

The Very Idea of e-Exams: Student (Pre)conceptions

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Full Paper Presentation:

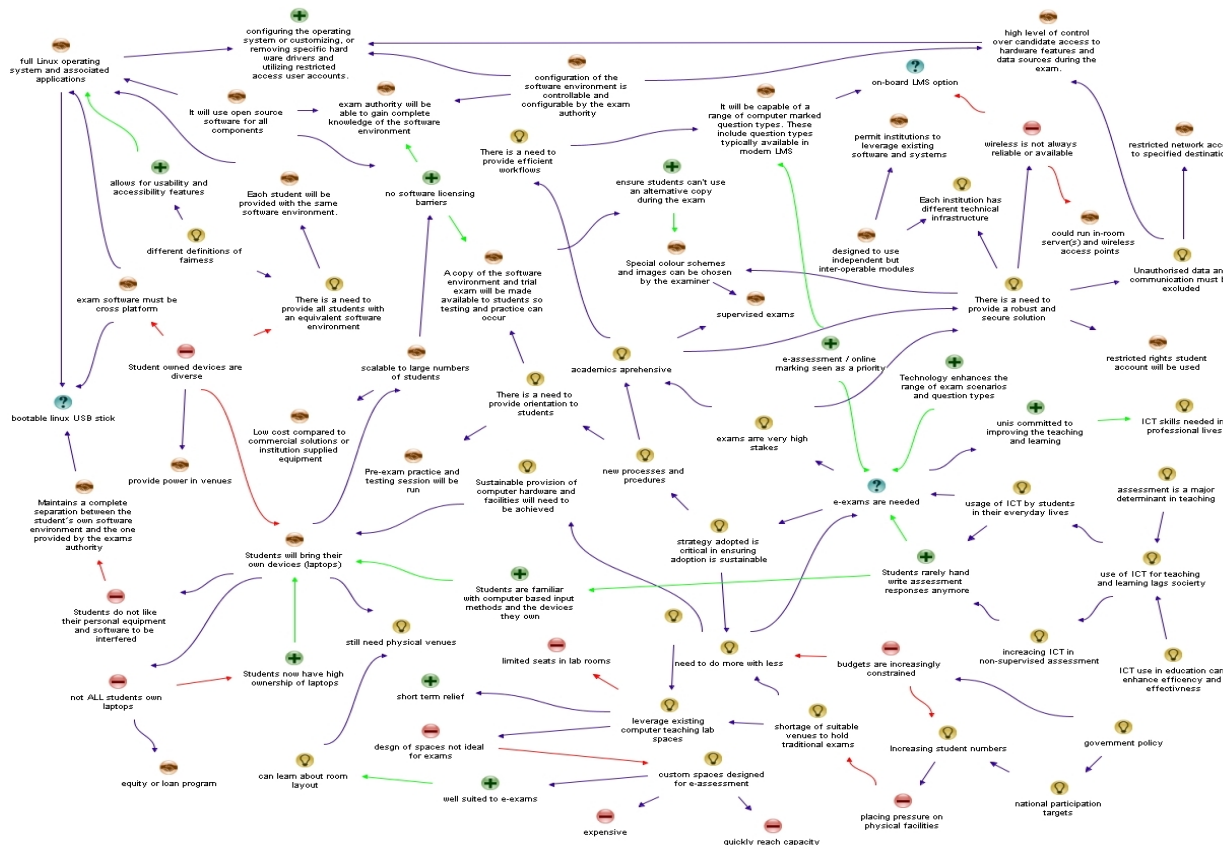
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Issues, Issues, Issues

There are many stakeholders, concerns, drivers, possible solutions in the e-Exams space - a classic 'wicked' problem!

bit.ly/eexam-map



See:

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>

A focus on the students

In this research we focused on the students.

They are the largest stakeholder group but not necessarily the most powerful when it comes to influencing project outcomes.

Study Purpose

- We wanted to gather students preconceptions of the idea of e-exams early in the process.
 - To help us identify areas of concern for students
 - Which would allow us to formulate strategies to address these concerns before any e-exam trials begun.
- Data gathering needed to occur before a series of e-exam trials were to be conducted.

Context

- A large university with diverse programs.
 - 45K students, Arts to Zoology
- Time was relatively short and resources were limited.
- An online survey of the student population was thought to be the most efficient way of covering this large and diverse group.
 - Limitations – the less technically literate students would be under represented.

Survey Design

- Survey constructed to cover a range of possible concerns.
- Prior research Dermo (2009), Lim et al., (2006), Mogey and Hartley (2012), Sorensen (2013), Fluck, Pullen & Harper 2009; Fluck, 2011; Fluck, 2013, Hillier and Fluck (2013) provided a means to *scope the issues*.
- A survey by Dermo (2009) provided the core.
 - Acknowledge that we would be using it in a different manner (pre rather than post).
 - But! we never intended to replicate it, instead we used this as a means for eliciting student concerns across a range of issues.
 - Students would largely be responding speculatively based on their *preconceptions*. (instructions given to students accordingly)

The questions

Theme	Five point Likert scale from 1 "strongly disagree" to 5 "strongly agree"	M	SD
Affective factors	Using a computer for an exam is more stressful than a handwritten paper exam	2.9	1.2
	I am at a disadvantage when undertaking computerised exams	2.4	1.1
Teaching and learning	Computerised exams are consistent with contemporary learning approaches at university	3.8	1.0
	The potential for immediate feedback with a computer based exam could help improve my learning	4.0	0.9
	Computerised exams allow me to demonstrate my knowledge in more ways than paper based exams	3.0	1.1
Validity	Computerised exams are appropriate for my discipline/subject area	3.4	1.2
	Computerised exams need to include a variety of question types in order to test my knowledge fully	3.8	0.9
Reliability	The technology used in computerised exams is unreliable	3.0	1.1
	Computerised exams favour some students more than others	3.5	1.0
	Paper-based exams are fairer than computerised exams	3.2	1.1
Practicality	Technical problems make doing exams via computer impractical	3.3	1.1
	Doing exams in the campus computer labs is impractical	3.3	1.1
Security	Computerised exams are just as secure as paper-based exams	3.3	1.1
	It is easier to cheat in computerised exams than with paper-based exams	3.4	1.2
Production	I prefer typing rather than hand writing essay answers	3.8	1.2
	I work more effectively when I type on a familiar keyboard	4.1	0.9
	I would prefer to use my own laptop to undertake a computerised exam rather than use equipment supplied by the university	3.7	1.1
	I get hand cramps when handwriting exams of 1.5 hours or more	3.7	1.3
	I would like to be able to type answers in an exam	3.3	1.4
Adoption	I want computerised exams replace paper-based exams at university	2.8	1.3

Plus two open ended comment questions

Participation

- 488 students (37% males, 63% females) = 1%*
- 9% post-grad, remainder were undergrads (with an even spread across year levels).
- 45 programs, those with at least 10 are listed:

Program	N	Program	N
Applied science	25	Electrical engineering	13
Arts	60	Information technology	15
Biomedical science	24	Law	29
Business management	24	Mechanical engineering	25
Chemical engineering	11	Mechatronic engineering	13
Civil engineering	18	Pharmacy	16
Commerce	22	Psychological sciences	15
Computational mathematics and physics	13	Social sciences	10
Education	11	Software engineering	10

*Krejcie & Morgan (1970) state that for a population of 50,000 a sample size of 381 would be sufficient to provide a representative sample in relation to opinions expressed by respondents to 95% confidence.

Analysis

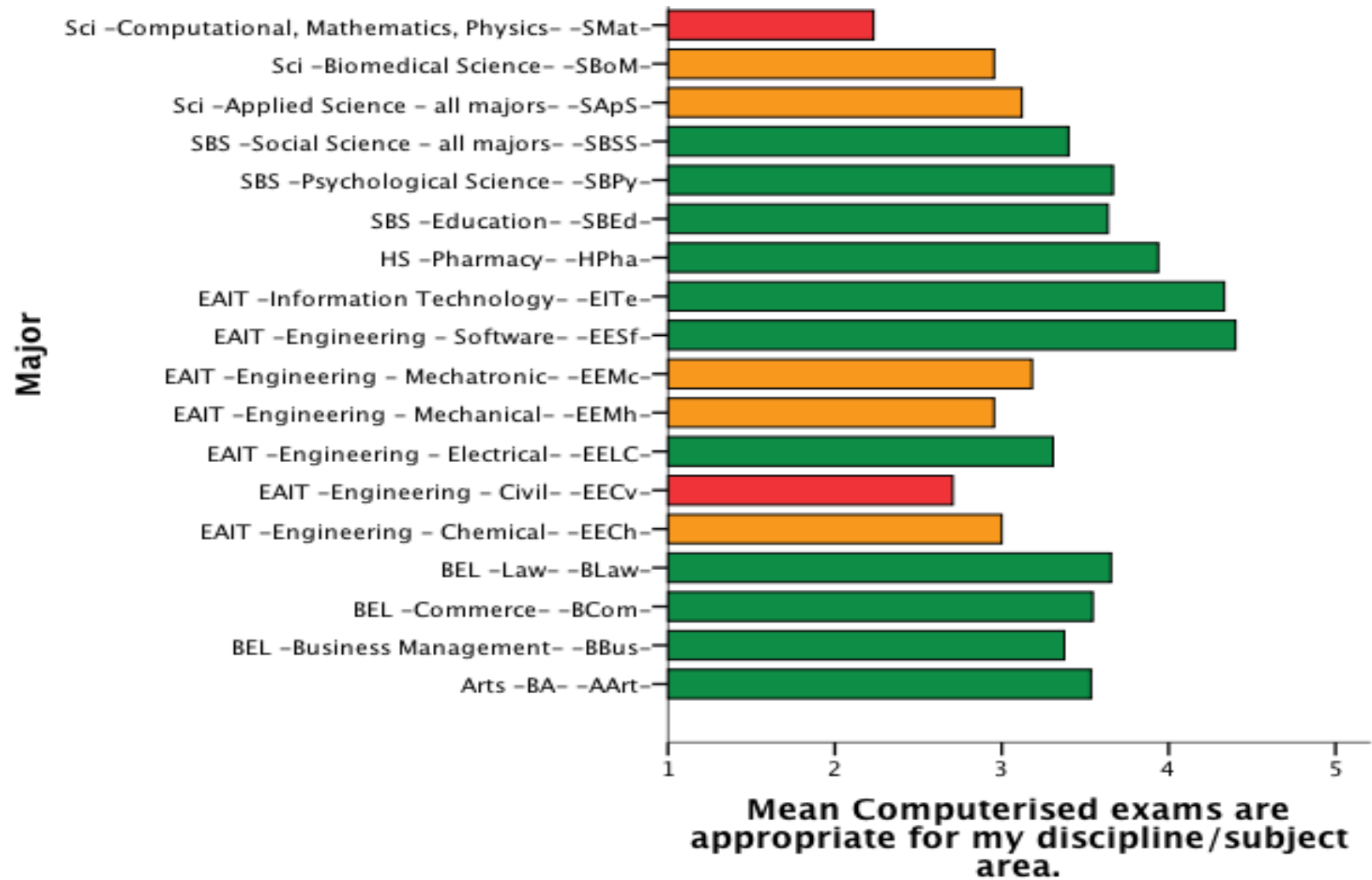
Statistics used to explore the body of *opinion* represented by Likert scales, rather than as a search for a single truth.

Tended to stick to non-parametric tests.

Themes drawn from open ended questions on currently held 'concerns' about e-exams and general comments (covered later).

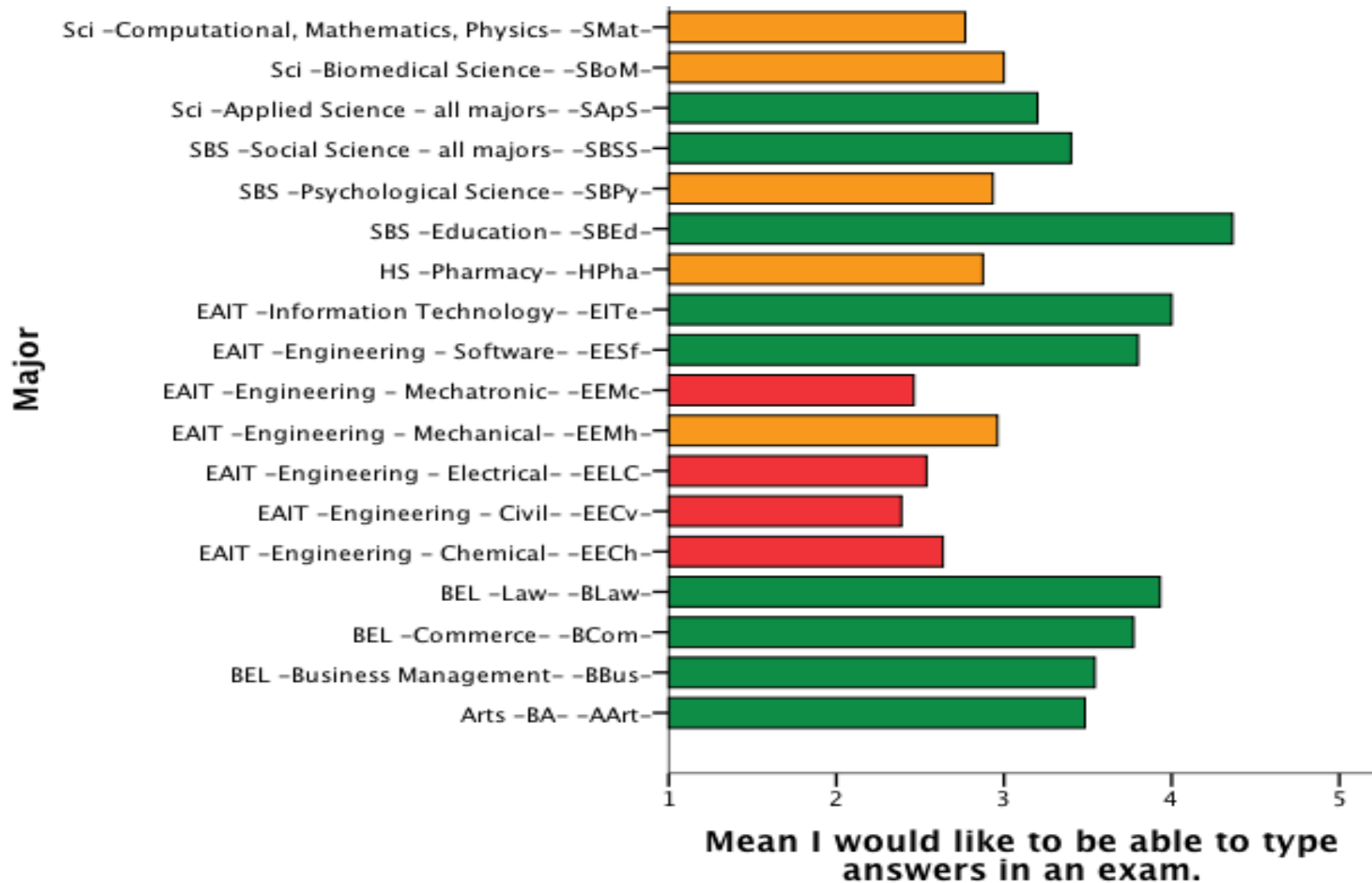
Findings

By program (major)



Findings

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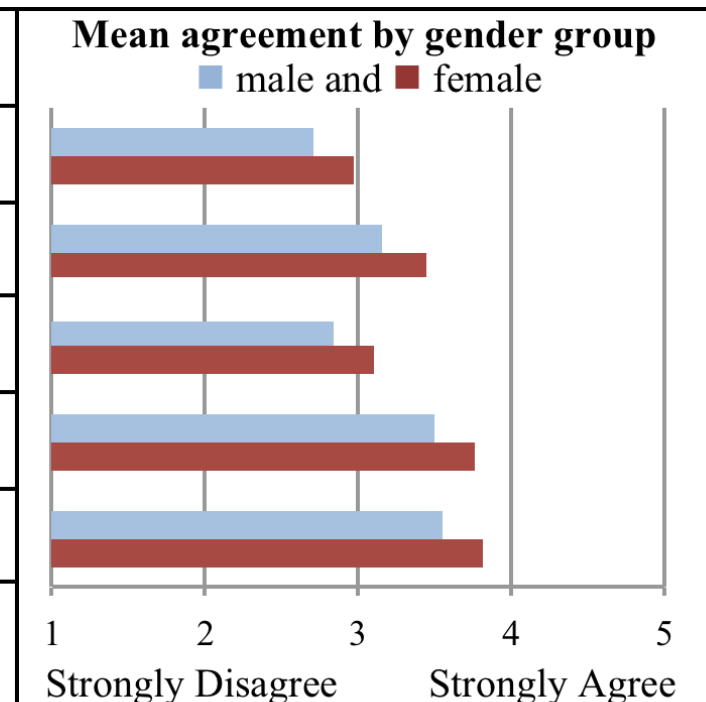
Findings

Gender

Females gave stronger agreement ratings than males across the five items where Mann-Whitney's test results showed significant differences.

N(m)	N(f)	U	Sig	Question
166	278	20778.5	<.05	Using a computer for an exam is more stressful than handwriting
174	290	21460	<.01	Technical problems make doing exams via computer impractical
158	259	17509.5	=.01	The technology used in computerised exams is unreliable
170	291	21653	<.05	I would prefer to use my own laptop to undertake a computerised exam...
177	299	23586	<.05	I get hand cramps when handwriting exams 1.5 hours or more

Notes: Asymp. Sig. (2-tailed). Only significant results are shown.
N(male) and N(female) shown.



Findings

Prior experience of e-exams... there was some!

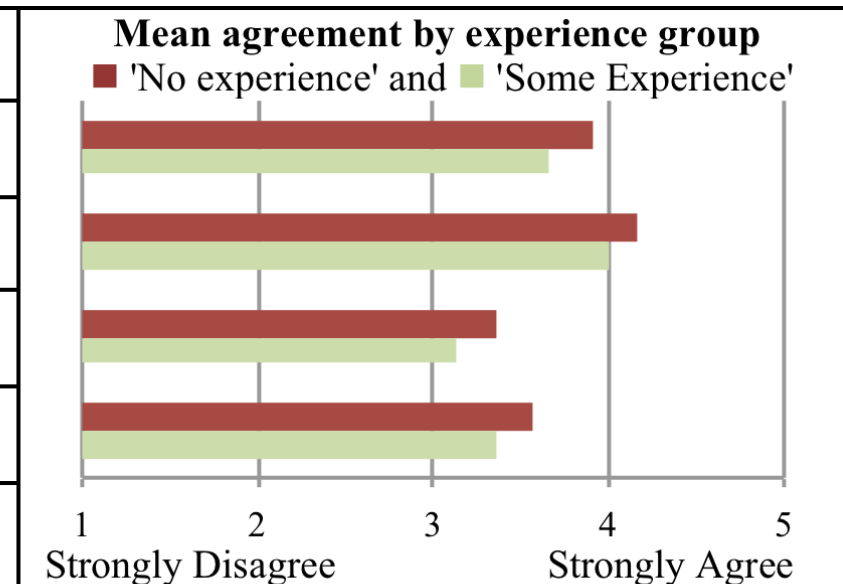
'no experience' (54.5%) and

'some experience' (45.5%) of e-exams

(But! 'some' was overwhelmingly 'a few' rather than 'a lot')

Nn	Ns	U	Sig	Question
285	190	24072	<.05	I prefer typing rather than handwriting essay answers
285	192	24576	<.05	I work more efficiently when I type on a familiar keyboard
262	190	21749	<.05	Doing exams in the campus computer labs is impractical
272	191	23298	<.05	Computerised exams favour some students more than others

Notes: Asymp. Sig. (2-tailed). Only significant results are shown.
N(no experience) and N(some experience) shown.



'Some experience' tended to lower their agreement with statements. Perhaps the complexity is dawning on them.

Findings - Themes

Theme	N	Example comments
Technical reliability	99	<p>Technical reliability frequently revolved around software errors:</p> <p>“Trouble logging in, losing all progress (not being saved)” - <i>male, civil engineering, no e-exam experience</i></p> <p>“Making a computer based mistake that may void the exam (like pressing submit accidentally)” - <i>female, nursing, no e-exam experience.</i></p>
Cheating	76	<p>Cheating was perceived to occur through (1) ability to look at the answers on the screens of other students and (2) insecurity of a computer-based examination platform:</p> <p>“There also is a greater risk for technical problems as well as unfortunately people figuring out ways to get around the system” - <i>female, software engineering, some e-exam experience.</i></p> <p>“How would plagiarism be prevented? Easier to look over someone's shoulder at a laptop screen that is raised up than it is to look at a paper flat on the desk - specific desks or dividers would be needed.” - <i>male, arts, no e-exam experience</i></p>

Findings - Themes

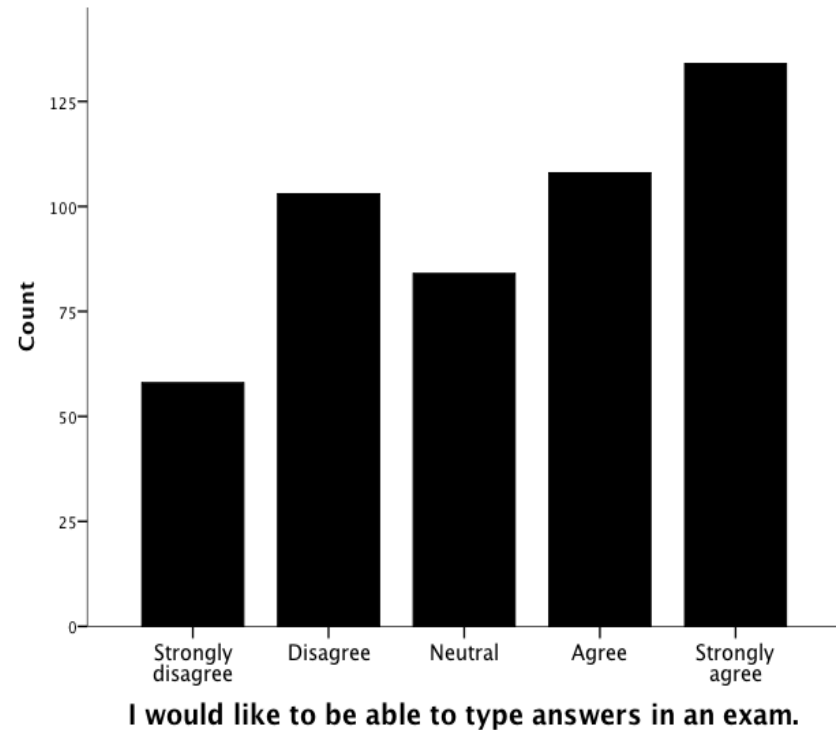
Theme	N	Example comments
Match with discipline	49	<p>Many students commented that computerised examination were not always appropriate to aspects of their discipline while others wanted it 'yesterday'. Rigidity of marking was also thought to be flaw of some computer marked questions:</p> <p>“It is too difficult in a biomedical science major to have fully computerised exams as too many questions rely on drawing diagrams within the answers. However for long essay questions where no diagrams need to be included or for multi choice, computer based would be preferable.” - <i>female, biomedical science, some e-exam experience</i></p> <p>“Coding based subjects in particular are in desperate need of computerised final exams. 60-70% of your overall grade in a subject teaching you how to program on a computer comes down to being able to hand write the general form of it on paper in an exam. It's stupid and proves absolutely nothing about your ability.” - <i>female, mechanical engineering, no e-exam experience</i></p> <p>“It is just plain stupid when a computer marks you 0% for an answer of 39.64 when it wanted 39.642. If a real person had marked that he would of just taken a small mark off for improper significant figures.” - <i>male, computational, math, physics, no e-exam experience.</i></p>

Findings - Themes

Theme	N	Example comments
Keyboarding prowess	42	<p>Many students reported concerns around keyboarding prowess such as (1) differences in typing speed, (2) familiarity with keyboard, and (3) sound of keyboard processing:</p> <p>“My typing speed is poor. I only use two fingers and would struggle to complete an exam in the time available different keyboards- makes me slower if its [sic] a different key board”- <i>female, social science, some e-exam experience</i></p> <p>“Computerised exams would be distracting - the sound of a hundred or so students typing and clicking would be incredibly frustrating!” - <i>female, arts, no e-exam experience</i></p>
Computer literacy	20	<p>The connection between computer literacy and equity made by several respondents.</p> <p>“Some students may not be able to afford their own laptops or computer for their exams and may have to use those supplied by the university. Therefore, they may not be as proficient in computer skills, typing, MS word functions, etc because they may not use computers as often as someone who owns there [sic] own and may be disadvantaged simply because they cannot afford a computer” - <i>male, law, no e-exam experience</i></p> <p>“...A Gen X/Baby Boomer can go to as many computers-for-dummies classes as they can fit in the rest of their life, but they will NEVER be at the same standard as a Millennial who has grown up with a computer” - <i>female, arts, no e-exam experience</i></p>

Interim Conclusion

- Students were
 - Cautiously optimistic
 - Just over half would like to see e-exams coming; mean agreement (3.3)



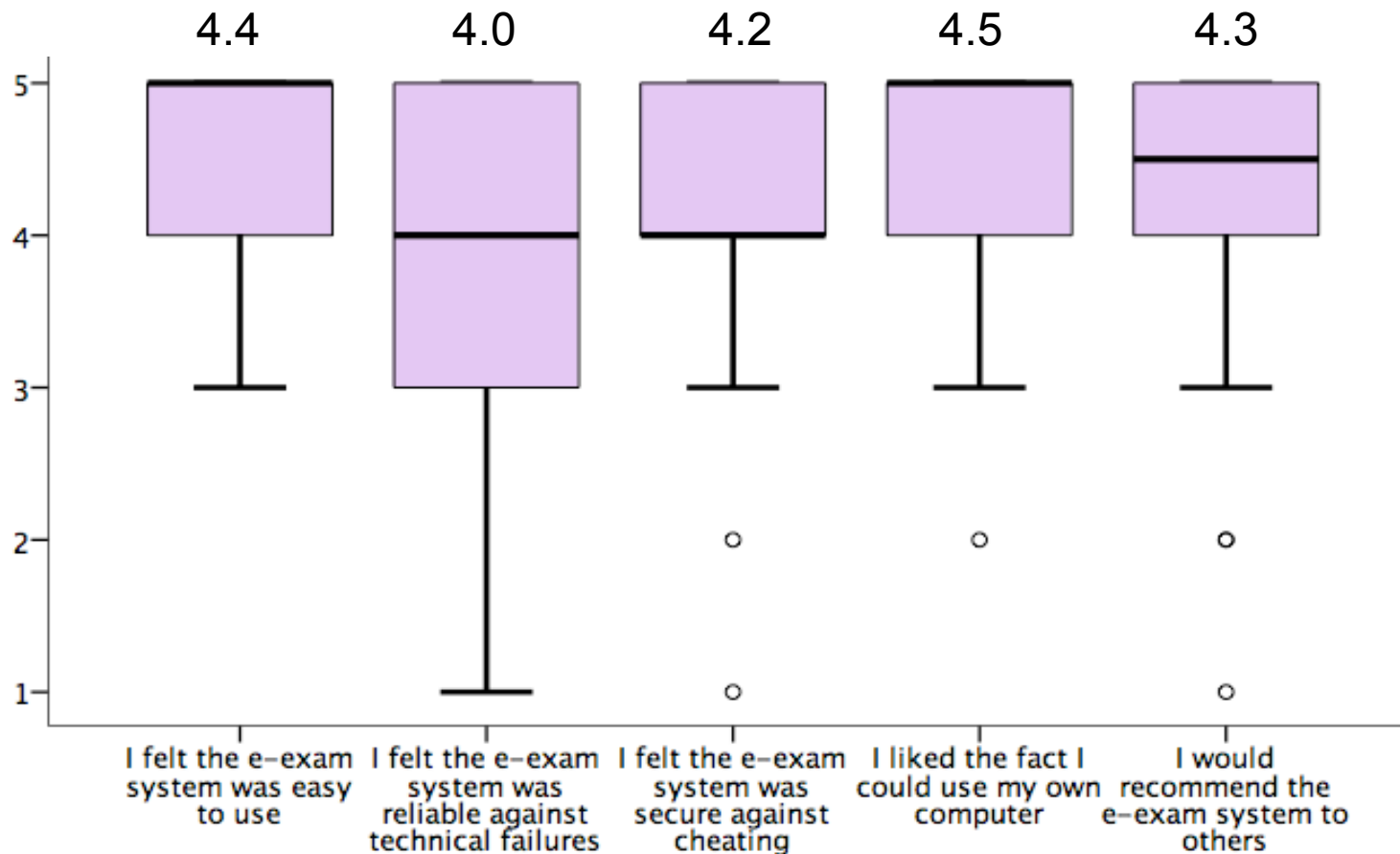
- Were attune to the nature of their discipline and how the idea of an e-exam might fit.
- The fear of the unknown (?) esp regarding technical failures and reliability.

ASCILITE paper ends here... but more to see ;-)

Follow-up

Post-exam survey conducted.

Those who used the e-Exam system liked it.



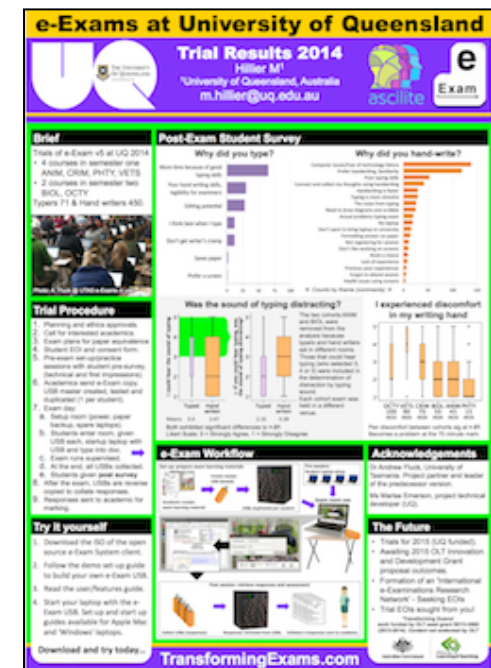
Likert scale/rating: 1 = strongly disagree to 5 = strongly agree [N = 69].
Means shown.

Questions?

e-Exam project

<http://transformingexams.com>

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More at the Poster session today!