

About e-Exams

Chinese University of Hong Kong 20 May 2015



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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 expressed 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 possible e-solutions to address these needs.*

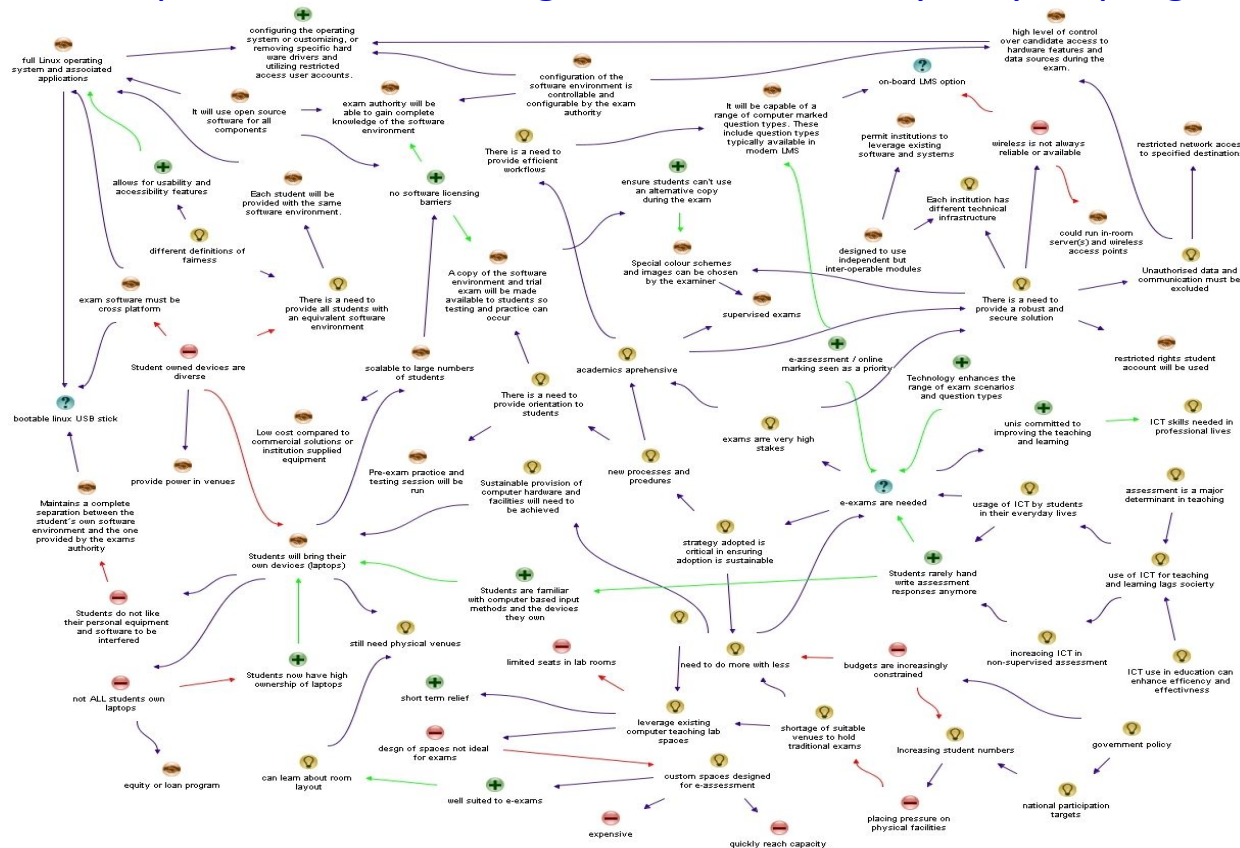
Why e-Exams?

Rationale: Concerns, drivers, possible solutions for e-Exams

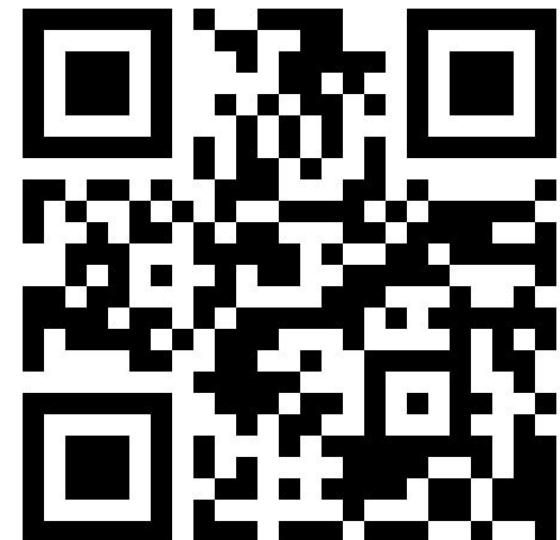
A truly '**wicked**' problem and a long road to get it right!...

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>



bit.ly/eexam-map



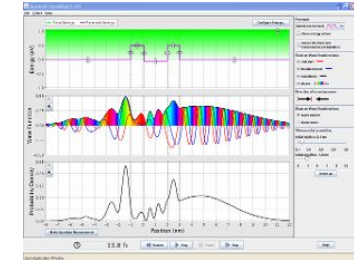
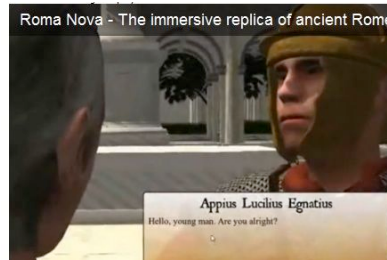
Essentially...

We are faced with a growing disconnect between the way high stakes testing is conducted using pen on paper exams and students' everyday experiences of study and life.

Where we are going: Post-paper exams

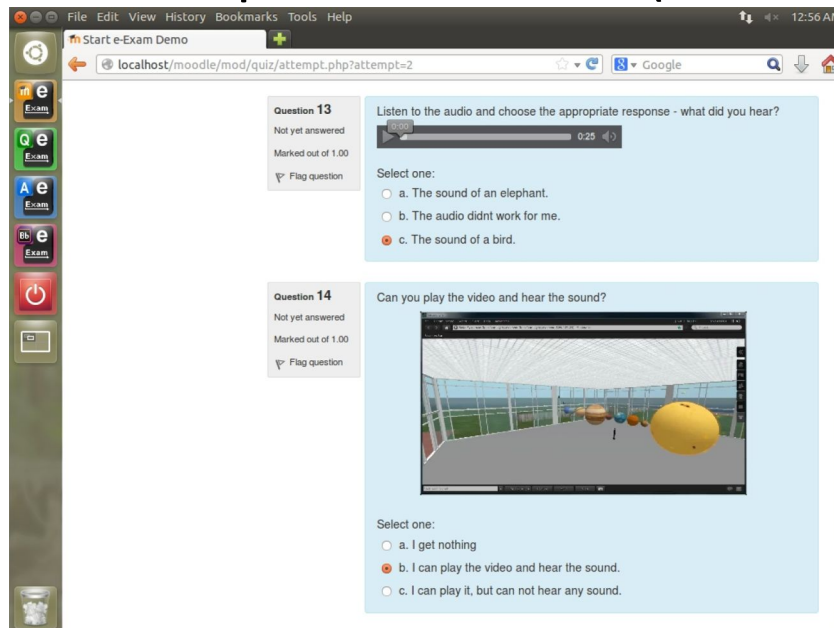
We need greater pedagogical flexibility and more authentic assessments in the exam room. ... alignment!

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



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

Moodle quiz with media (auto marked).



Question 13
Not yet answered
Marked out of 1.00
Flag question

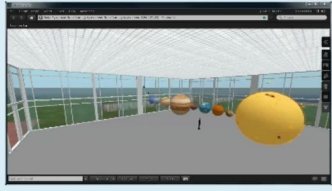
Listen to the audio and choose the appropriate response - what did you hear?

Select one:

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

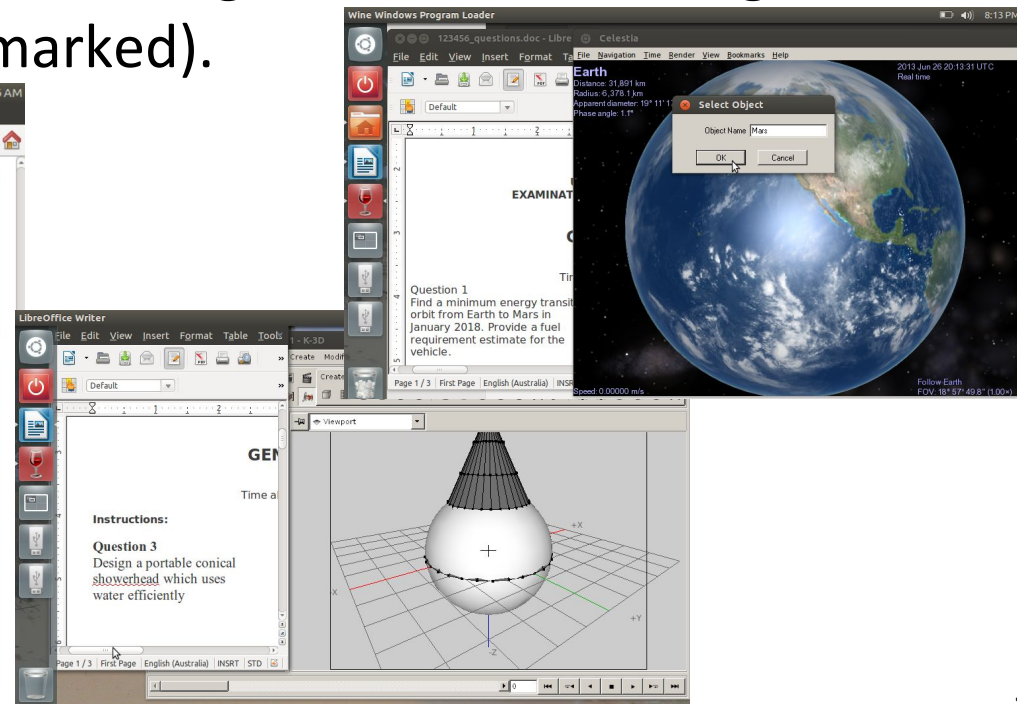
Question 14
Not yet answered
Marked out of 1.00
Flag question

Can you play the video and hear the sound?



Select one:

- 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.



Wine Windows Program Loader

123456_questions.doc - Libre

File Edit View Insert Format Table Tools

Earth
Distance: 31,891 km
Radius: 6,378.1 km
Apparent diameter: 19° 11' 11"
Phase angle: 1.1°

Select Object
Object Name: [Max]
OK Cancel

EXAMINAT

Question 1
Find a minimum energy transit orbit from Earth to Mars in January 2018. Provide a fuel requirement estimate for the vehicle.

Page 1 / 3 | First Page | English (Australia) | INSR | STD

Speed: 0.00000 m/s

Follow Earth
EqW: 16.47° 49.8' (1.000)

LibreOffice Writer

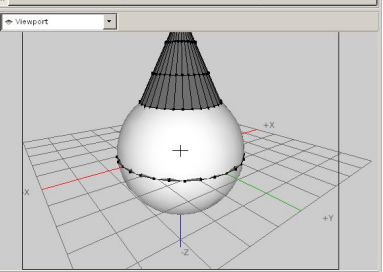
File Edit View Insert Format Table Tools

GEN

Time a

Instructions:

Question 3
Design a portable conical showerhead which uses water efficiently



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-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 libero.
- d) Mauris vehicula eros a viverra pellentesque.
- 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.

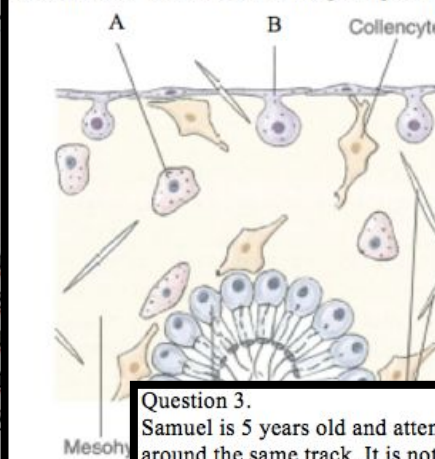
Answer a to f.	Terms
<u>f</u>	I. Paxogen
<u>a</u>	II. Sitabosis
<u>c</u>	III. Fakeasalism
<u>e</u>	

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 with a minimum height set (by dragging the bottom edge) 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	Label goes here. Constructed response question.
B	Blue text makes it easier to see which questions have been answered and which have not!
C	Use minimum row heights to provide plenty of space, but don't use double carriage returns!
D	Doing so means the layout is less likely to be disrupted.

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.

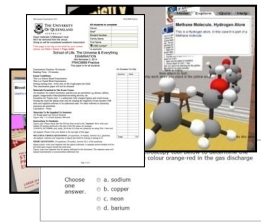
In the table below, give two (2) examples of flippant faxadism relevant to his age range (4-6 years), and describe how Samuel and Eamon differ in their abilities to perform faxadism.

[4 marks]

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

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:

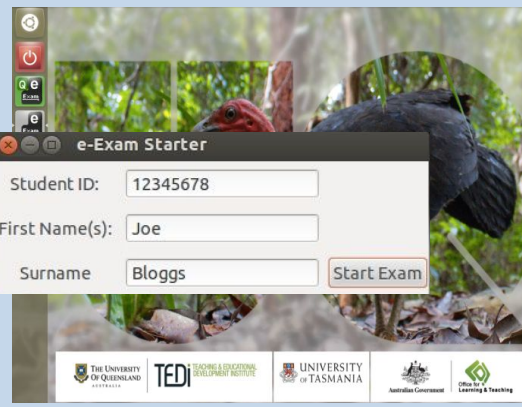
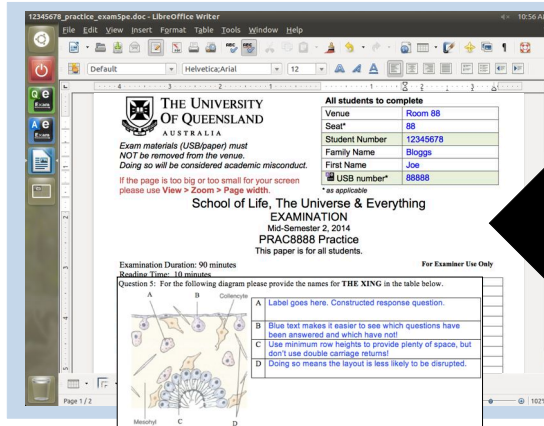
Student laptop setup & practice.



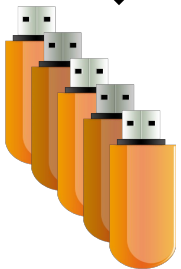
Exam room use



*e-Exam system takes over laptop.
Ubuntu Live USB.
Libre Office.*



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.
3. Boot laptop.
4. Do exam.
5. Return USB.
6. Leave room.

First and Most Recent e-Exams

VETS2100 S2 2014



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

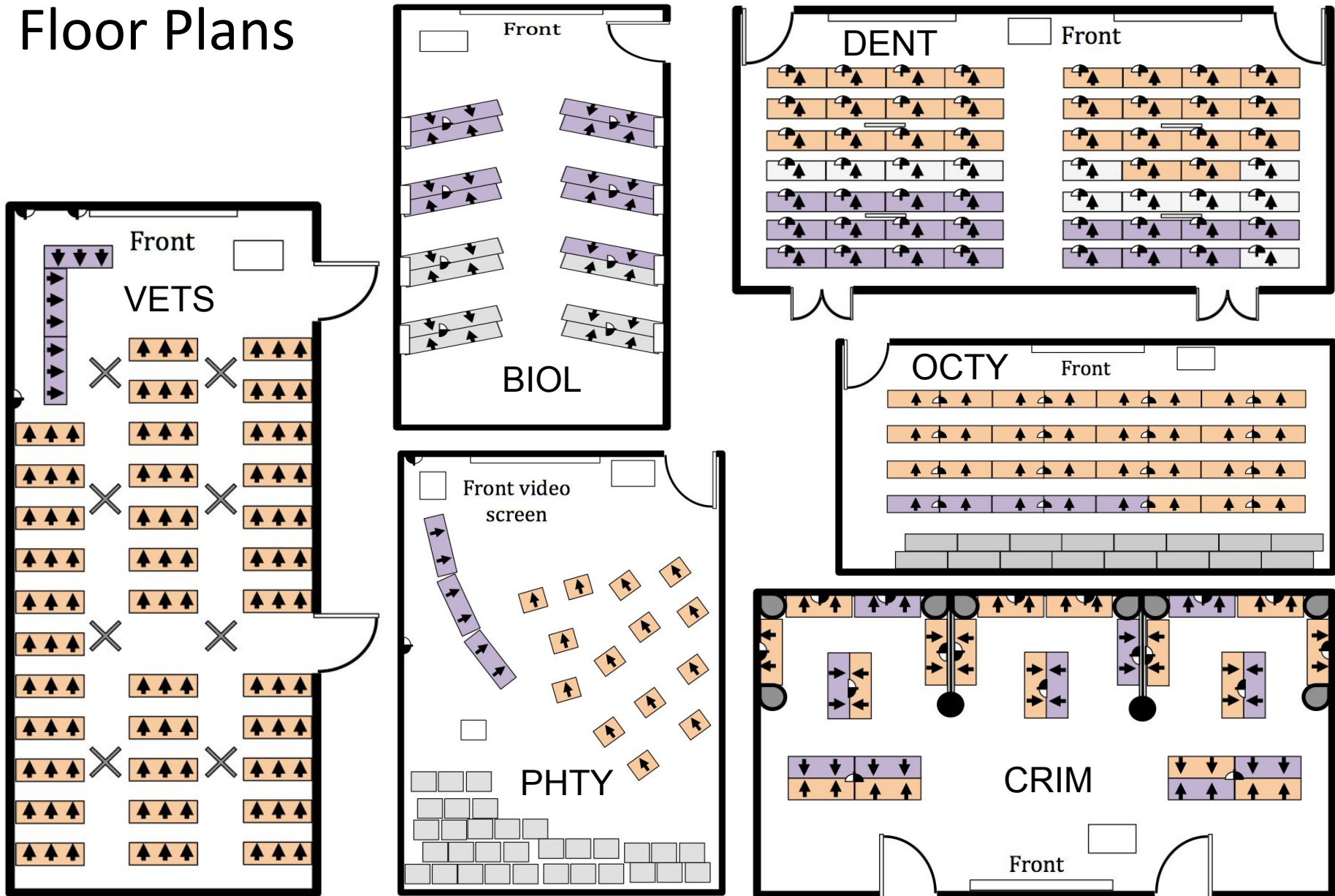
DENT4092 S1 2015



← 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.

Spaces

Floor Plans



UQ e-Exam Trials 2014

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

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

Hillier, M. (2014). The Very Idea of e-Exams: Student (Pre)conceptions. Presented at the Australasian Society for Computers in Learning in Tertiary Education conference, Dunedin, New Zealand.

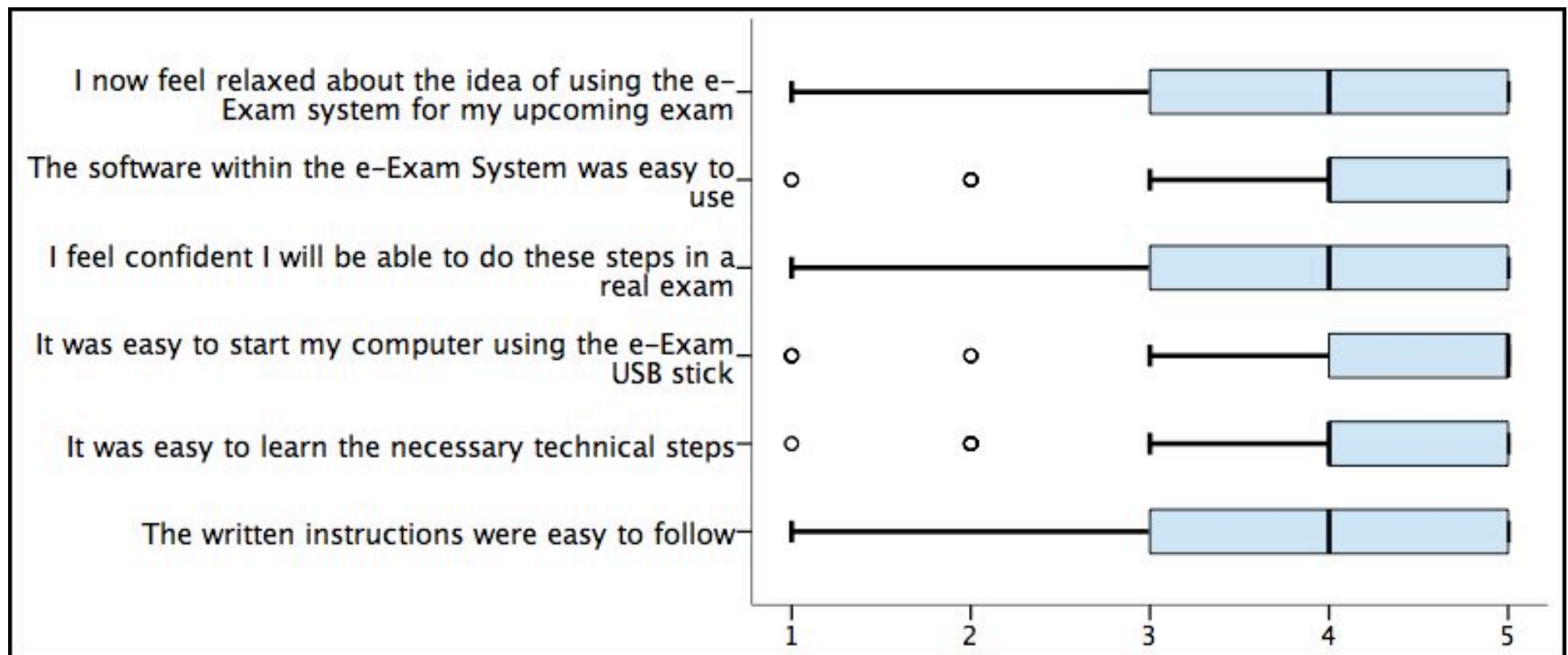
Retrieved from <http://ascilite.org/conferences/dunedin2014/files/fullpapers/91-Hillier.pdf>

- 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.
 - http://transformingexams.com/uq_trials/e-exams_2014_trial_results_sept.pdf
- Future analysis – production (words, language density, marks).
 - Further Dentistry and Criminology exams conducted April 2015.

Pre-exam Survey

Impressions of the e-exam system

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



Trial Phase Attrition

Number of typists at each stage of the trial
(Survey responses)

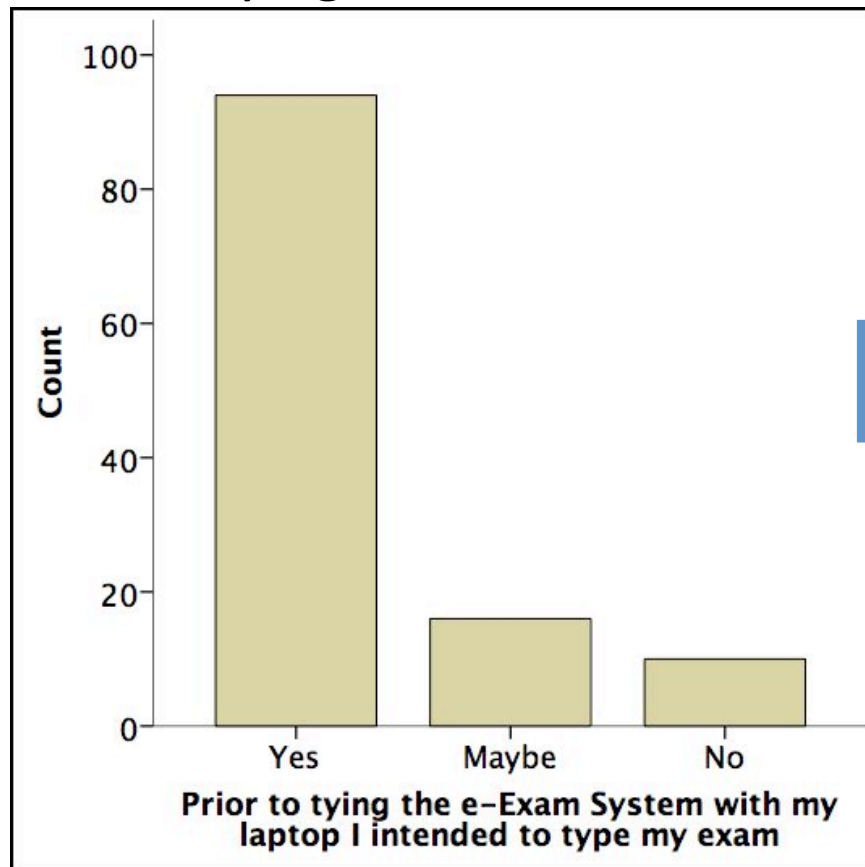
Steps of trial	Yes will type	Maybe type	Total typists	Attrition	No (hand-write)*
1 EOI	201		201		361
2.1 Pre - before try	94	16	110	91	10
2.2 Pre - after try	86	15	101	9	23
4 Exam (after)	71		71	30	450

- *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).*

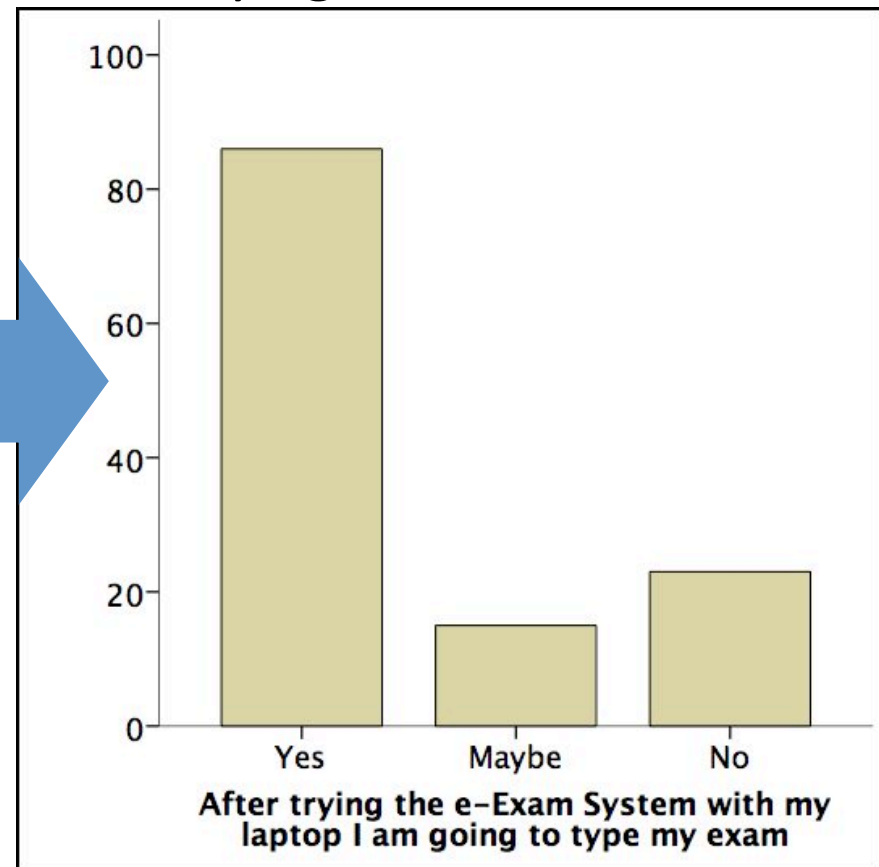
Pre-exam Survey

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

Before trying e-exam

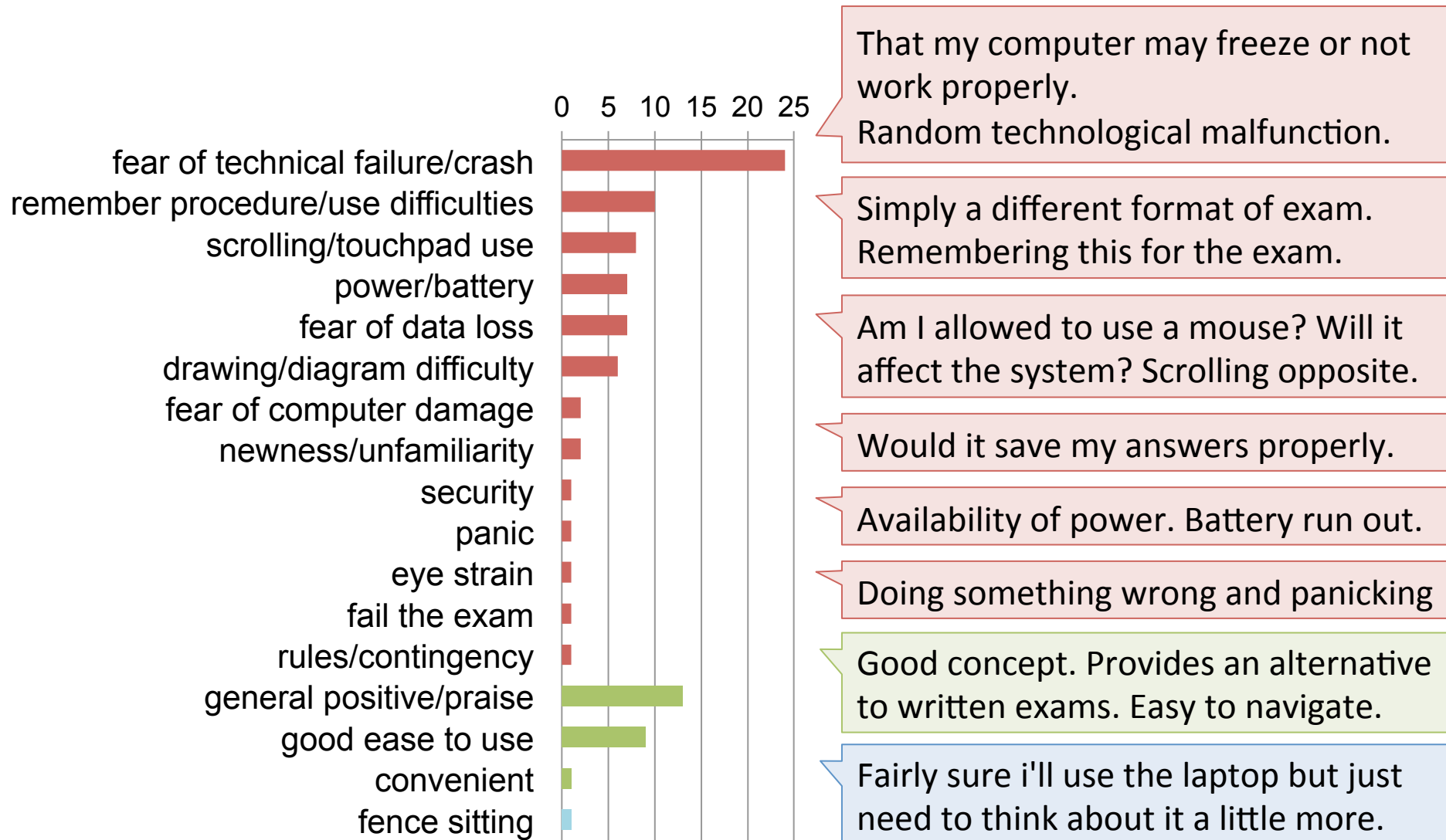


After trying e-exam



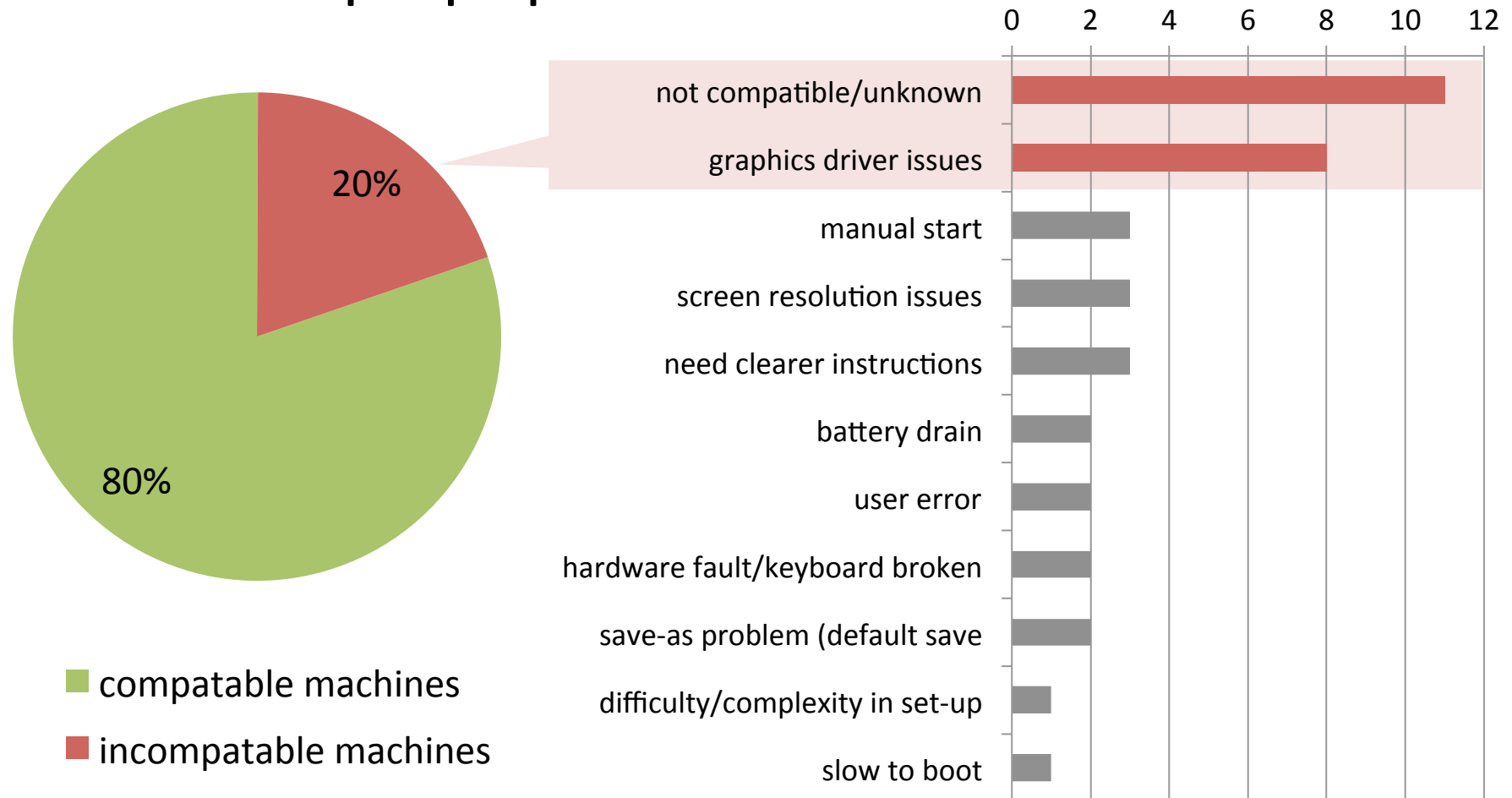
Pre-exam Survey

Open text comments – concerns and praise



Pre-exam Laptop Testing

Number of laptops passed and technical issues.



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)

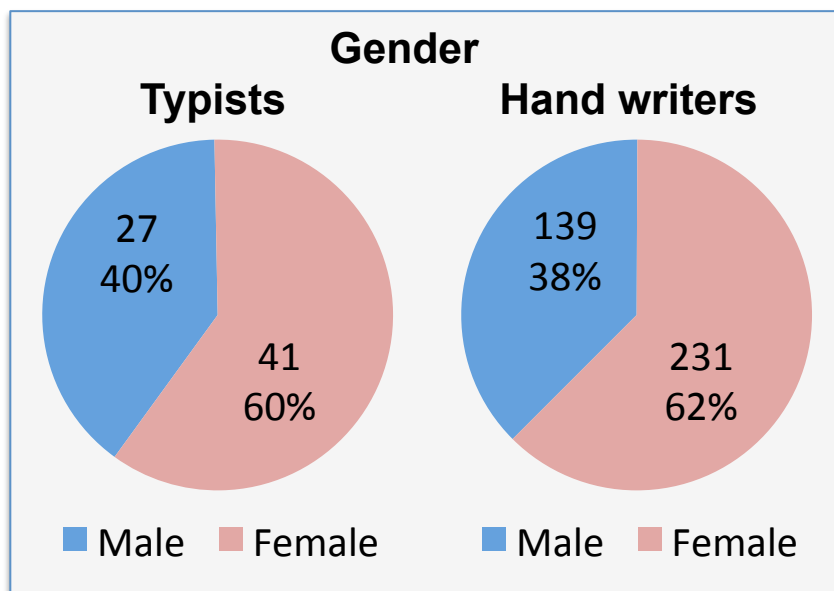
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Participation across the six 2014 courses in the trials		Typed	Handwrote
ANIM	Animal Biology: 45 min mixed short answer and MCQ (type 'x')	5	109
BIOL	Zoology (BIOL): 50 min short answer (Multiple choice section done pen on OMR sheet)	10	81
CRIM	Criminology: 70 minutes. Single long essay response section (and a Multiple choice section done pen on OMR sheet)	17	50
OCTY	Occupational Therapy: 100 min mixed short answer and MCQ (type 'x')	3	24
PHTY	Physiotherapy: 15 min (watch video and write) before OSCE	25	108
VETS	Veterinary technology: 90 min theory, mostly short answer	11	78
		71	450



It is important to note:

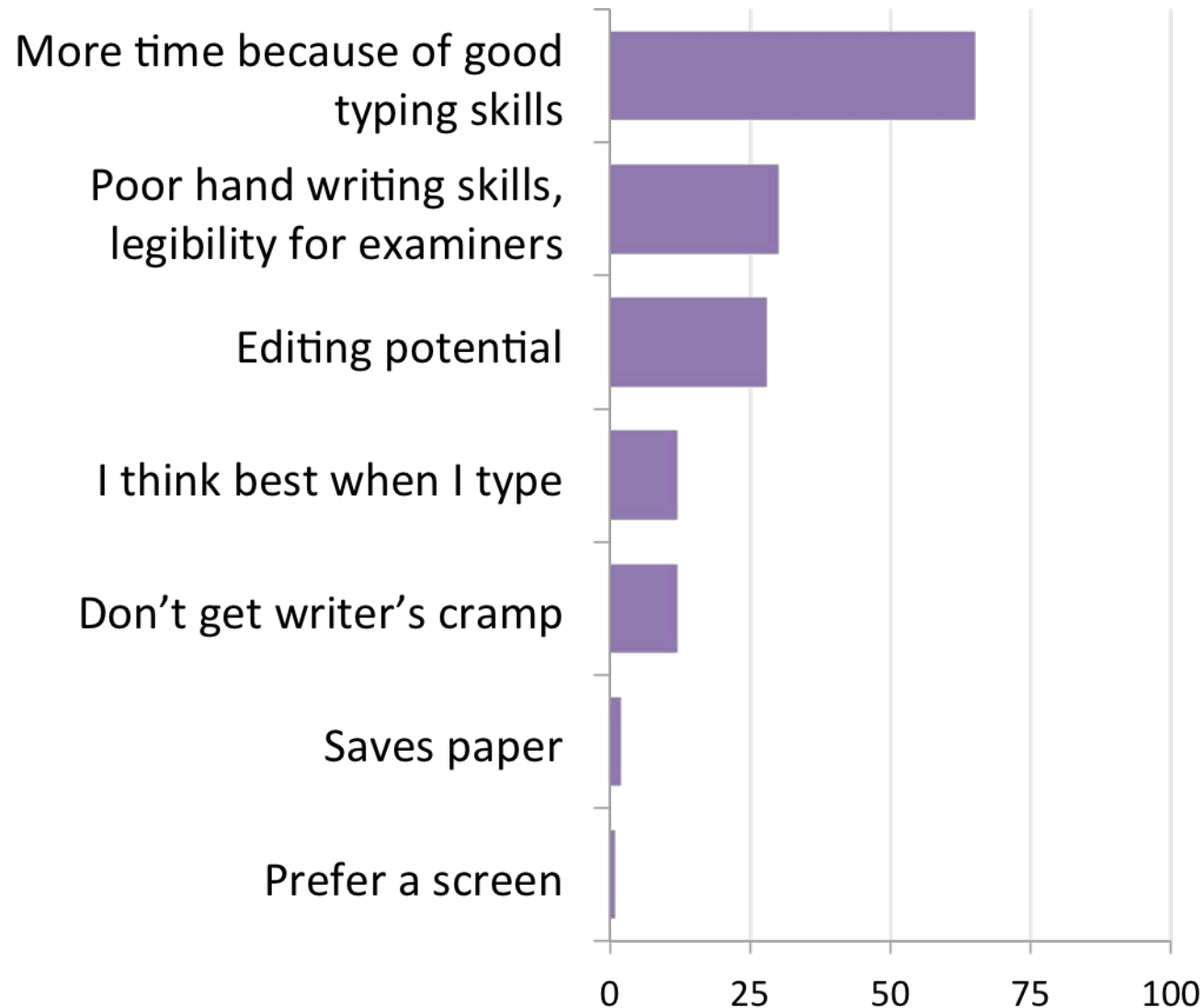
- First 'toe in the water' trials.
- Participation was optional.
- Mid term exams worth an average of 15% of the course grade.

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)



Phase 2 Post-exam Typist's Comments

Quicker typing and the ability to edit or completely delete my answer without compromising on space.

You can write as much as you otherwise would but don't get a sore hand when typing.

I have terrible handwriting. Felt bad about it.

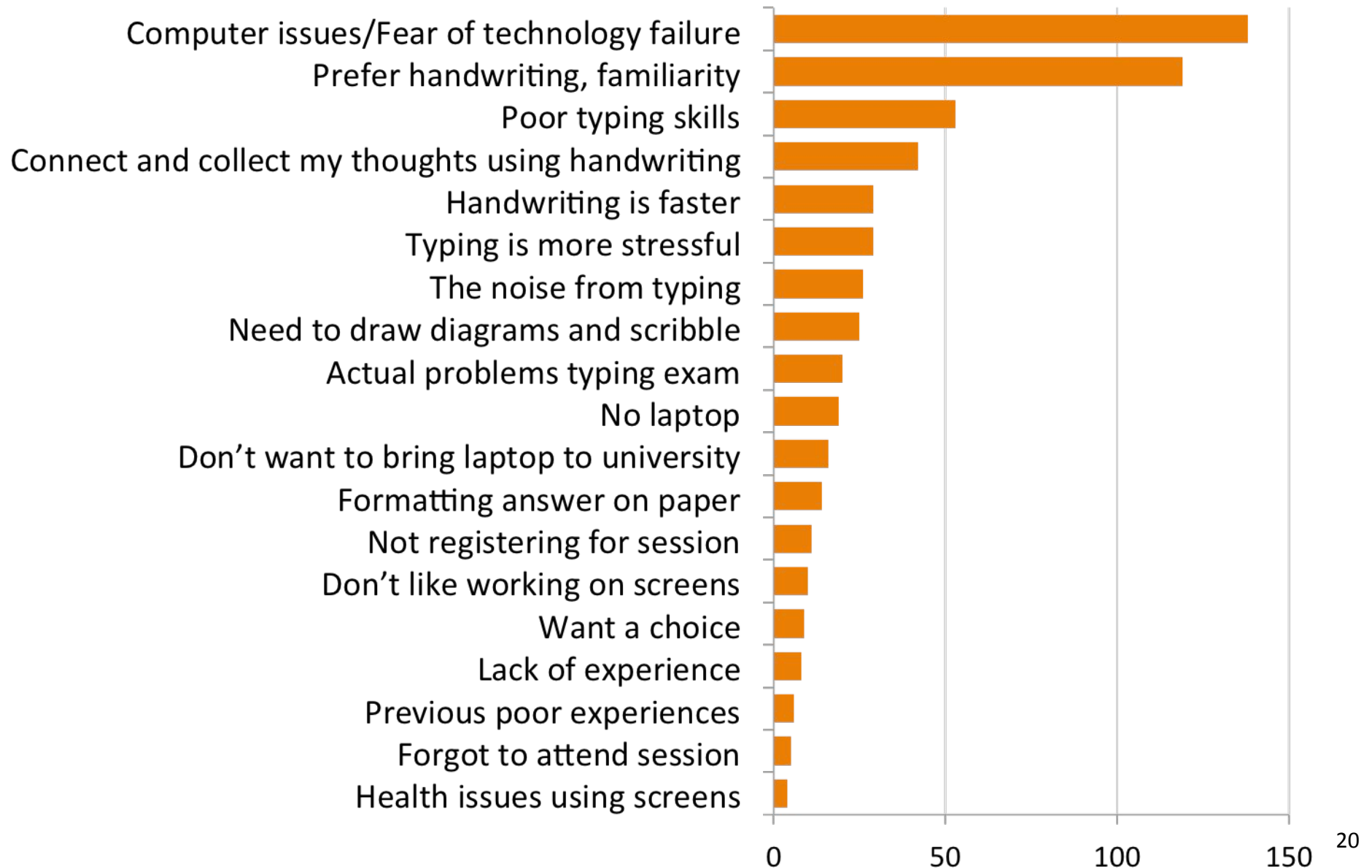
I could get info down faster and examiner could read it.

It is cleaner, I make lots of mistakes when I'm writing and it usually ends in lots of scribbles everywhere.

Typing is more natural for me. I think best when I am typing.

Reasons for handwriting the exam

(added 30 October 2014)



Phase 2 Post-exam Hand-writers

I felt more comfortable handwriting as nothing can go wrong & I wasn't relying on the computer system to complete my exam.

Three years of prior exams writing so stick with what you know.

I am worried about computer malfunctions.

I'm a slow typer and feel disadvantaged.

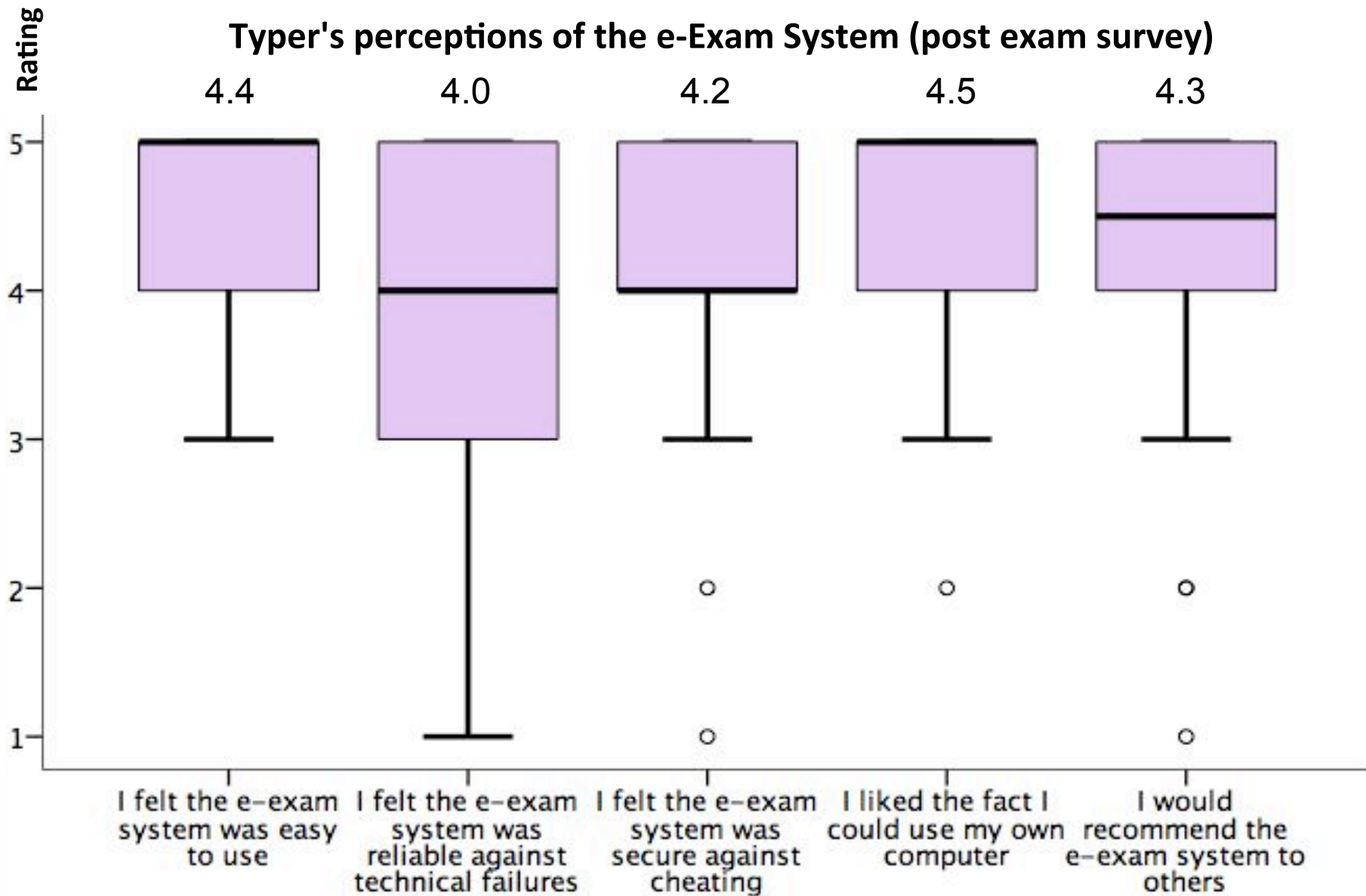
I was initially planning to type this exam but decided against it due to the unpredictability of machines

I think more about what I'm writing when I handwrite but my hand gets sore and it isn't fast.

It's easier to handwrite. Though probably not easier for you to read my writing.

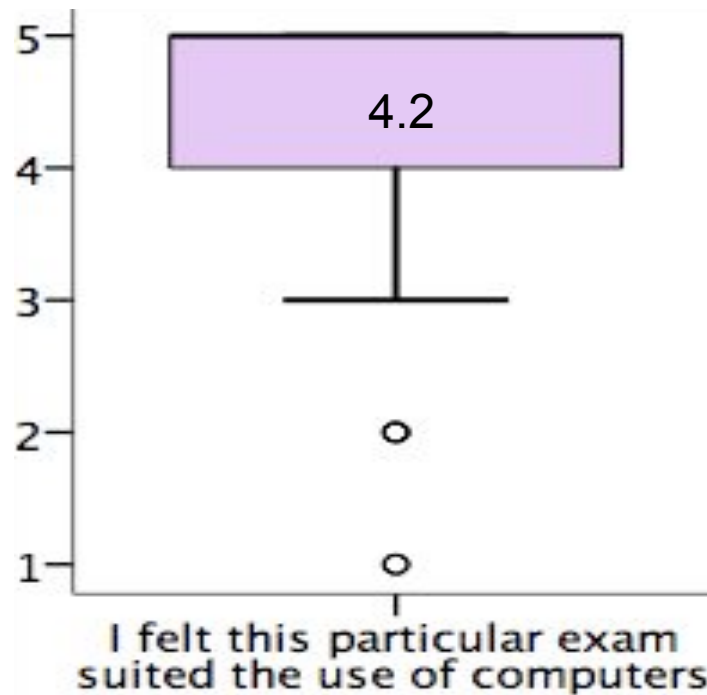
Lazy to bring laptop.

Those that used the system said...



Likert scale/rating: 1 = strongly disagree to 5 = strongly agree [N = 69]. Means shown.

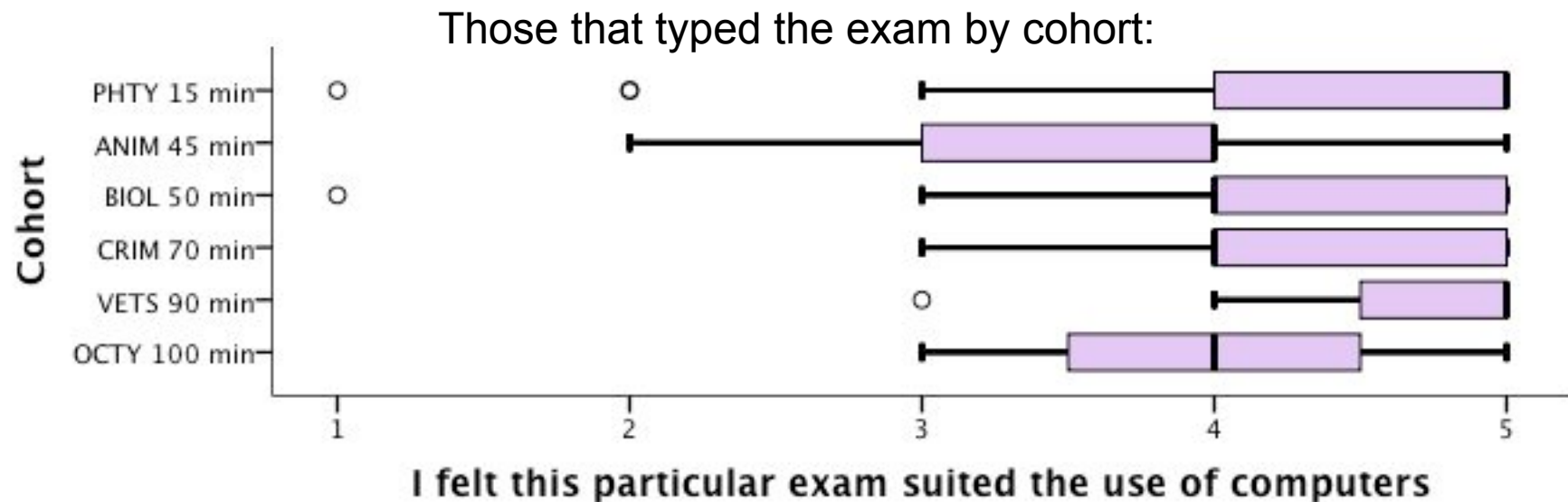
Did typers think the exam suited the use of computers?



Those that typed the exam.
All six cohorts combined (ANIM, BIOL, CRIM, OCTY, PHTY & VETS).
Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree

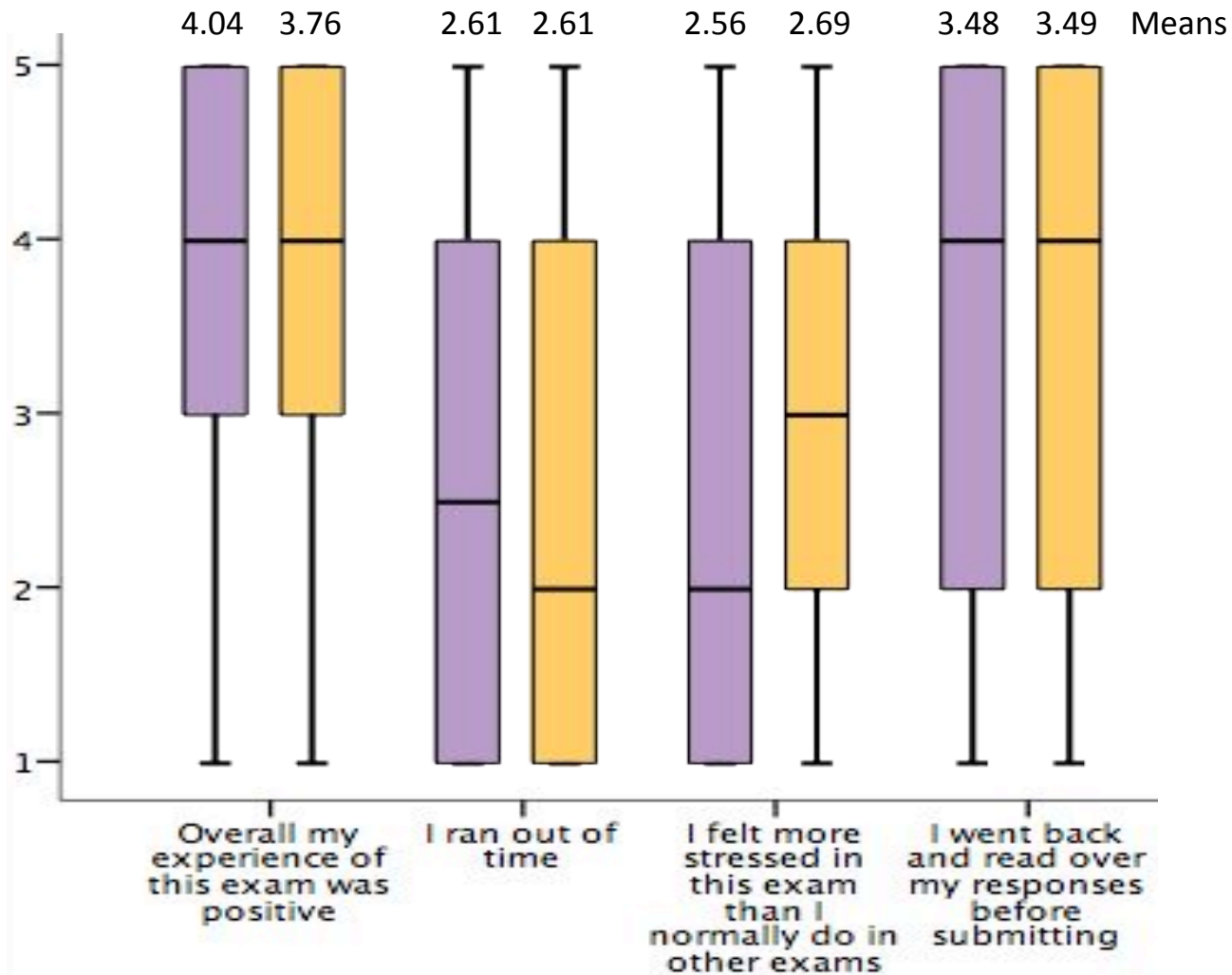
Mean of 4.2 (value shown) N = 69.

Largely that was a 'yes'.



Student reaction to exam conditions

Typers (left) and Hand writers (right)



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

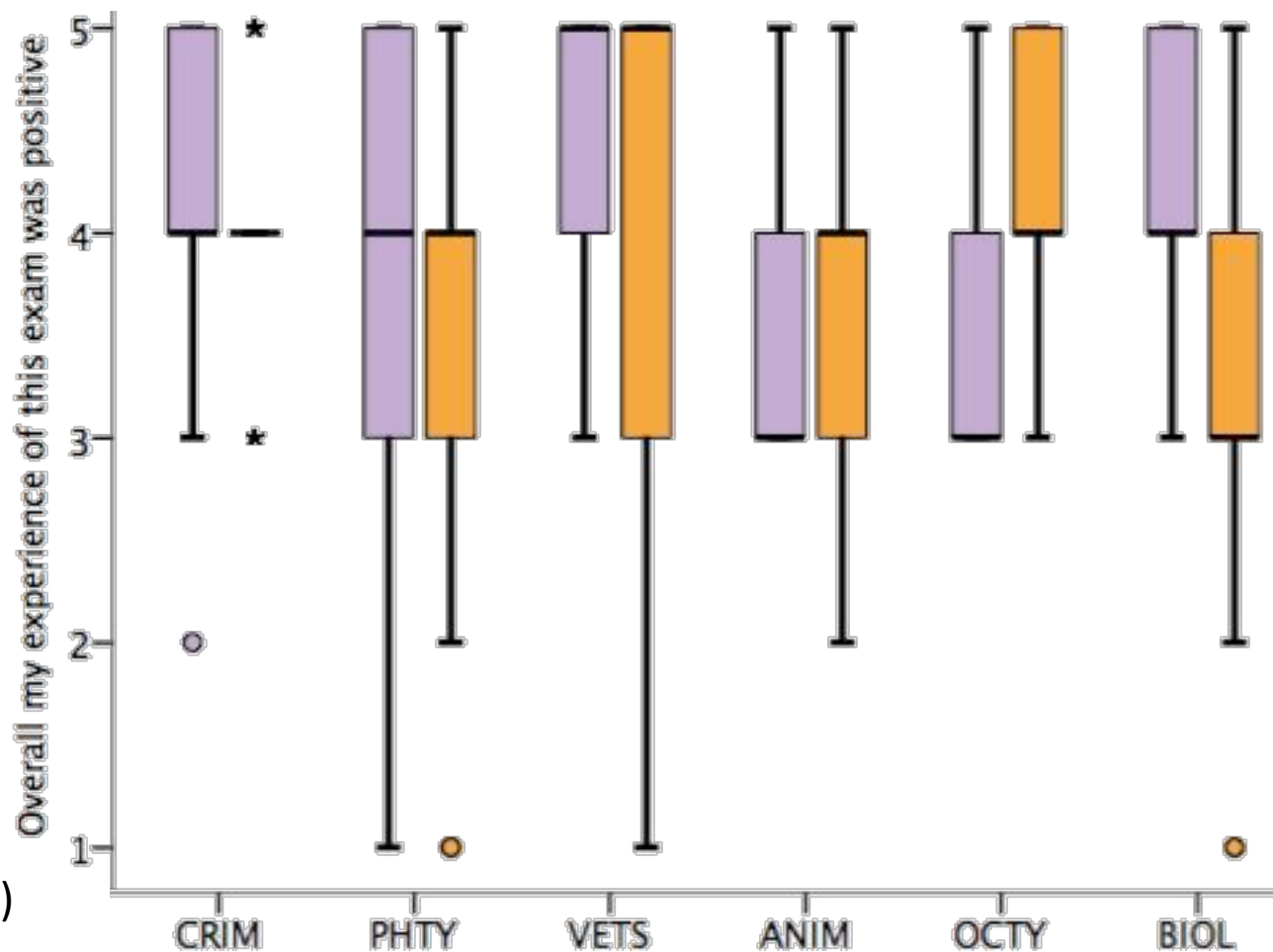
U	13242.5	15203	14527.5	15145.5
Z	-2.132	-0.083	-0.751	-0.394
Sig. (2-tail)	0.033	0.934	0.452	0.694

Overall exam experience by cohort

Typers (left) and Hand writers (right)

Agree
(better)

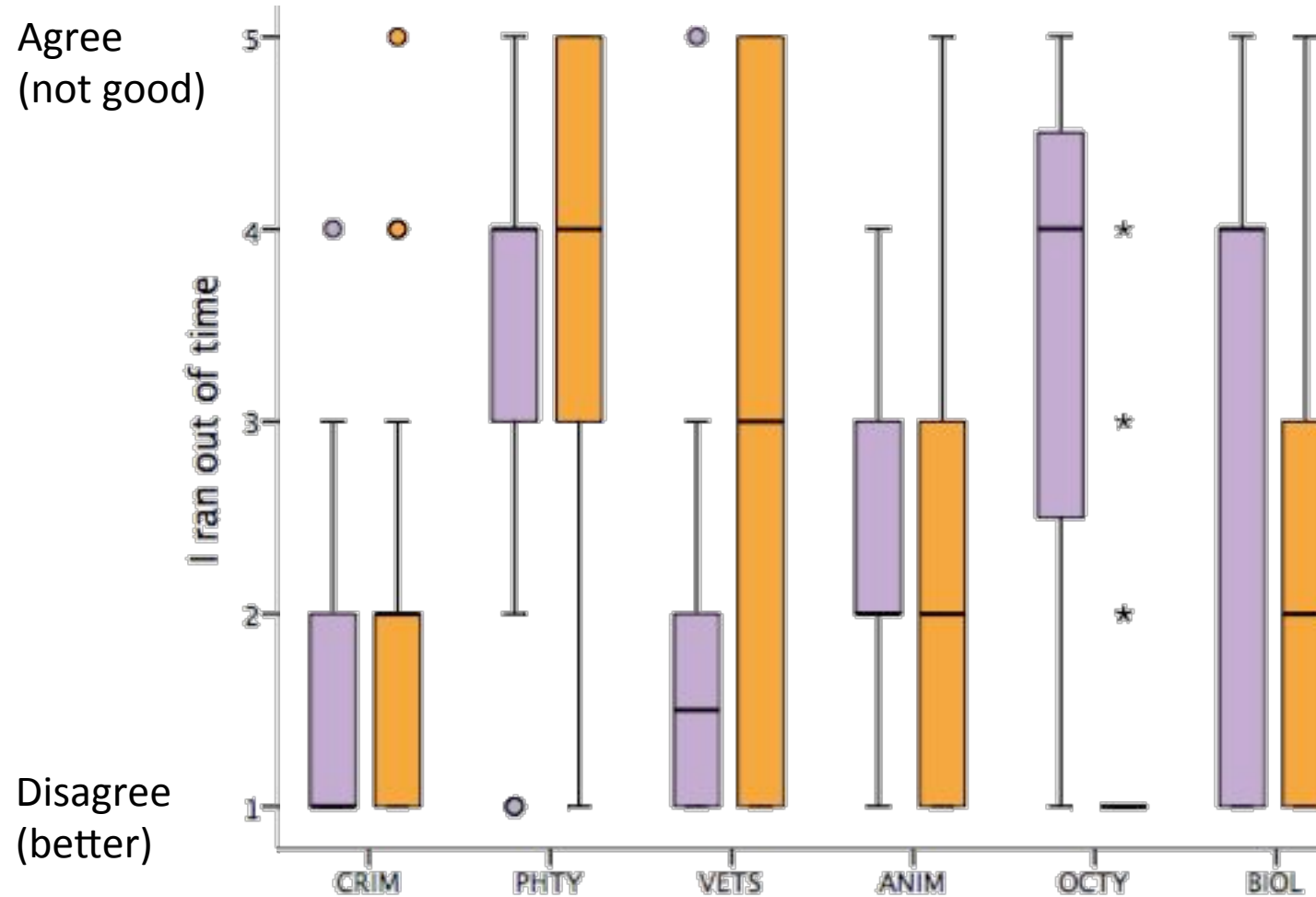
Disagree
(not good)



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

Running out of time by cohort

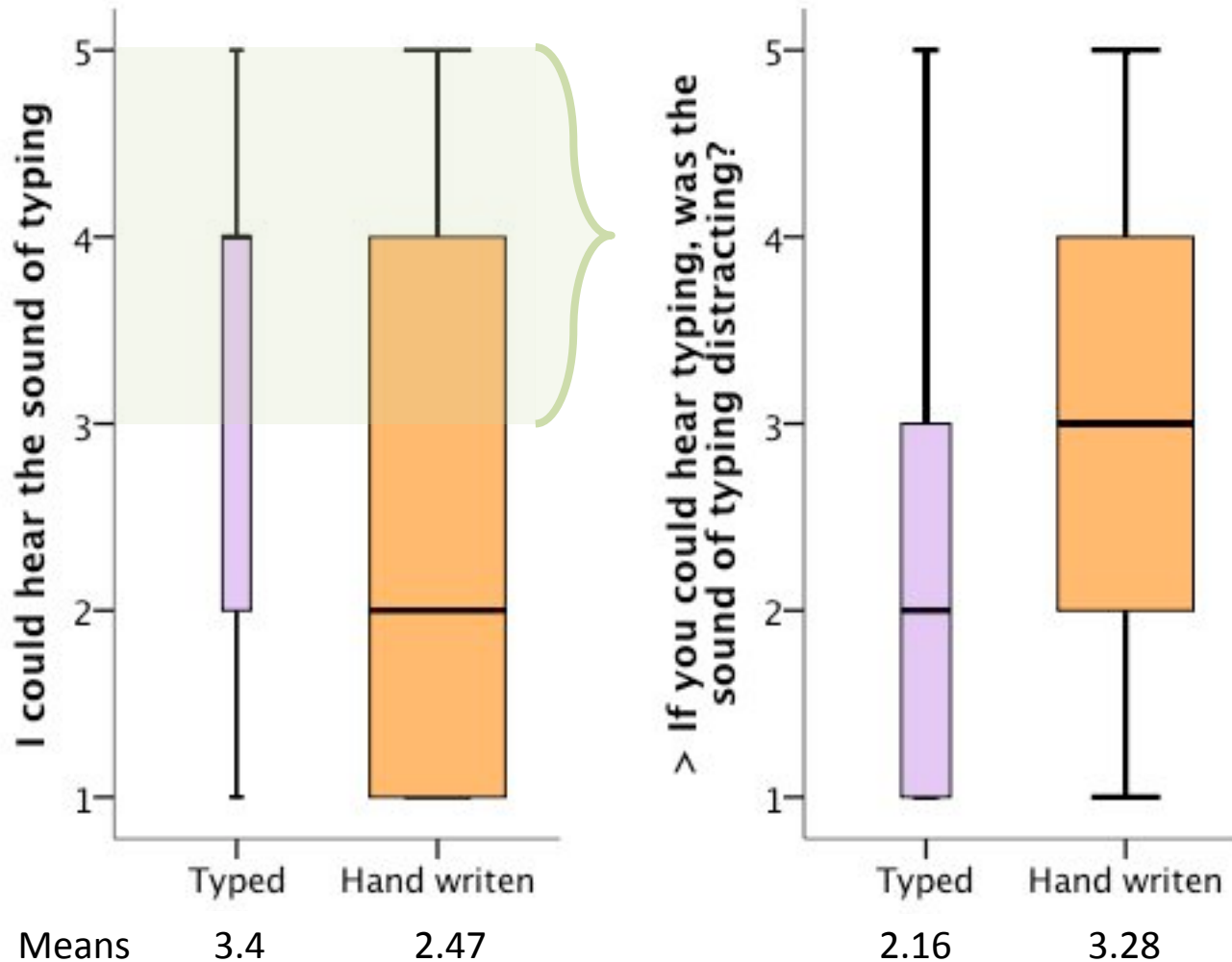
Typers (left) and Hand writers (right)



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

Was the sound of typing distracting?

In each boxplot **Typers (left)** and **Hand writers (right)**



Means 3.4 2.47
 Both exhibited significant differences to $>.01$
 Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree

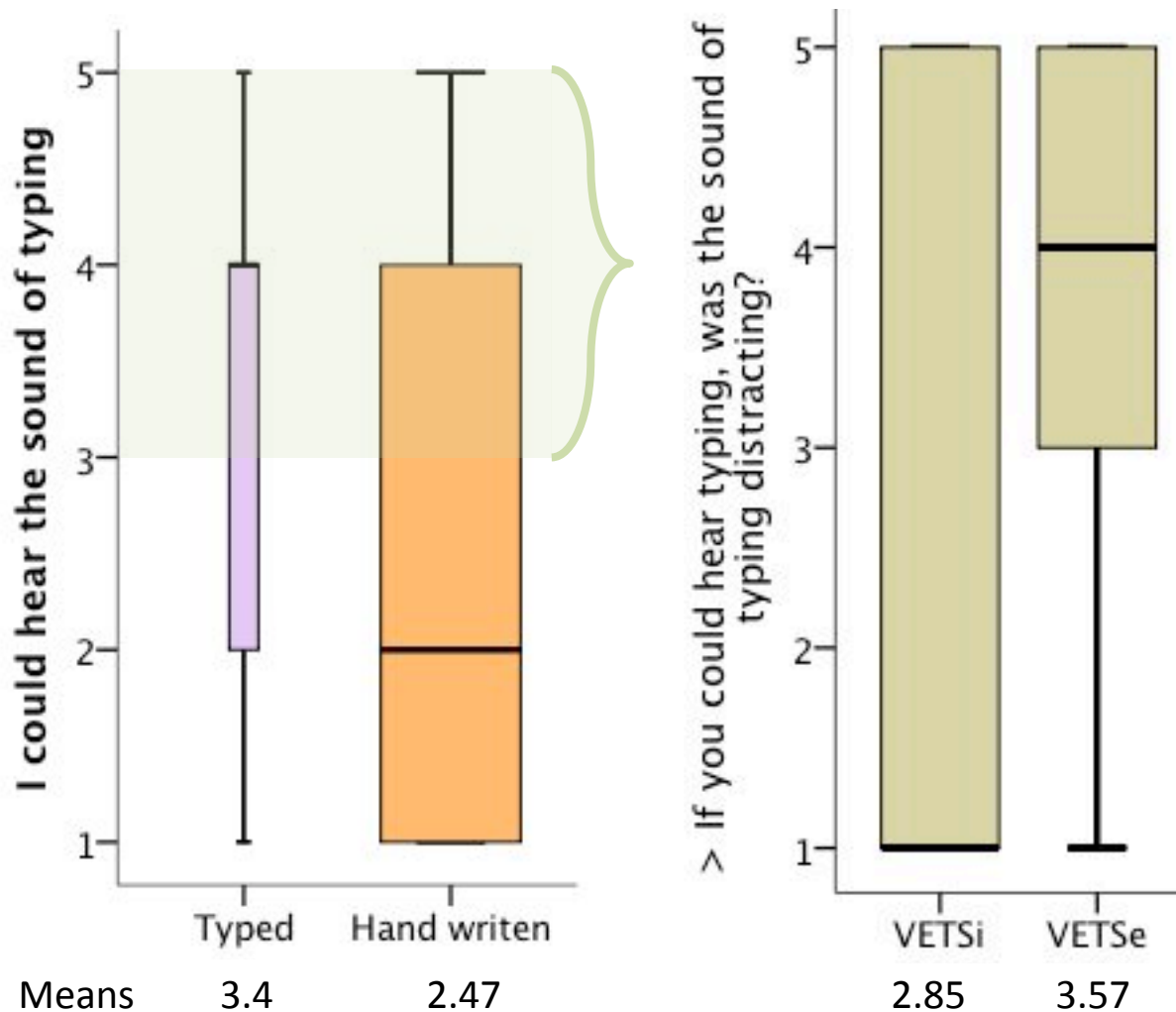
The two cohorts ANIM and BIOL were removed from the analysis because typers and hand writers sat in different rooms.

Those that could hear typing (who selected 5, 4 or 3) were included in the determination of distraction by typing sound.

Cohort exams were held in different venues.

Was the sound of typing distracting (VetSci)?

In each boxplot **Typers (left)** and **Hand writers (right)**



Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree

VetSci Course:

VETS both the internal and external cohorts used same room, but at different times (4 weeks apart).

VETS internal: warm day, ceiling fans and construction noise.

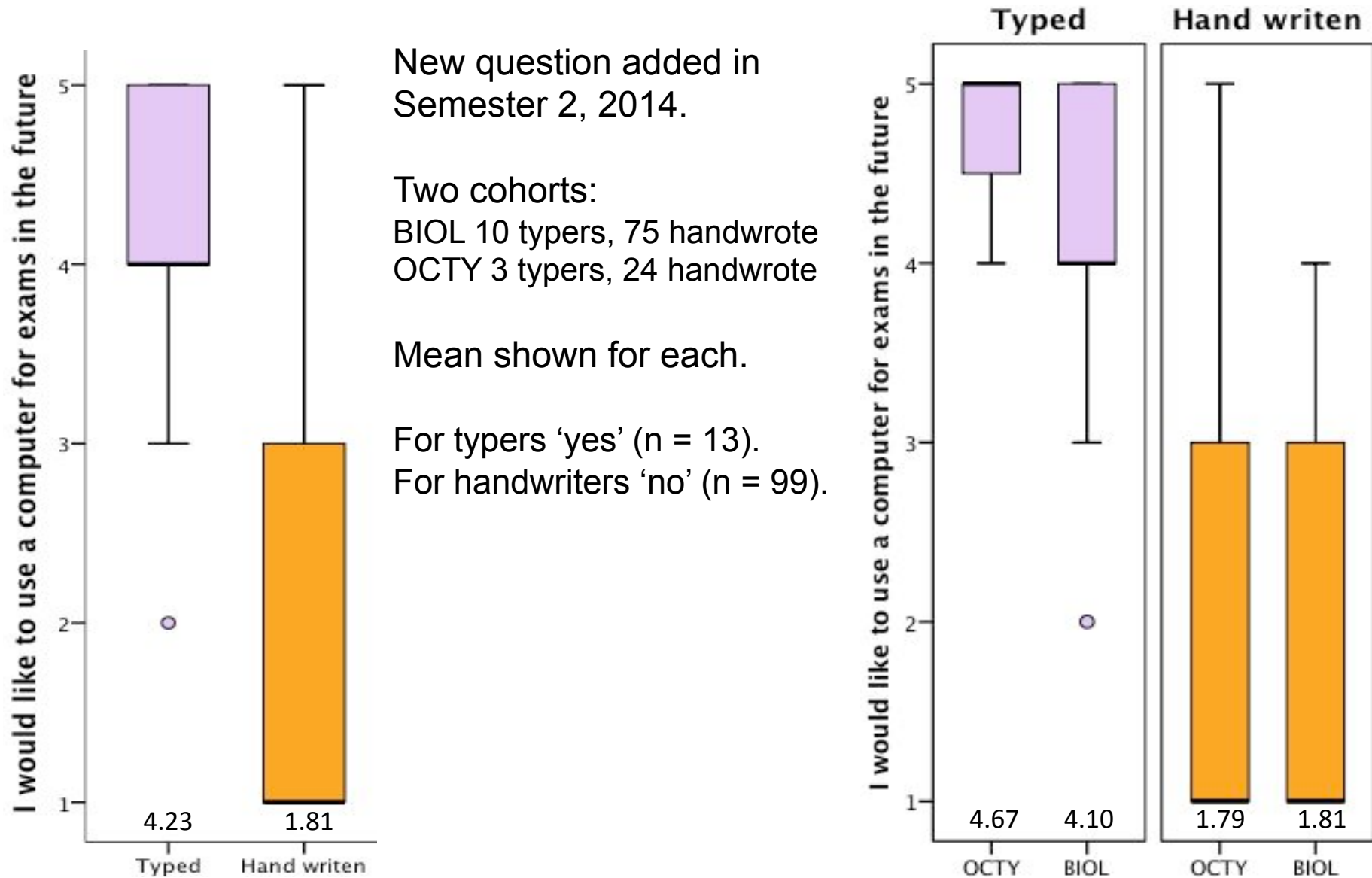
VETS external: cooler day, no fans, quiet.

Environmental conditions and acoustics play a large role in the degree to which 'typing noise' becomes a distracting factor.

Hand-writers were not all quiet either!

Future intention to type

Typers (left) and Hand writers (right)



New question added in Semester 2, 2014.

Two cohorts:
 BIOL 10 typers, 75 handwrote
 OCTY 3 typers, 24 handwrote

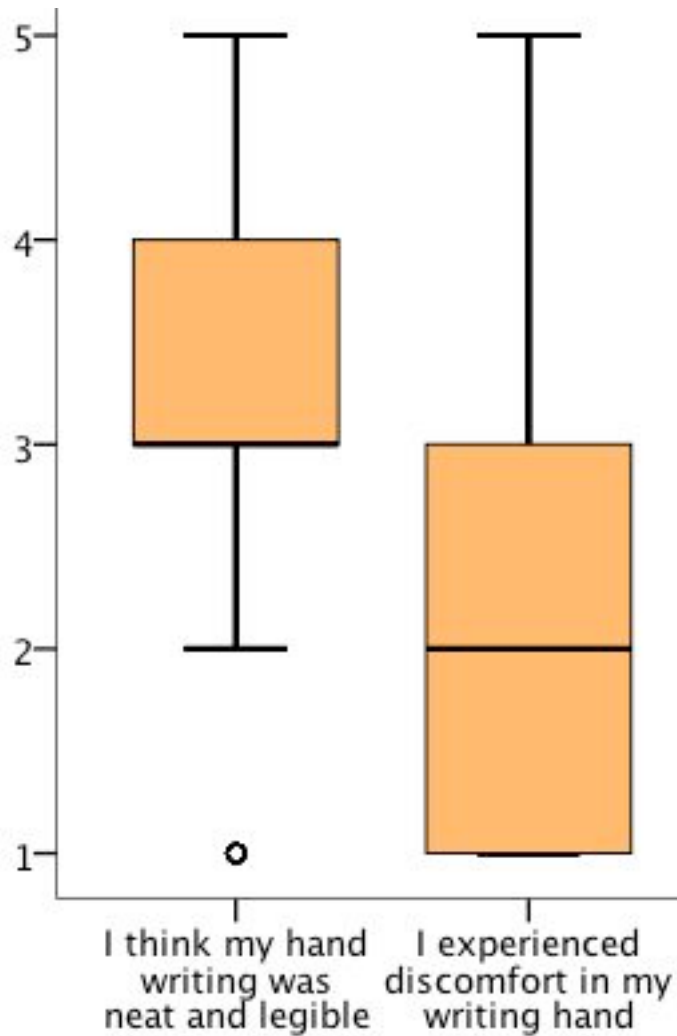
Mean shown for each.

For typers 'yes' (n = 13).
 For handwriters 'no' (n = 99).

Likert Scale: 5 = Strongly Agree, 1 = Strongly Disagree

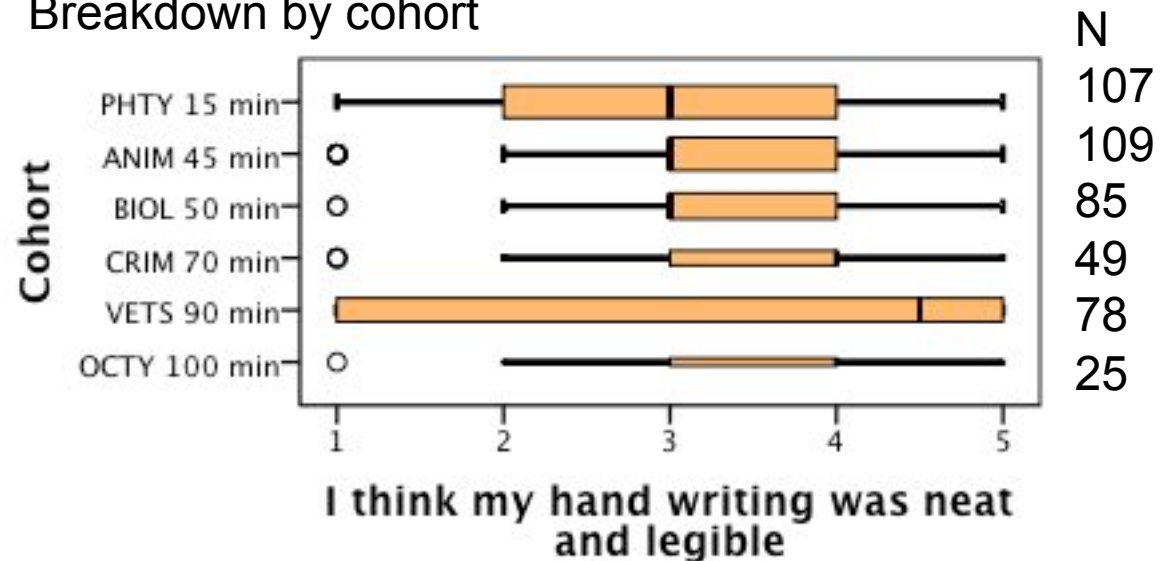
Hand writing in the exam

All six cohorts



Are some students over estimating the neatness of their hand writing?!

Breakdown by cohort



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.

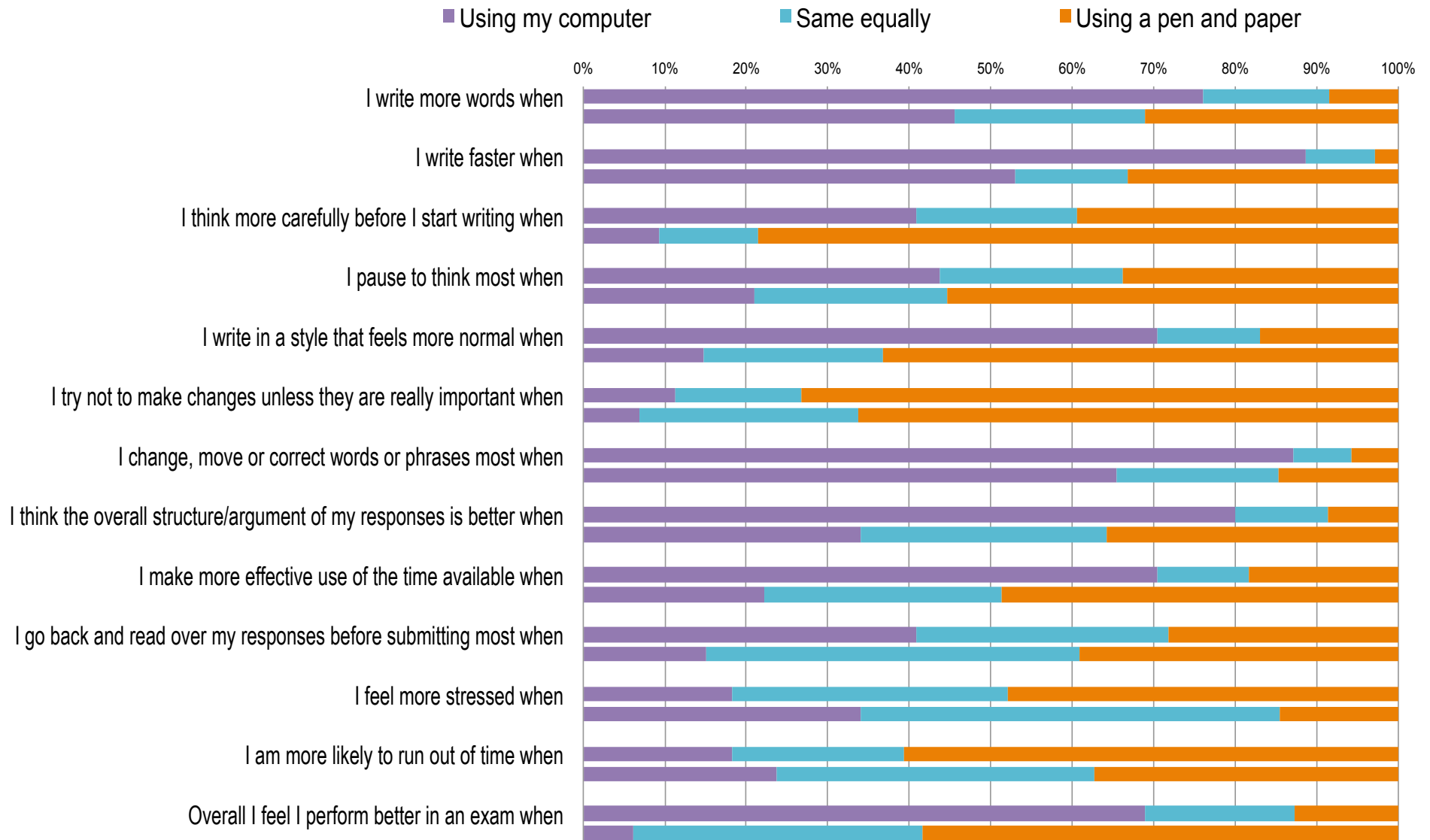
Issue	N	Notes, Additional Observations, Suggested Solutions
Boot/start up	2	In reality most participants needed assistance/forgot boot key. <i>Familiarity: need to practice!</i>
Entering ID	0	All good. (some students entered 's' rather than 8 digit number but system copes fine).
Using the software	1	Some did not know how to '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. (noticed one student used 'save as' when save was 'greyed out') now fixed
Software crashed/ computer froze	4	1 x Old 2009 white Macbook. Office suite quit to desktop. 3 x System drive ran out of space causing the system to crash (now fixed).
Touchpad/ mouse	7	Sensitivity reported by participants. <i>Some adjustments were made.</i> <i>USB wired mice highly recommended! Investigate drivers.</i>
Scrolling	15	Two finger scrolling opposite to OSX, keyboard shortcuts. Small scroll bars. Sensitivity. <i>Familiarity: need to practice. Larger scroll bars. Investigate a user selectable option for touchpad/scroll behavior (and re-mapping of keyboard shortcuts).</i>

Further development is needed to address these issues.

Warnings remain in readme files available on public download sites.

Student consideration of general exam conditions when using computer versus pen:

All six cohorts. Response pairs: those who typed (line 1) & those that hand-wrote* (line 2)



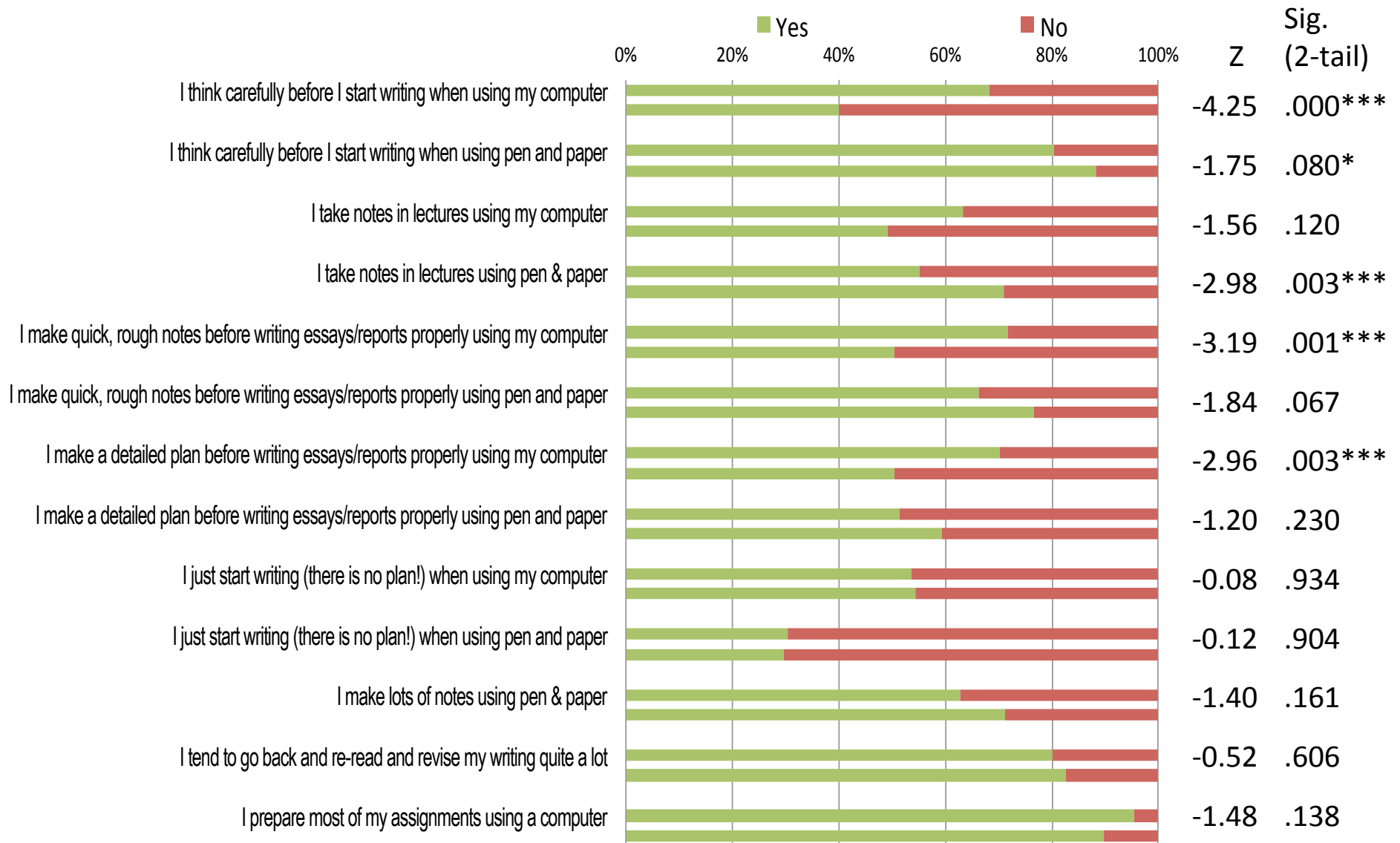
* Note - Many of those that hand-wrote their exam had no prior experience of using a computer for an exam so the results presented here are largely speculative on their part.

However, it is reasonable to assume that they drew on their general use of computers.

Note! Updated March 2015 edition places 'same equally' in the middle rather than on the right.

Writing strategies under non-exam conditions – general writing habits:

All six cohorts. Response pairs: Typers (line 1) and Hand writers (line 2)

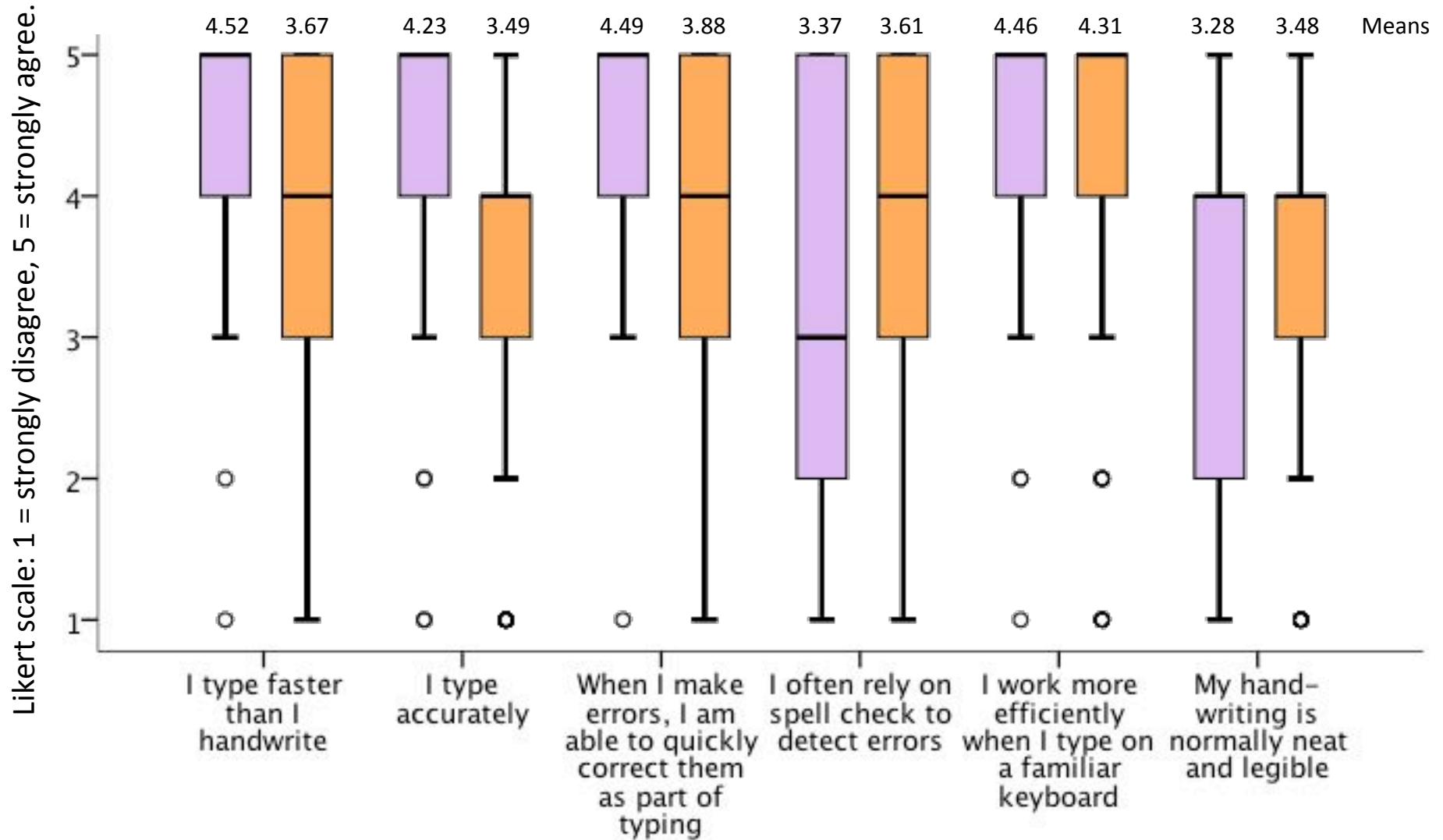


Nonparametric U & Z used to compare those who typed in the exam to those that hand wrote.

Note! The September 2014 edition of this chart was incorrectly reversed against the stats.

Student writing

Typers (left) and Hand writers (right)



Mann-Whitney U	8213	7551.5	8523	11097	10917.5	11621.5
Z	-4.637	-5.089	-4.248	-1.342	-1.656	-0.77
Sig. (2-tailed)	>.001	>.001	>.001	0.179	0.098	0.441

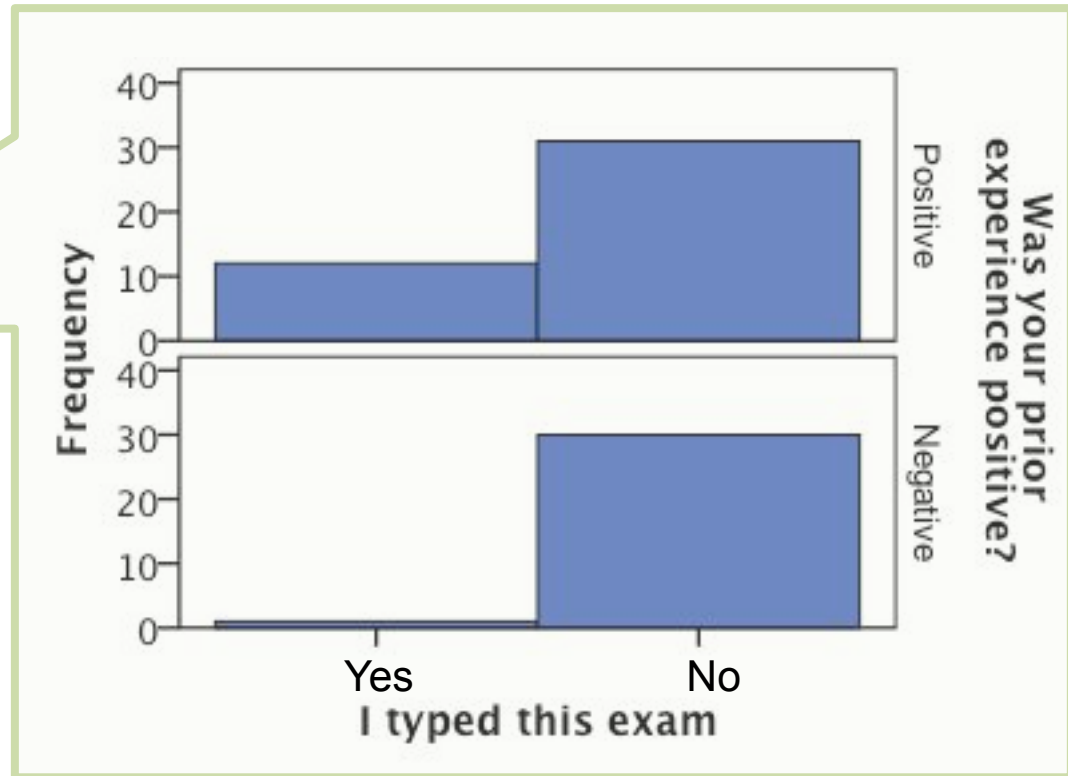
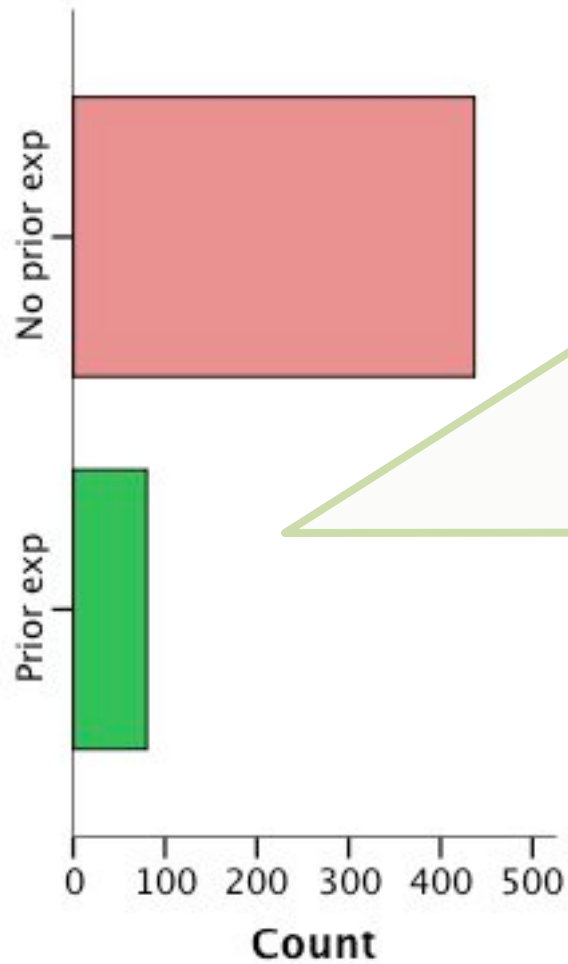
Did the nature of prior experience of e-exams impact on the decision to type this exam?

All participants, all cohorts.

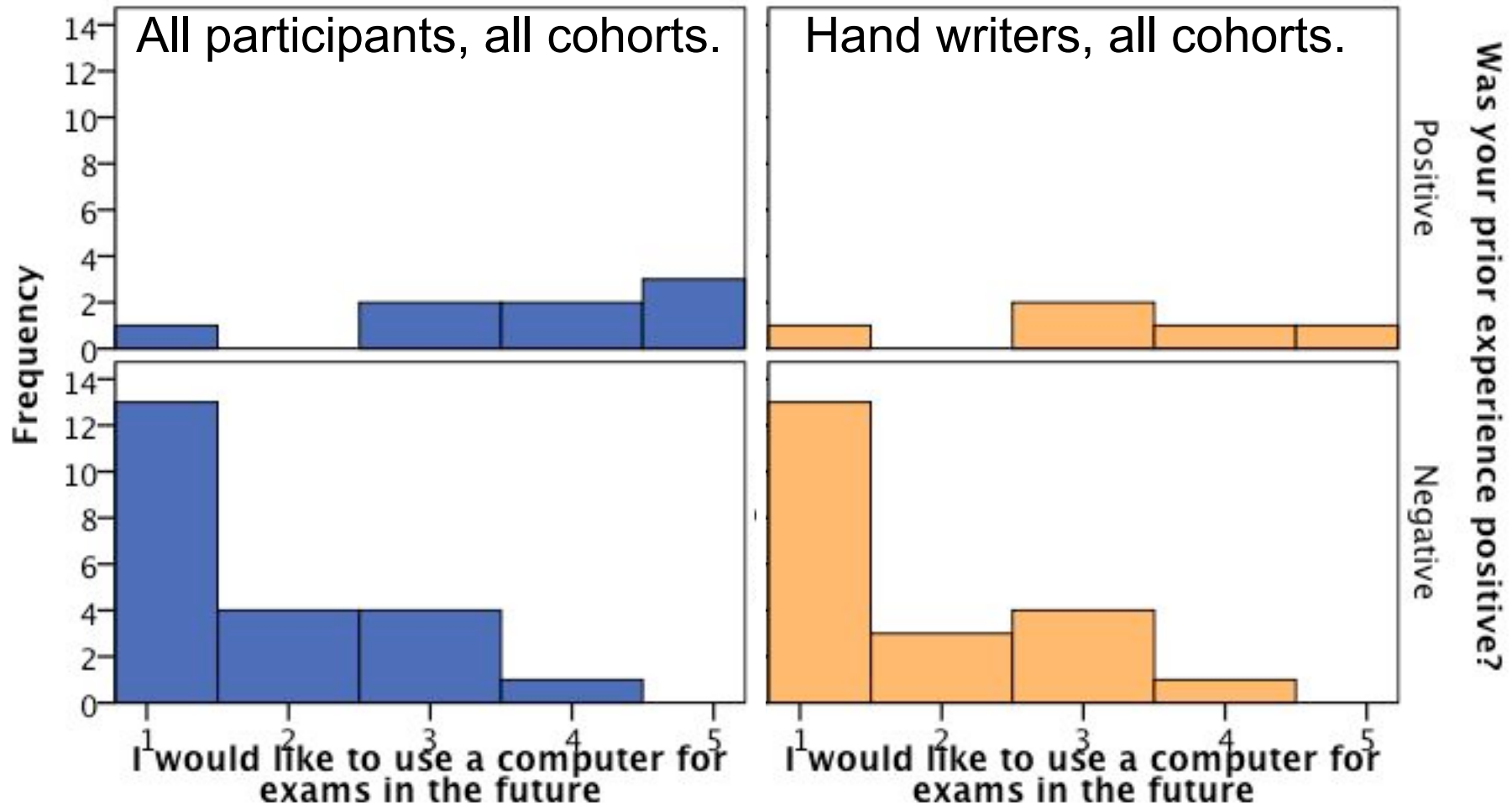
Of those with Prior exp.	All
Mann-Whitney U	502
Z	-2.734
Sig. (2-tailed)	>.01

Looks like a 'yes'!

Before this exam, I had used a computer to type responses to a short answer or essay style exam.



Does the nature of prior experience of e-exams impact future intended use?

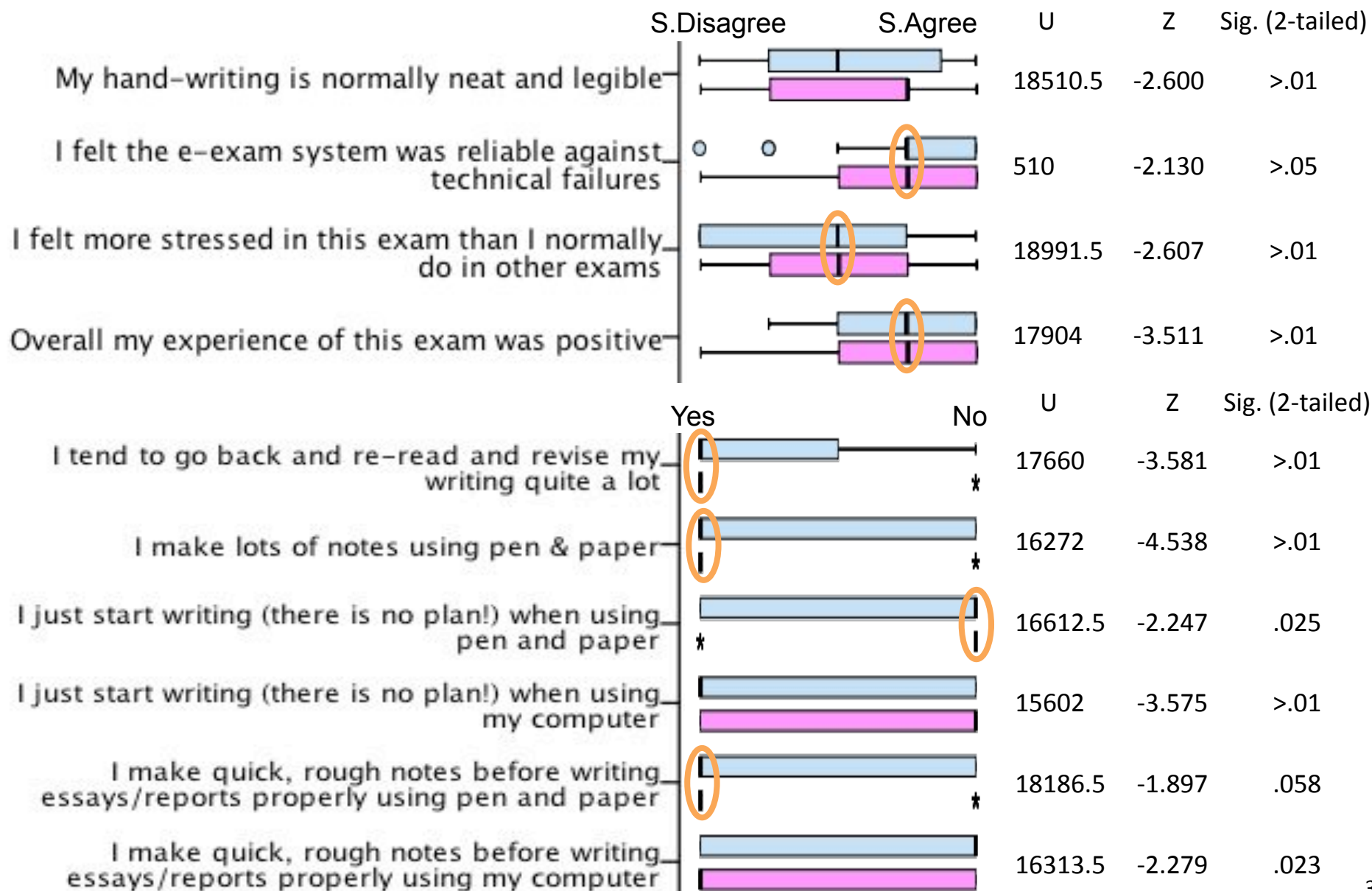


	All	Hand writers
Mann-Whitney U	22.5	21
Z	-3.262	-2.248
Sig. (2-tailed)	>.01	>.05

Looks like a 'yes'!

The role of gender in exams and writing habits

All participants, all cohorts: 9 out of 52 items were statistically significant (so most were not).
The significant items are shown below with Male (Line 1) and Female (Line 2).



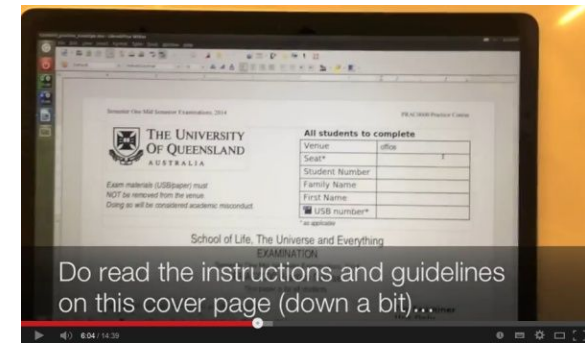
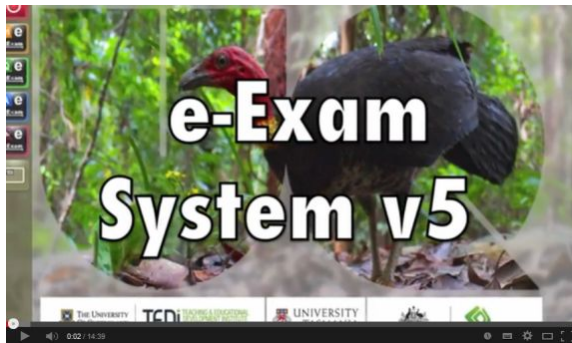
e-Exam Project Resources

More information....

Demo set-up Guide,

Student Practice and User Guide

<http://transformingexams.com>



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>

Contact: m.hillier[at]uq.edu.au

End

Cite this resource

Hillier, M (2015) "About e-Exams" Chinese University of Hong Kong, 20 May.

Feedback Survey

<http://ta.vu/eexamsurv>

