

Handwriting or Typing Exams
Can we give students the choice?

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The initial problem



Coursework



Exams

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Why essay exams and Why laptops ?

Small steps (NB: This is not a one size fits all solution)

Laptop ownership higher than 90%

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Greg Sarab
CEO Extegrity inc



**Long & successful record with
USA law schools**

Edinburgh :
Trials with small classes (MBA)
and other pilots
Using tablet PCs (diagrams)



Student reaction:

Interesting idea, but with some reservations
Keep exploring
Tablets cumbersome to use

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Exam4 software



[www . extegritty . com](http://www.extegritty.com)

Easy to use, cut down word processor

- Student owned laptops – easy install (PC & Mac versions)
- Exam questions are NOT part of the download
- Course team decides re spell check & other features
- Course team decides re saving to network, USB, local disc
- Student just signs in & picks course from list, no file names to enter
- Regular encrypted snapshots throughout exam
- Option for student to retain encrypted version of script
- Student decides re font size, timer settings
- Admin needs code to decrypt scripts
- Can print or mark digitally, whole or part scripts

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So why not just full steam ahead?

.... would it be fair ?

"It's not a level playing field as some people can type a lot faster than others."

"I think it's a bit unnecessary & computers have a tendency to go wrong."

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Other Research – what we know

- Students with good IT skills perform 10% better at online writing exercises. Horkay et al (2006).
- On average a law student typing an exam could expect to perform slightly better than their colleague who handwrites. Augustine-Adams et al (2001)
- Pupils who have written their (non exam) essays using a computer write to a better standard (MacCann, Eastment & Pickering 2002; Russell & Plati 2001; Goldberg 2003; Hartley & Tynjala 2001)
- Students who write essays on a computer write more than students who handwrite (Russell & Haney, 1997; Russell & Plati 2001; Wolfe Bolton Feltovich & Niday, 1996).
- A type-written essay will be marked more harshly than an identical handwritten text. (Russell & Tao 2004, MacCann et al 2002)



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- Is the mark awarded to an examination script influenced by the format of the script (typed or handwritten) rather than its content ?
- Is there generally a difference in the amount of text that can be written or typed in an examination?
- Are students who type slowly any more or any less disadvantaged than students who handwrite slowly ?
- Do students perceive typing examinations to be as fair as handwriting responses to examinations?



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Our experiment

1st year divinity class, 70 students
 (Optional) Mock exam, free choice to handwrite or type
 Use own laptop or borrow a loan machine
 Select one question from three, all pre-seen
 All students sit in same room and do the mock exam
 Transcribe all scripts into other format
 Four experienced PG markers
 Each marker marks every student script once
 - either as typed or as handwritten



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Data from 51 students.

69% (n=35) female
 31% (n=16) male

34 in age range 18-21 years
 8 in age range 28-54 years

37 students sat the mock exam (28 female, 9 male); (24 typed, 11 handwrote)

Confident, frequent users of technology
 37 (88%) students reported using the computer either daily or "as frequently as possible", only two responded "less than daily" (both female).

Typing ability

12 type faster (more males)
 14 handwrite faster (more females)
 12 no difference

(Typing speed was not associated with IT confidence level.)



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Student's expectations

How much would you write ?

	Type Faster	Write Faster	No difference	Total
Type More	8	2	1	11
Write More	0	9	2	11
No difference	4	0	6	10
Don't Know	0	0	5	5
Total	12	11	14	37

How would you write ?

Approach to writing essay	Count
no change	12
positive change, structure & layout	7
negative change, structure & layout	1
positive change, thinking processes	6
negative change, thinking processes	6

What mark would you get?

	Type Faster	Write Faster	No difference	Total
Do better on a PC	8	1	4	13
Do worse on a PC	1	9	2	12
No difference	2	0	1	3
Not sure	1	2	7	10



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Are essay exams on computer a good idea?

18 Positive comments

Yes, as the world is becoming more and more computerised, we must embrace this in all parts of academic life.

Yes, because the nature of exams are changing and revision styles are changing because of computers.

Yes. People are using computers more in the workplace, so it would be beneficial.

10 Negative comments

No, because it would put people on different starting points (e.g., touchtyping). Also exam conditions are different, we have always done exams on paper.

No. Computers can crash & break down. This would not be good if we had a time limit. They are not efficient and safe compared to pen and paper.

No. I would write less; it would interrupt my thought process.



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Are essay exams on computer a good idea?

Fast typists want to type, and fast writers want to write. (!)

6 students made strongly Pro Choice comments – all fast handwriters

Strong support among the 'no difference in speed' group for typing exams

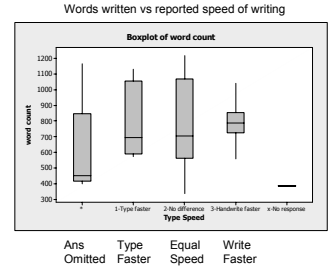


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Is there a difference in the amount of text that can be written or typed in an examination?

Yes, there is a difference – but it is about the spread in the data not the typical no. of words written.

Females tended to write slightly more than males, no correlation with age.

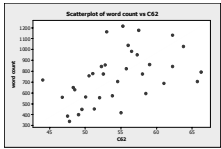


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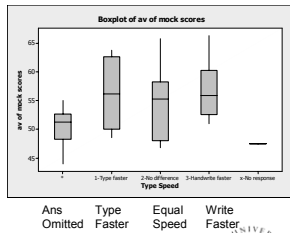
Are students who type slowly any more or any less disadvantaged than students who handwrite slowly?

No

Longer scripts tended to score more than short scripts (correlation = 0.484)



But not related to writing preference



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Is the mark influenced by the format of the script (typed or handwritten) rather than its content?

No.

Variation between markers is much more important than variation due to format

ORIGINAL SCRIPTS ONLY

Mean Score Awarded handwritten scripts = 52.79 St Dev = 7.13 (n=52)

Mean Score Awarded typed scripts = 54.90 St Dev = 9.0 (n=96)

ORIGINALS PLUS TRANSCRIPTS (n=74)

Mean Score Awarded handwritten scripts = 55.12 St Dev = 8.25

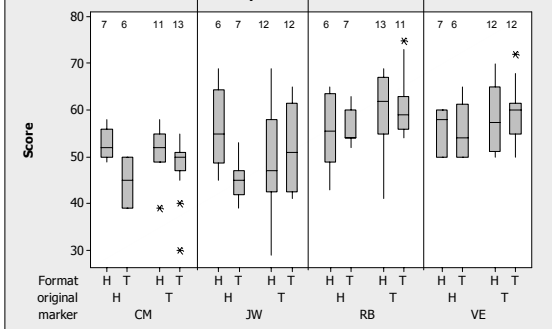
Mean Score Awarded typed scripts = 53.19 St Dev = 8.53

marker	N	Mean	StDev	Min	Max
CM	37	49.54	6.03	30.00	58.0
JW	37	50.46	9.32	29.00	69.0
RB	37	58.68	7.33	41.00	75.0
VE	37	57.95	6.39	50.00	72.0



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Boxplot of Score



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The remaining ifs

Only looked at 1st year Divinity

No mock can ever truly repeat the exam context

Practice isn't just familiarity with the software:

"I had no concept of how much I had written, with a hand written exam you aim to write about three sides of A4"

NB : This also applies to markers, not just students !

Still analysing data about the quality of the writing produced, to explore wrt student choice of format and any marking tendencies.

.... But we do now have a suitable exam hall



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