



TRANSFORMINGEXAMS.COM

A Scalable Examination Platform for BYOD Invigilated Assessment

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

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Transforming Exams

Updated 31 May 2019



Australian Government
Department of Education and Training



MONASH
University



THE UNIVERSITY
OF QUEENSLAND



UNIVERSITY OF
TASMANIA



Australian
National
University



MACQUARIE
University



AUSTRALIA
ECU
EDITH COWAN
UNIVERSITY



University
AUSTRALIA



RMIT
UNIVERSITY



UNSW
AUSTRALIA



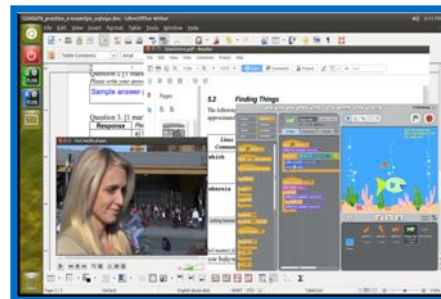
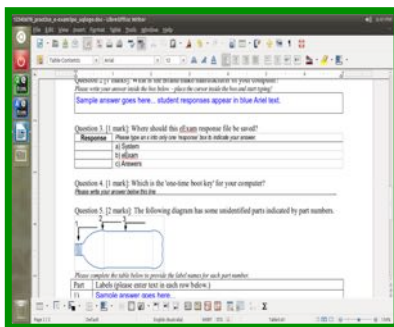
University of
South Australia

Adoption roadmap: towards authentic e-assessment

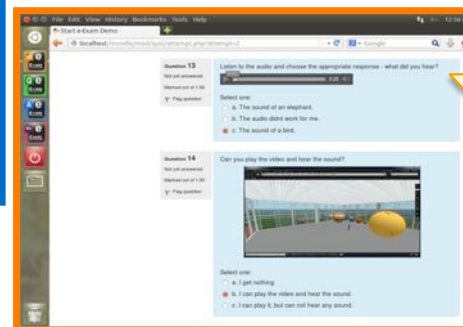
| Start > | > > > | > > > | > > > | > > > | > > > | > Future > |
|---|--|---|---|---|---|------------|
| Get Ready | Phase 1 | Phase 2 | Phase 3 | Phase 4 | Phase 5 | |
| Institutional approvals, research ethics, hardware and infrastructure | Paper equivalent small scale. Basic doc exams to begin! | Post-paper small to medium. Expanding the app and media landscape. | Medium to large scale. Adding the power of an LMS. | Whitelisted and logged Internet Network BYOD exam. | Open but fully logged Internet Network mixed mode BYOD exam. | |
| | Crawling | Walking | Running | Jumping | Flying! | |



<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.

Word documents

Question formats

Short answer or essay length questions

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.

Show the mark for each question

Place instructions for each question

1. What is your name? [1 mark]

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

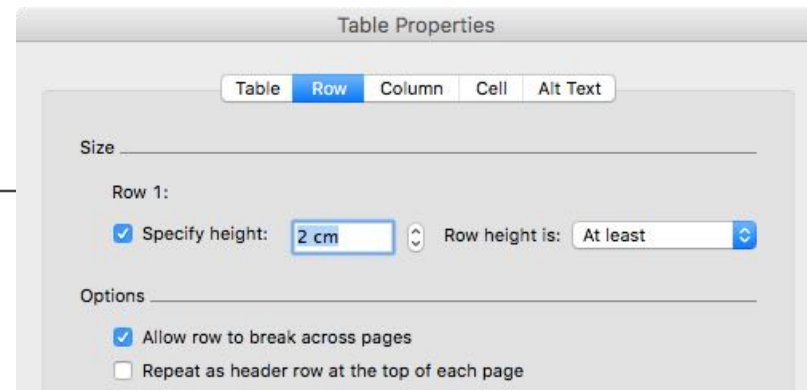
Type here.

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...



Word documents

Question formats

Selected response, sorting, matching and diagram labeling.

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

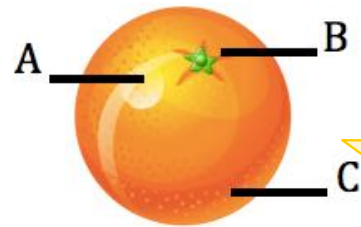
| Response | |
|-----------------|--|
| a) System | |
| b) <u>eExam</u> | |
| c) Answers | |

Indicate how students should respond.
E.g single or multiple response.
A sorting question can be done by entering numbers.

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

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

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.

Please type your answer into the labels column below.

| Part | Labels |
|------|--------|
| a) | Type |
| b) | |
| c) | |

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 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 libe
- d) Mauris vehicula eros a viverra pellent
- e) Curabitur eu mi at nibh commodo var
- f) Aenean eget orci porta, malesuada lor

Please write or type the letter of the descriptions listed

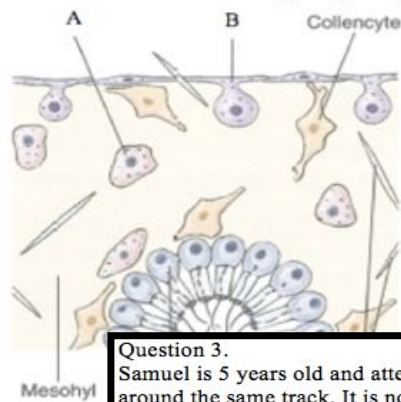
| Answer a to f. | Terms |
|----------------|-------------------------|
| <u>f</u> | <u>I. Paxogen</u> |
| <u>a</u> | <u>II. Sitabosis</u> |
| <u>c</u> | <u>III. Fakeasalism</u> |
| <u>e</u> | |

Question 7: Some rationales for punishment are **XEZT** 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 box) 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.

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



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

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 faxadism relevant to his age range (4-6 years), and describe how Samuel and Eamon differ in their abilities to perform faxadism.

[4 marks]

| Two different examples of flippant <u>faxadism</u> (one per row) <u>Type here</u> | Describe Samuel's abilities (age 5) | Describe <u>Eamon</u> 's abilities (age 10) |
|--|--|---|
| | <u>Minimum heights set for both rows</u> | |
| | | <u>More details about setting heights appear later in these examples.</u> |

Word documents

Question formats


Diagram and drawing responses

Place instructions for typists to use drawing tools (note be sure the instructions match the e-Exam system software! – see below)


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

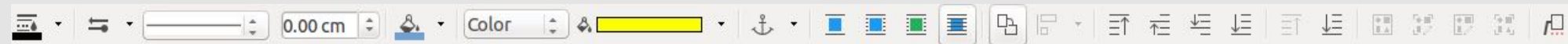
Please put your answer below this line (you may make more space as required).

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.



2. 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.
3. To edit an object, select it with  from the drawing tool bar. Then
4. Use the 'Properties' tool bar at the top of the window

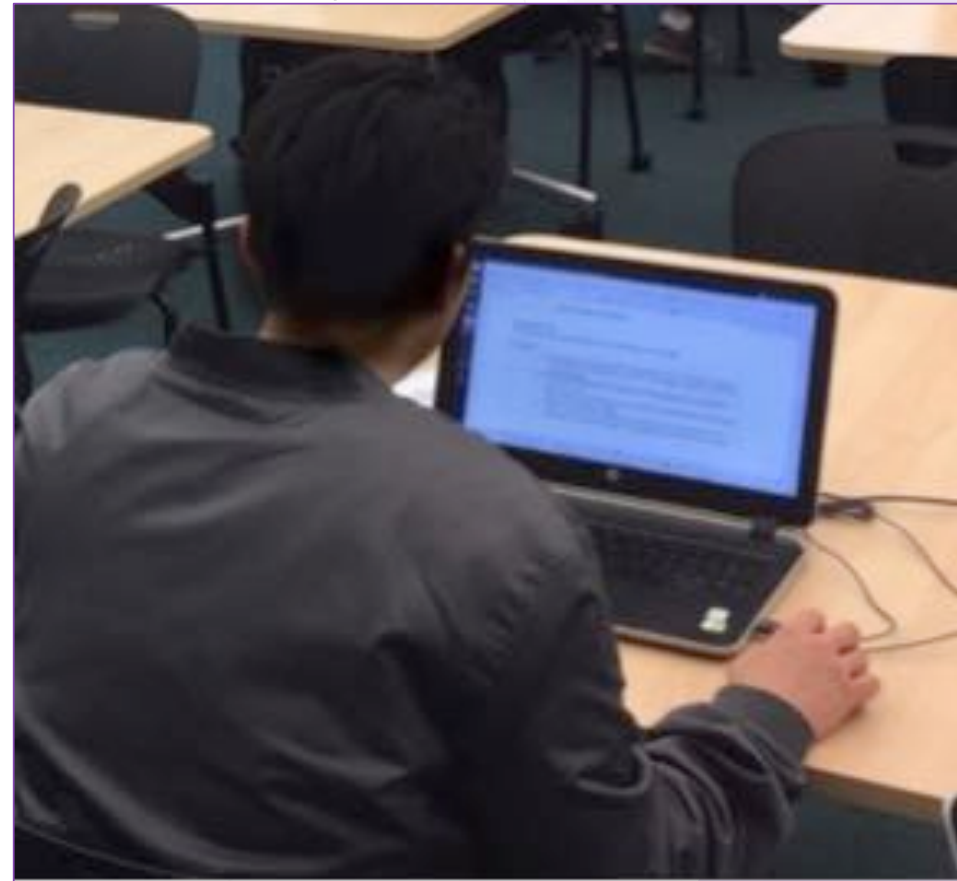


Paper-equivalent student's choice

Macquarie University. Paper equivalent in-class exam. ICT in Education, 80 min
40% Final exam. Word document: 10 x MCQ and 1 x Essay.

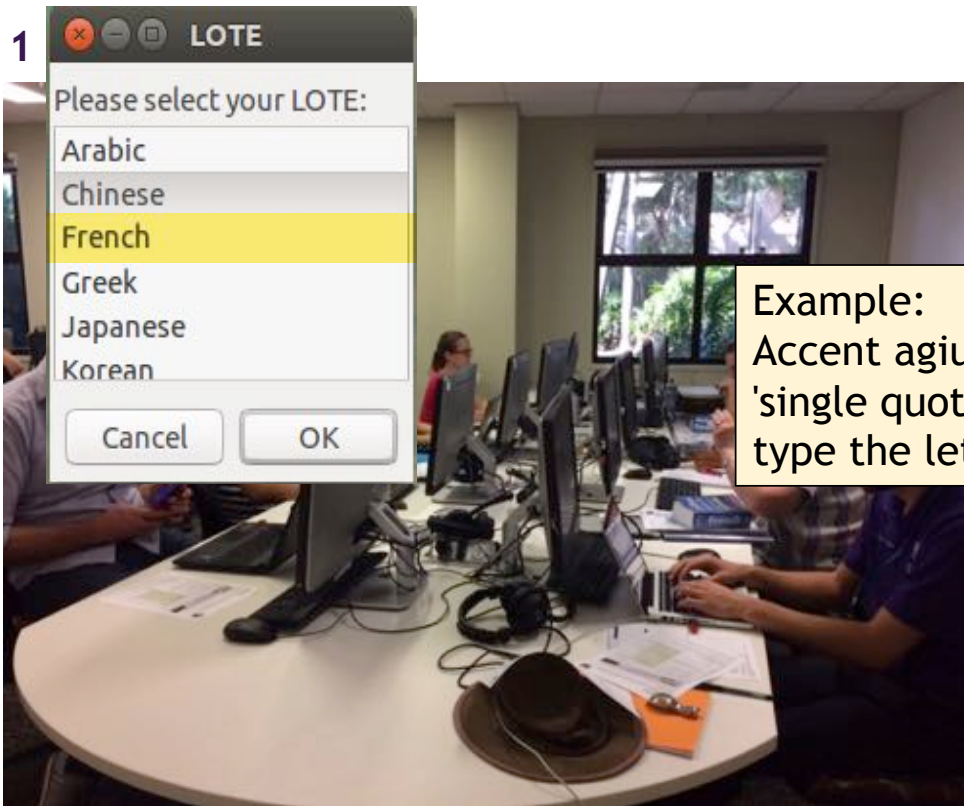
Phase 1 ~ toe in the water.

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.



3

Example:
Accent agiu é: type a
'single quote' then
type the letter e.

2

Text 1
Brief

This French ad for Expédia.fr is targeted at Francophone travellers who want to visit Senegal, West Africa. The Australian branch of Expedia has asked you to translate the ad copy into English with Australian travellers in mind.

Source Text 338 words

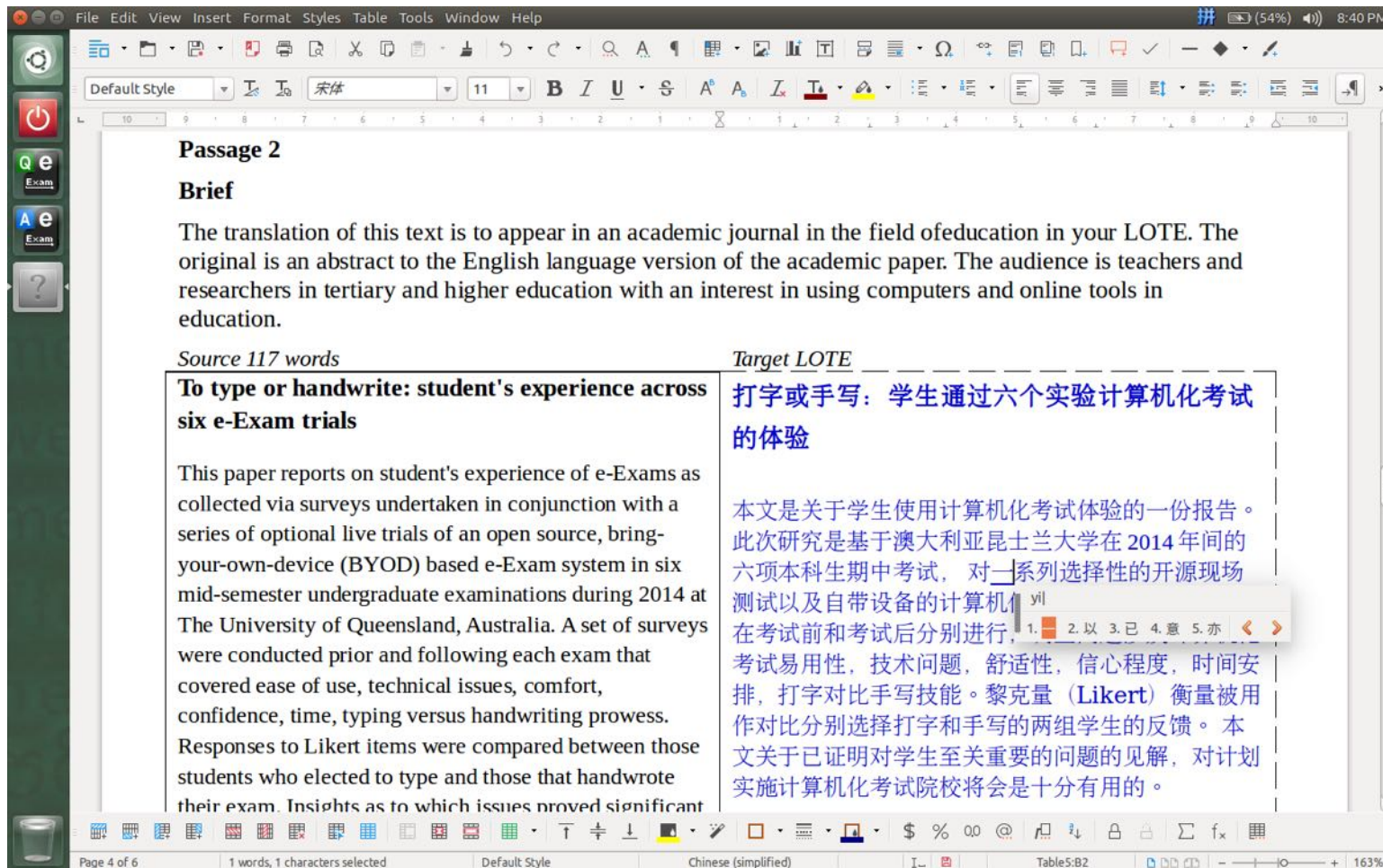
Target text – type in the dashed box below.

| Vacances à destination de : Sénégal | Holidays in Senegal |
|--|---------------------|
| Envie de partir en vacances en Sénégal ? Laissez Expedia vous guider vers les vacances parfaites, où vous pourrez vous détendre et profiter de votre séjour. Notre page consacrée aux séjours en Sénégal vous aide à organiser votre séjour et à en profiter pleinement. Si vous avez déjà réservé ou pensez réserver un voyage en Sénégal, pourquoi ne pas réserver un hôtel avec votre billet d'avion ? Vous pourrez ainsi réaliser des économies en profitant des meilleures offres d'Expedia. | |
| Pour planifier votre séjour, utilisez notre carte pour trouver les principaux sites touristiques à visiter en Sénégal et vous familiariser avec les environs de votre hôtel. Vous vous y rendez pour la première fois ? Notre page sera un bon point de départ. Vous pourrez en apprendre plus sur votre destination et ainsi établir un itinéraire reprenant tous les lieux que vous souhaitez visiter, y compris les musées, marchés, magasins, restaurants et bars. Nous avons également une section dédiée aux attractions touristiques et lieux d'intérêt. Jetez-y un œil pour plus d'idées d'activités lors de votre séjour. | |

Paper equivalent language translation exam

NAATI certification at Monash University 2016-2018.

Multiple languages and input methods available. LOTE selected at system startup.

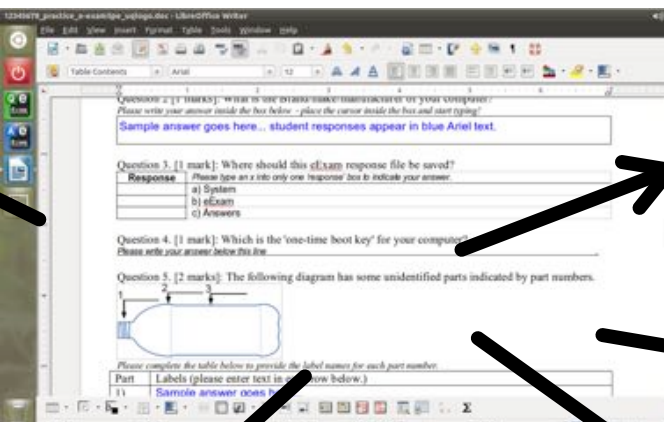


Towards 'post-paper' (phases 1 to 2)

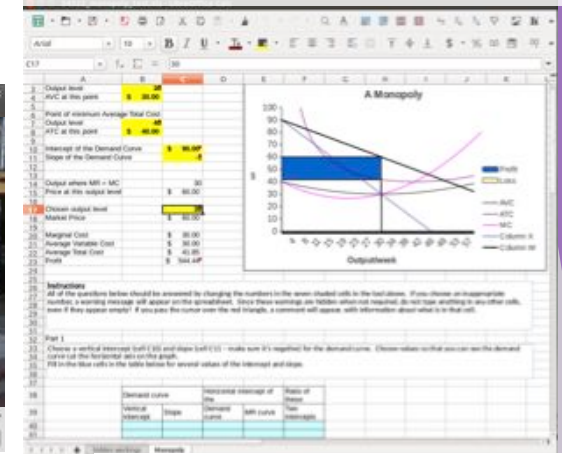
Start simple and build up!



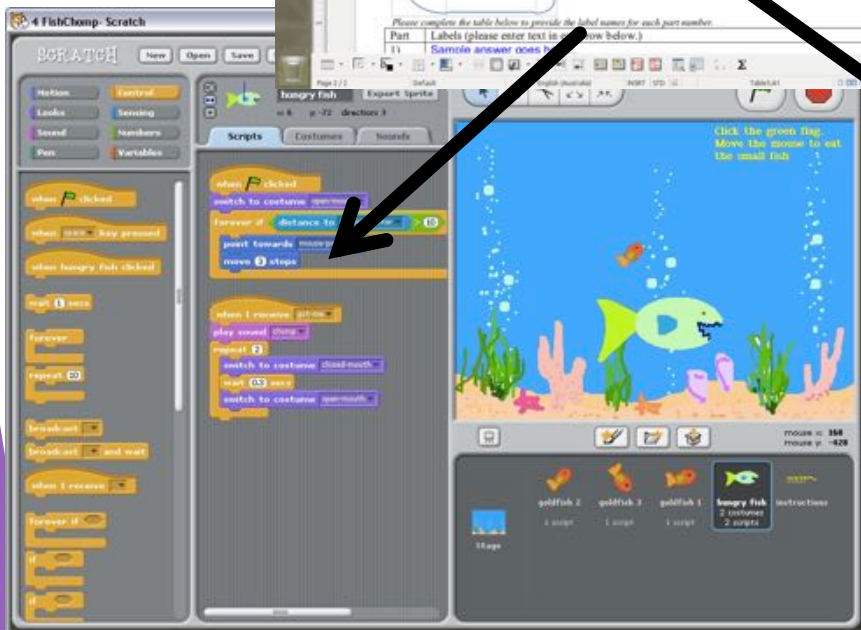
Start! Exam doc



Video



Scratch SDK

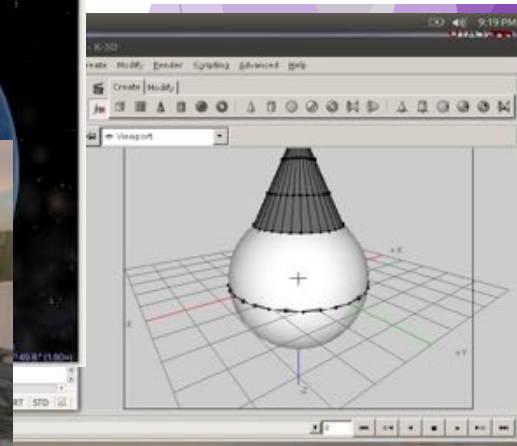


Spreadsheets as 'forms' or as calculation and analysis.

Specialist applications

PDF

Sims



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.

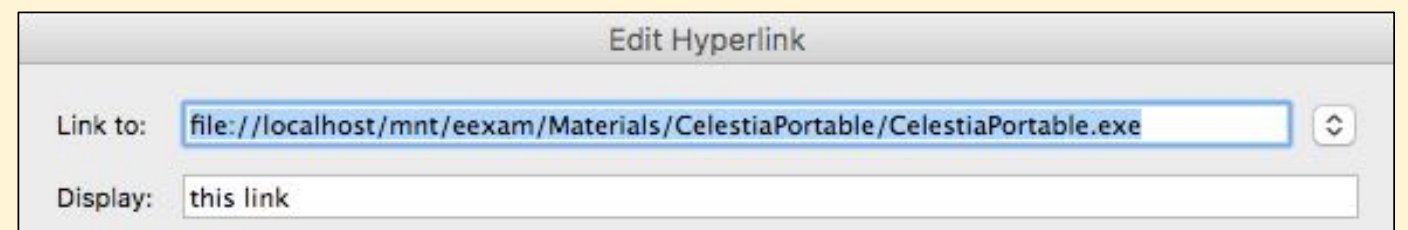
Provide instructions for alternative access e.g. Students can find the resource using the File manager.

9. View the video file by clicking on [this link](#), 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](#) 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.

Please put your answer below this line

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?

Provide instructions to access the software.

Provide space for responses – these can potentially be copy-pasted from the other software.

Command History

File Edit ?

File Browser /home/ubun

Scilab 5.5.2 Console

```
Startup execution:  
loading initial environment  
  
-->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)  
-->
```

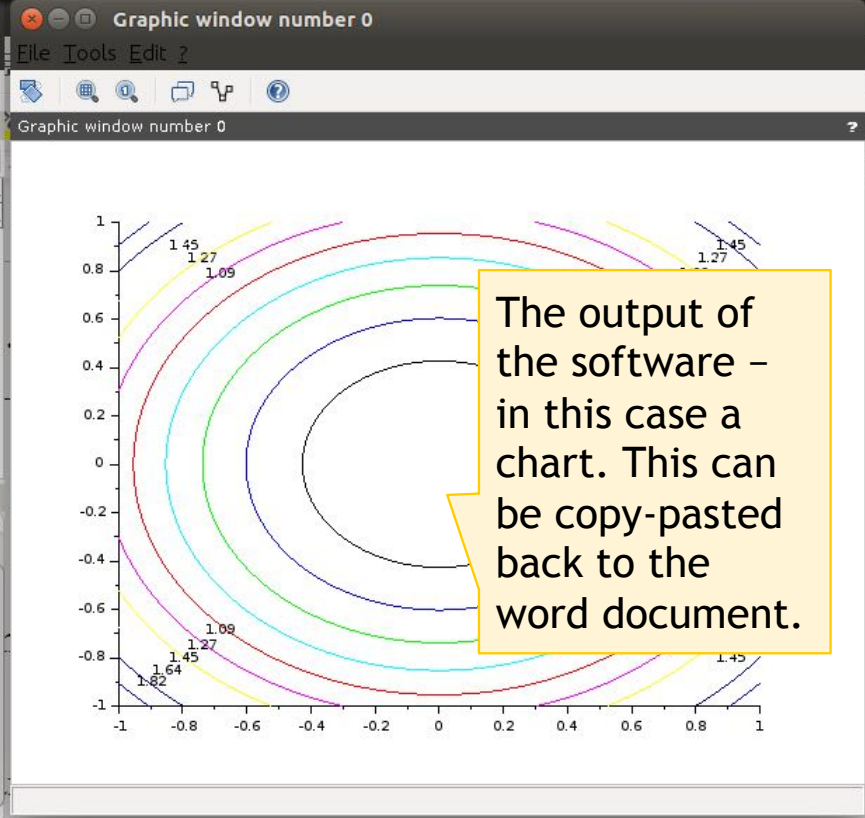
Variable Browser

| Na... | Value | Type | Visi... |
|-------|-------|--------|---------|
| ydata | 1x100 | Dou... | local |
| xdata | 1x100 | Dou... | local |

Command History

```
f = x1**2 + x2**2;  
endfunction  
xdata = linspace (-1, 1, 100);  
ydata = linspace (-1, 1, 100);  
contour (xdata, ydata, f  
// -- 07/02/2018 00:29:57 --  
function f = myquadratic  
f = x1**2 + x2**2;  
endfunction  
xdata = linspace (-1, 1, 100);  
ydata = linspace (-1, 1, 100);  
contour (xdata, ydata, f
```

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.

```
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?

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

The chart shows that

Mathematics and other applications

Starter files, code, frameworks, spreadsheets or large data sets can be provided for analysis.

The screenshot shows a desktop environment with several applications open. In the foreground, the Scilab 5.5.2 Console window is active, displaying the following code and output:


```
-->function f = myqua
-->f = x1**2 + x2**2;
-->endfunction

-->xdata = linspace (-1, 1, 100);
-->ydata = linspace (-1, 1, 100);
-->contour ( xdata ,
-->

Input: (-0.53518, 1.85926)
>> corr(boys(:,2), boys(:,3))
ans = 0.95695
>>|
```

The LibreOffice Writer window shows a document with the following text:

be required for the following question.

application, click on the circular icon  on the top left of the screen, and then type 'Scilab' in the box that appears.

results of the following Scilab program? [1 mark]

response inside the box below.

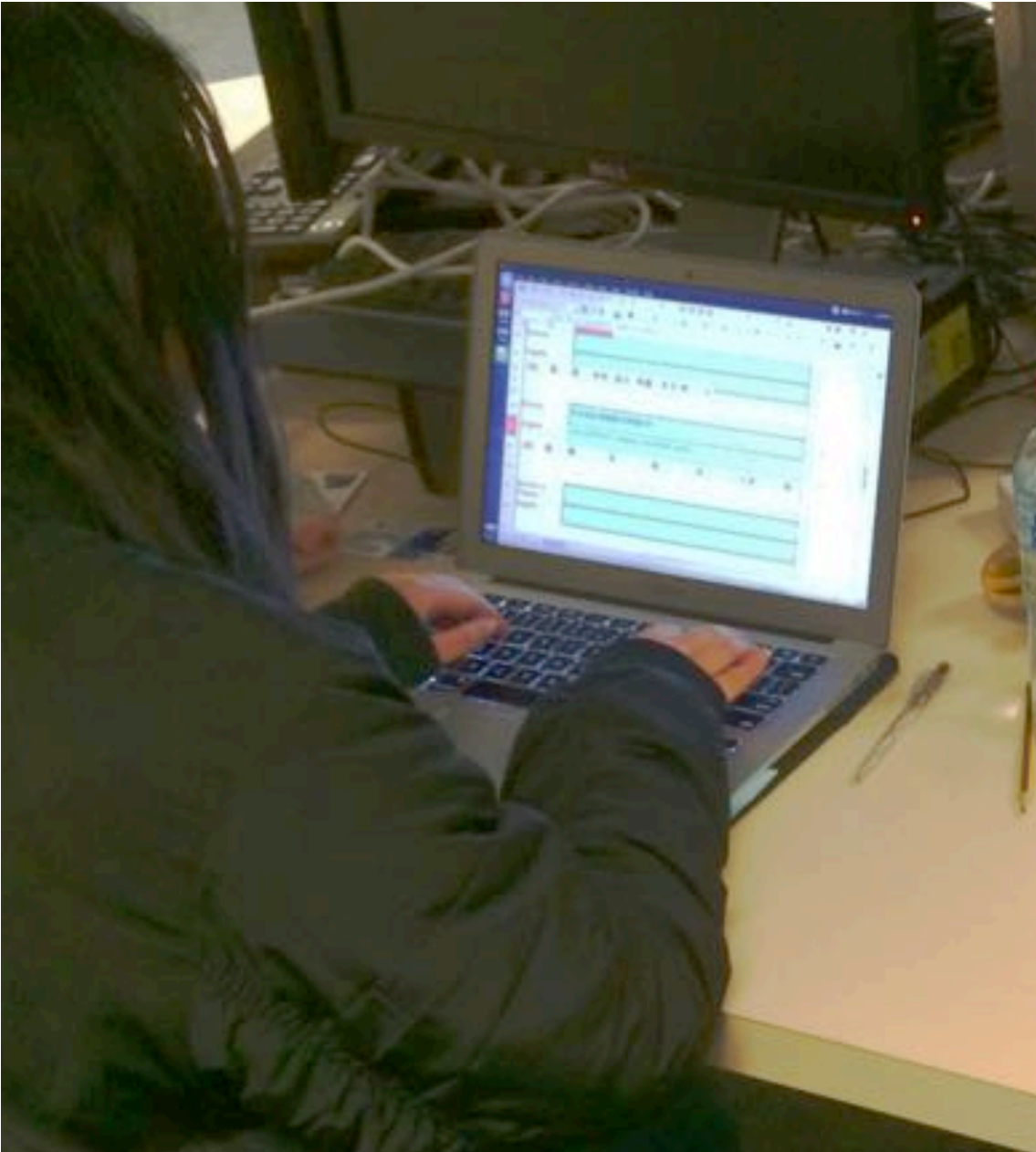
```
f = myquadratic2arg ( x1 , x2 )
+ x2**2;
on
inspace (-1, 1, 100 );
inspace (-1, 1, 100 );
xdata, ydata, myquadratic2arg, 10)
```

The Scilab graphic window shows a contour plot of a quadratic function, with the following text below it:

How do you interpret this chart? The graphic shows...

Multiple applications can be used together.

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

Language tools available according to LOTE selection

Language tools available according to LOTE selection

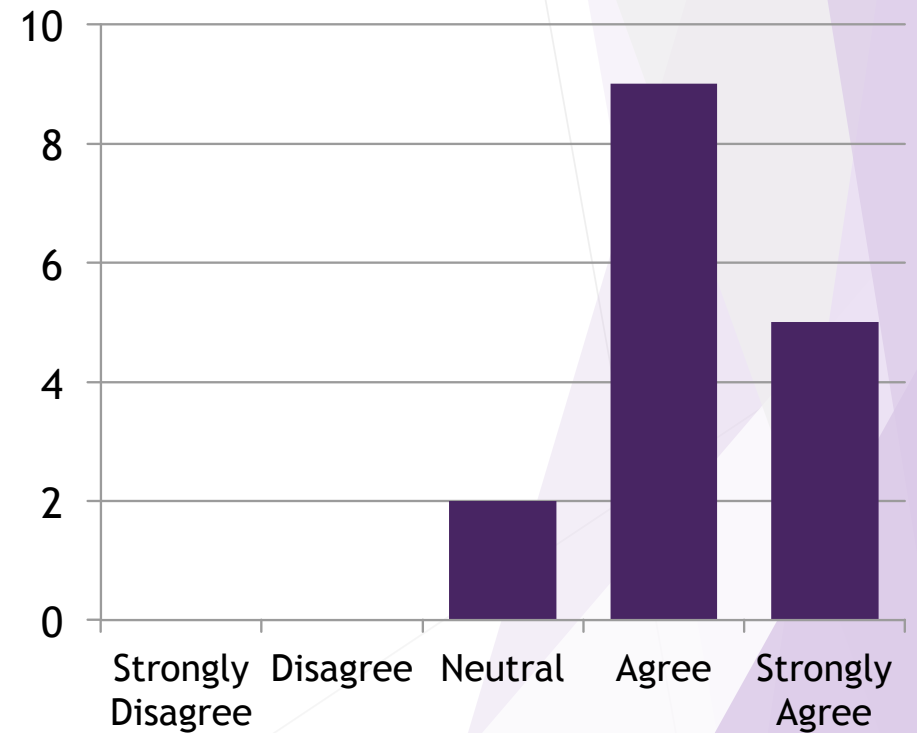
Respond in designated cells (other cells are locked).

e-Exam Trial - Chinese language (Monash 2017)

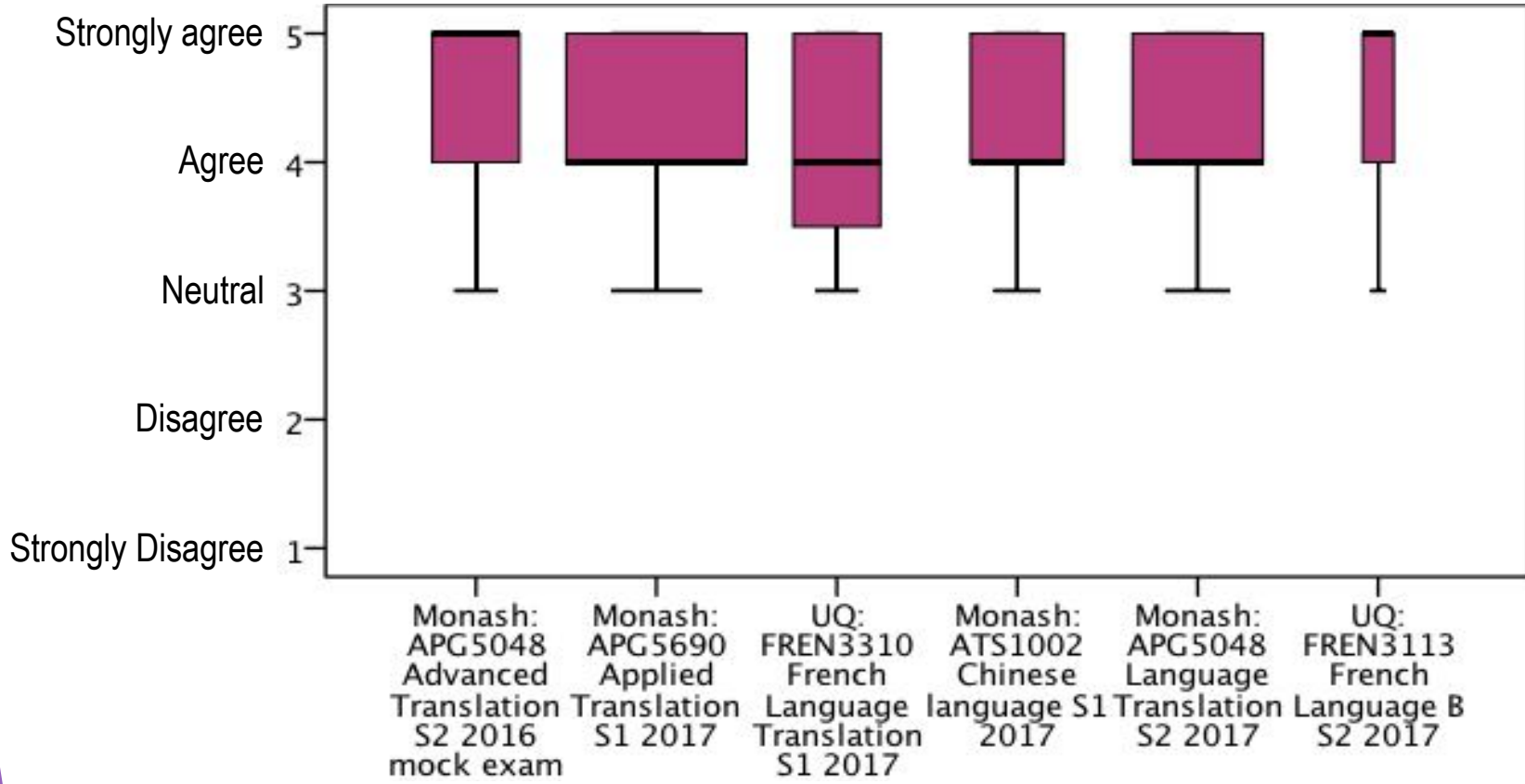
2017 example : 1st year Introduction to Chinese - 1hr, 16% in-class test.
73 students enrolled; 16 typed and 57 handwrote.



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



**Feedback - Selected 2017 trials. Those that typed the exam:
 “I would recommend the e-Exam system to others”**



| | | | | | | |
|------|-----|-----|-----|-----|-----|-----|
| 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

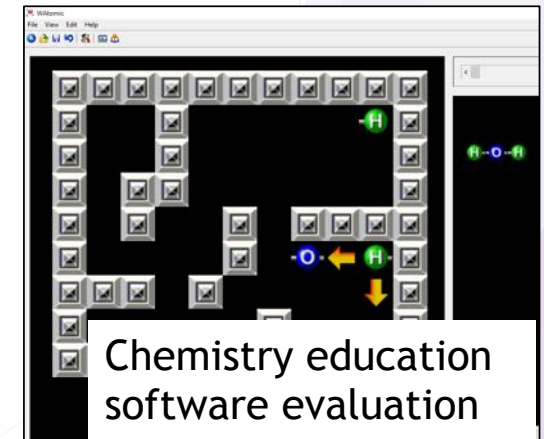
Word document question and response space – links to e-tools

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)



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.

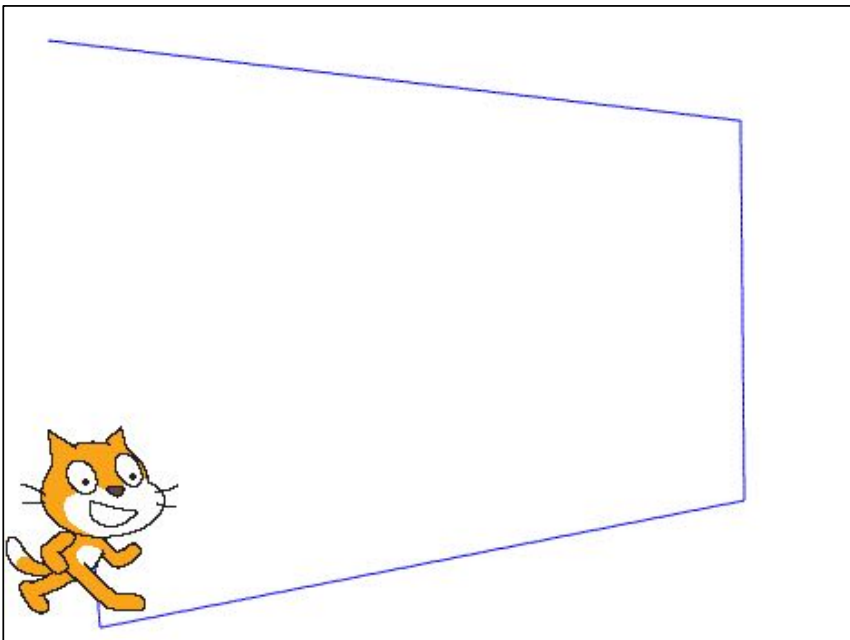


Solve a problem in Scratch

Digital Technologies Education

Write a program in Scratch using Felix the cat and a blank stage that:

- Allows Felix to be moved by pressing arrow keys on the keyboard
- Allows the user to draw a picture of a house as they move Felix around the stage.



```
when right arrow key pressed
  glide 5 secs to x: 172 y: 109
  wait 1 secs
  repeat until key down arrow pressed?
    glide 5 secs to x: 174 y: -100
    wait 1 secs
  repeat until key left arrow pressed?
    glide 5 secs to x: -181 y: -170
    wait 1 secs
  repeat until key up arrow pressed?
    glide 5 secs to x: -209 y: 153
```


Programming e-Exam

Edith Cowan University. Teaching Python Programming exam.

Offline word document + Python IDLE

Q1: [Sequence, user input, output] 5 points

A painter requires a program to calculate the number of litres of paint needed for a job. One litre of paint will cover 16 square metres. The program should accept the number of square metres to paint and then output the number of litres of paint required to the user.

Write a commented Python program for this task.
Open **IDLE** Python environment.
Remember to save all files to `./mnt/answers/`

Q2 [looping] 5 points

A program is required that receives input of five surnames one by one and then prints out the surnames sorted alphabetically.

- Draw a flowchart to represent the algorithm for your program [3 points]
 - You can use the drawing tools within this word processor. Make some extra space here, draw the diagram and save this file (it will be submitted on the USB stick).
or
 - Use a separate piece of paper labelled with your student ID to draw the diagram.
- Write a Python program for this problem [2 points]

Q3 [write a text file] 5 points

A program is needed to store a list of tools and their hire rate in dollars per day. Write a Python program to accept data from the user and store it in a text file.

Possible Data:

Air compressor: \$45 per day
Tile cutter: \$25 per day
Brick Saw: \$110 per day
Nail gun \$40 per day

Q4 [read a text file, use a function] 5 points

- Add to your program in Q3 so that it can retrieve the name of the tools and the cost per day from the text file [3 points].
- Display the data read from the file on the screen: make `'displayData'` a function in your program [2 points].

Q5 [Everything] 10 points

Create a *robust, modular, user-friendly, & commented* Python program to simulate an automatic teller machine. The program should:

- Set up the accounts for 3 people and store their four-digit pin number and their initial balance in a text file. [3 points]
- Allow a user to login using their pin [1 point]
- Allow a user to see the balance of their account [2 points]
- Allow a user to deposit and withdraw money [4 points]

End of Exam



```
1  ##...//Assessment 1.2: In-Class Test~
2  ##...Question #3 & 4~
3  ##...Author: #####~
4  ~
5  ##...//Create text file to store tools and hire rate~
6  ~
7  def displayData():~
8  ...print(a.read())~
9  ~
10 a = open("tools_sheet.txt", "w")~
11 ~
12 ##...//Receive user input of tools and hire rate~
13 tool1 = input("Please enter the first tool tool needed: ")~
14 price1 = input("Please enter the hire rate: ")~
15 print(tool1, ":", price1, file=a)~
16 ~
17 tool2 = input("Please enter the second tool tool needed: ")~
18 price2 = input("Please enter the hire rate: ")~
19 print(tool2, ":", price2, file=a)~
20 ~
21 tool3 = input("Please enter the third tool tool needed: ")~
22 price3 = input("Please enter the hire rate: ")~
23 print(tool3, ":", price3, file=a)~
24 ~
25 tool4 = input("Please enter the fourth tool tool needed: ")~
26 price4 = input("Please enter the hire rate: ")~
27 print(tool4, ":", price4, file=a)~
28 ~
29 a.close()~
30 ~
31 ~
32 ##...//Start of Question #4~
33 ~
34 ##...//Retrieve data from Question #3~
35 a = open("tools_sheet.txt", "r")~
36 print("diplaying contents of text file")~
37 displayData()~
38 a.close()~
39 ~
40 ##...//Display data from text file (in IDLE Shell enter 'displayData()')~
41 ~
```

Robust Moodle

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

Moodle quiz question/response medium Selected 3rd 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.

Question 5

Not yet answered

Marked out of
24.00

Flag question

Edit question

Section 3

Indicate the tones you hear.

Please enter a number for the tone you hear in the app

1. chuang lian

2. cao chang

3. fang xiang

4. guo jia



Third party software included

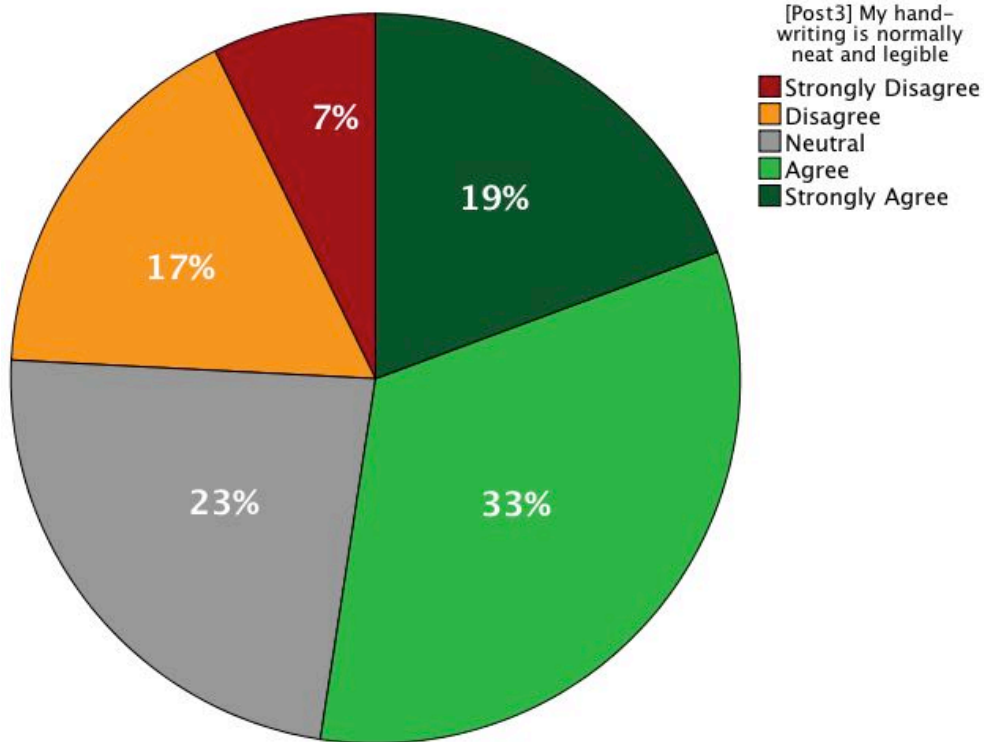
The screenshot displays the 'Start e-Exam Demo' interface. On the left is a vertical toolbar with icons for a refresh button, a power button, an 'e-Exam' logo, a question mark, and a small image. The main content area contains instructions for 'Advanced students' to translate Chinese passages into English. It includes a 'Passage 1' with Chinese text about population structure and labor force, and a 'Notes' section defining '口径' (kǒujīng) as 'standard' and '产出' (chǎnchū) as 'output'. Below the passage is a text input field for the translation and a toolbar with icons for bold, italic, list, link, and image. On the right, the 'DimSum Chinese Tools' window is open, showing a search for the character '还有' (hái yǒu), with a dropdown menu displaying its pinyin 'hái yǒu' and other details.

LMS questions in Safe Exam Browser

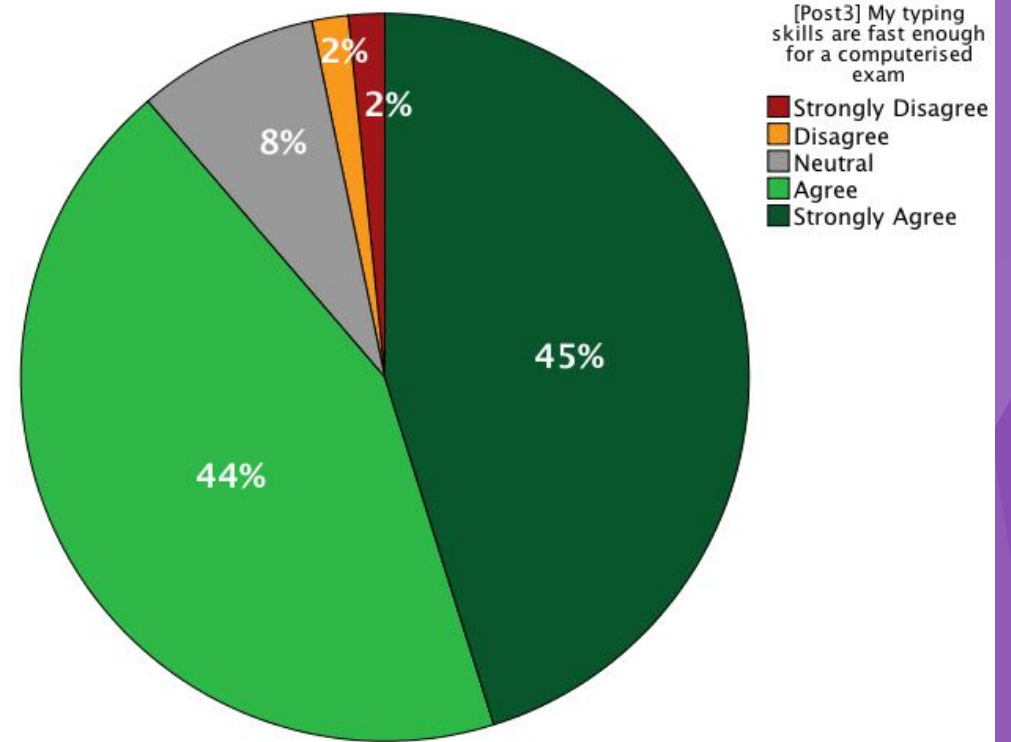
This is an offline dictionary tool 'Dim Sum'

Student Findings - Post exam survey (final 3rd exam in sequence) - Monash 2018 - BYOD Robust e-Exams (Moodle)

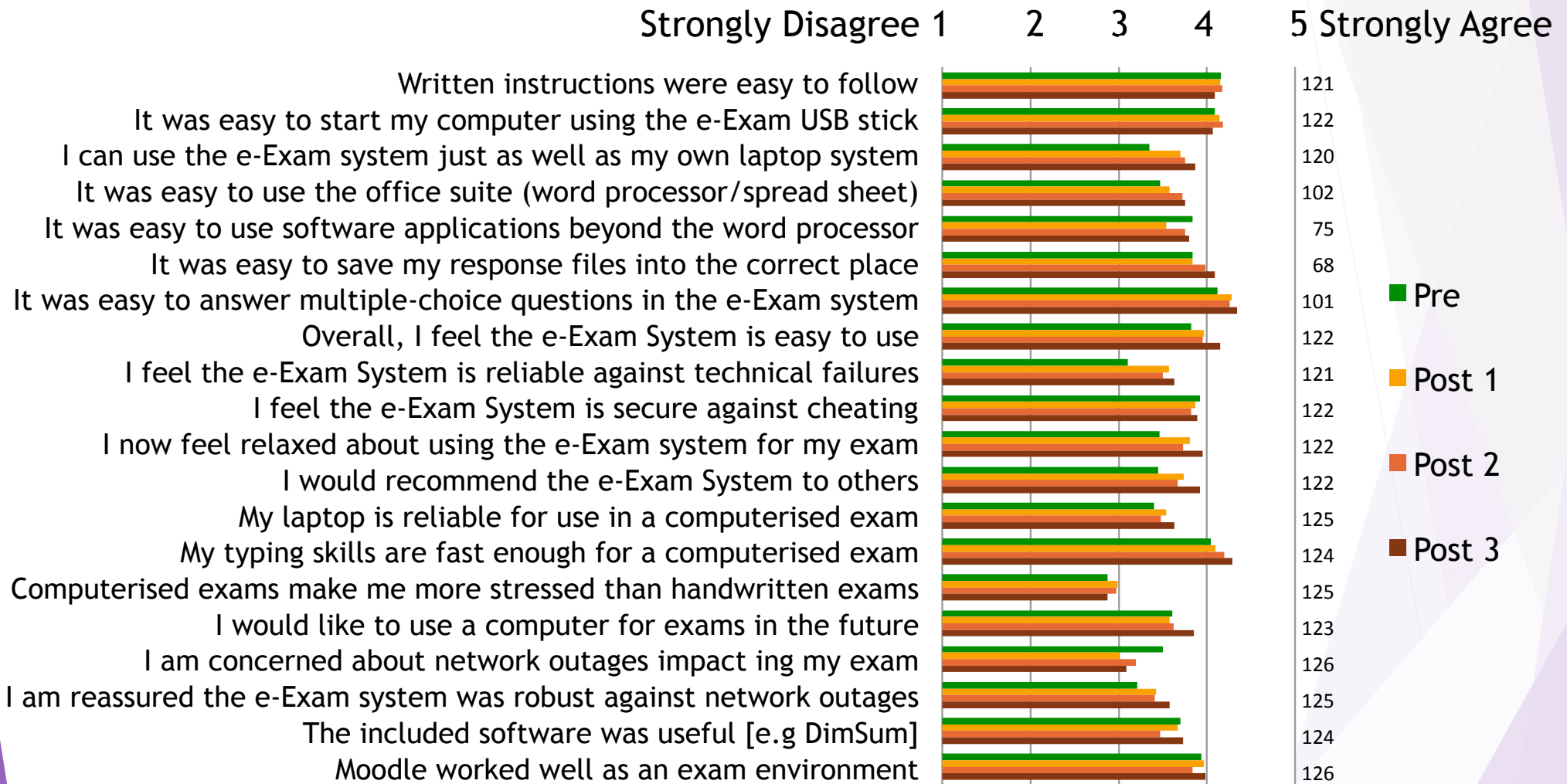
My hand writing is neat



My typing is fast enough for exams



Student Findings Pre and post survey (Moodle 2018)

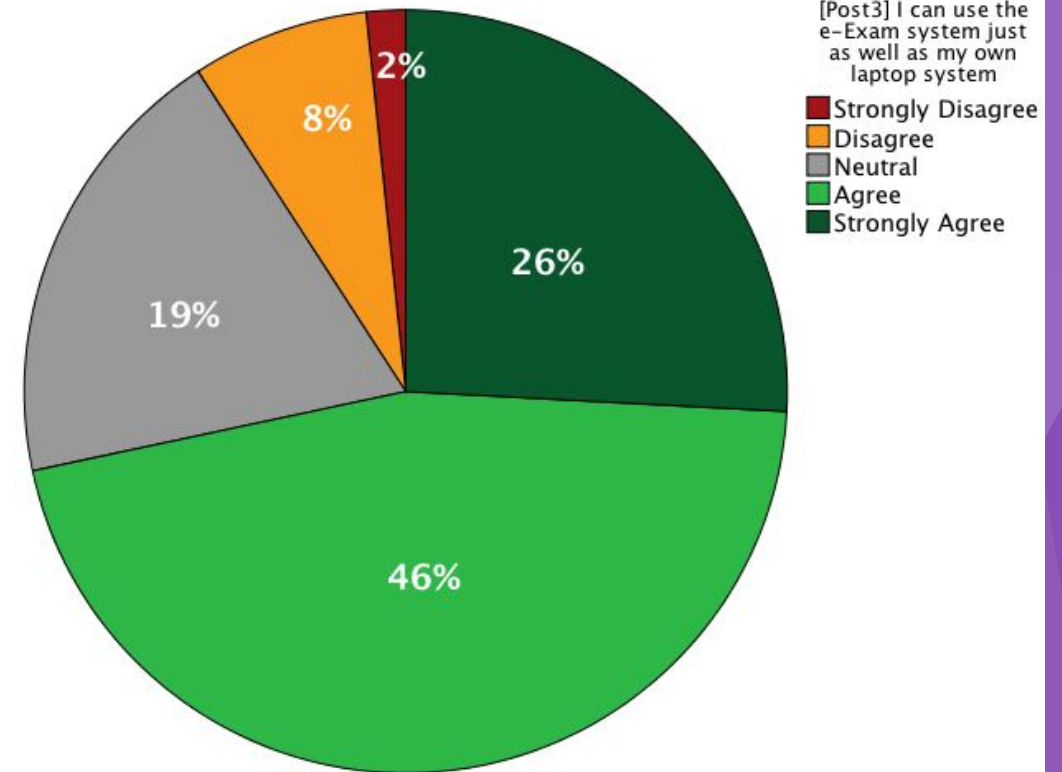
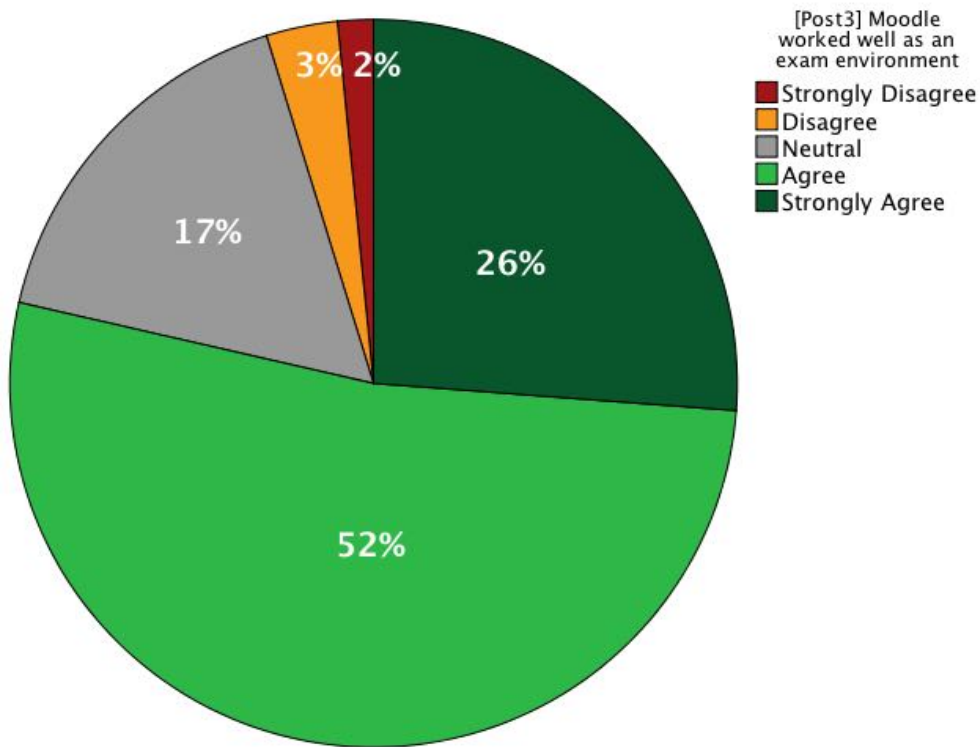


Caveat: Not random samples - descriptive of these groups only.

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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