</td>
<td>79</td>
</tr>
<tr>
<td>I feel the e-Exam System is reliable against technical failures</td>
<td>126</td>
<td>127</td>
<td>125</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>I feel the e-Exam System is secure against cheating</td>
<td>125</td>
<td>126</td>
<td>124</td>
<td>107</td>
<td>80</td>
</tr>
<tr>
<td>I now feel relaxed about using the e-Exam system for my exam</td>
<td>127</td>
<td>128</td>
<td>126</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>I would recommend the e-Exam System to others</td>
<td>126</td>
<td>127</td>
<td>125</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>My laptop is reliable for use in a computerised exam</td>
<td>127</td>
<td>128</td>
<td>126</td>
<td>109</td>
<td>82</td>
</tr>
<tr>
<td>My typing skills are fast enough for a computerised exam</td>
<td>128</td>
<td>129</td>
<td>127</td>
<td>109</td>
<td>82</td>
</tr>
<tr>
<td>Computerised exams make me more stressed than handwritten exams</td>
<td>126</td>
<td>127</td>
<td>125</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>I would like to use a computer for exams in the future</td>
<td>127</td>
<td>128</td>
<td>126</td>
<td>109</td>
<td>82</td>
</tr>
<tr>
<td>I am concerned about network outages impacting my exam</td>
<td>128</td>
<td>129</td>
<td>127</td>
<td>109</td>
<td>82</td>
</tr>
<tr>
<td>I am reassured the e-Exam system was robust against network outages</td>
<td>129</td>
<td>128</td>
<td>126</td>
<td>108</td>
<td>81</td>
</tr>
<tr>
<td>The included software was useful [e.g DimSum]</td>
<td>126</td>
<td>127</td>
<td>125</td>
<td>107</td>
<td>80</td>
</tr>
<tr>
<td>Moodle worked well as an exam environment</td>
<td>127</td>
<td>128</td>
<td>126</td>
<td>108</td>
<td>81</td>
</tr>
</tbody>
</table>

**Caveat:** Not random samples - descriptive of these groups only.
Student Findings - 3rd exam (final)

Moodle worked well for exams

Can use as well as own laptop OS
Some Key Findings - BYOD Robust e-Exam Moodle

a) The e-Exam system was rated well by the typists: 4+ out of 5 (strongly agree)

b) Robust network features worked (at least two obvious WiFi outages):
   Responses were auto saved to USB, retrieved following exam and re-joined the e-workflow in Moodle. No Lost work! No interruptions!

c) Time saved in marking essay responses: 20% to 30% over that of paper responses.

d) Students need transition opportunity: from earlier exams ~ pre 2015 roughly 30% preferred paper - Must help all stakeholders adopt e-Exams!
Case studies

More information and mini cases at http://transformingexams.com

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