

E-Check - “Exams - Comparing Handwritten Essays with those Composed on Keyboards” – Final Report

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Abstract

Previous work has shown that giving students the choice of whether to type or hand-write the final essay-exam does not affect their final mark. However, the number of students choosing to type has remained low – less than 10%. This work aimed to start the process of understanding better the different processes involved in typing rather than hand-writing essay type exam so we can assist our students to make a more informed choice as to what is best for them. The results of this work confirm that the “best” choice of composition mode for examination essays for any individual is not necessarily obvious or intuitive, and providing an opportunity to practice and reflect is therefore important. The study has also raised new questions especially about planning behaviours and has highlighted the need for further work in this area.

Keywords

Essay exams, typing, hand-writing, timed exams

Aims

This study sought to gather evidence about differences in how students go about composing timed essays using keyboard and word processor compared to pen and paper. From this increased understanding, staff can then help students make a more informed choice when they have the option to write or to type essay in essay-type examinations, rather than students falling back on “gut-reaction”.

Outcomes

The research has demonstrated that, as a result of the embedded practice session :

- Students acted and reacted in ways they had not initially anticipated. They were able to reflect on this and several changed their choice of composition mode in the subsequent examination. Hence we recommend that providing an opportunity for students to practice and contrast the two modes is important.
- We have evidence that real differences may exist in planning behaviours, when comparing handwriting and typing modes. However the consequences of those differences may impact differently on different students and merits further investigation.

Dissemination activities

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One day event : 23 April 2012

30 Participants representing 17 different institutions/organisations.

Slides available at

<http://www.ed.ac.uk/schools-departments/institute-academic-development/learning-teaching/staff/courses-events/iad/slides>

(resulted in invitation to visit Aberdeen University to share our experiences)

JISC RSC Scotland iTech award nomination

http://www.rsc-scotland.ac.uk/case_studies/docs/University_of_Edinburgh-Handwriting_vs_Typing_Essay_Examinations.pdf

Presentations & Academic Papers –

- Enhancement Themes conference March 2012 – presentation “Handwritten vs typed essay exams: Differences in Process and Product”
- International CAA conference July 2012 – paper & presentation “Stylistic differences between typed and handwritten essay examinations
- Higher Education Academy Arts and Humanities Conference, Pedagogies of Hope and Opportunity – presentation “Typing or hand-writing essay exams: what should students choose?”
- Paper Active Learning – Moge M, Cowan J , Paterson J, Purcell M “Students’ choices between typing and handwriting in examinations”, Active Learning (in press 2012)

Methodology

An unseen practice exam was scheduled in class time for a first year, first semester, Divinity course – Christian Theology 1 (these students had not previously taken any University exams). The exam consisted of two questions (both questions were on the same topic with only the required approach varying. Both were judged to be of equal level of “difficulty”), and all the students were asked to respond to the questions in the same order (A first and then B). About half the class, seated towards the back of the room, were directed to type their first response, and the other half to handwrite their first answer. Then half way through the class, students were directed to switch to the second question, and to use the other mode of composition. The room layout was far from ideal with the students seated fairly close to each other.

The typed scripts were created using Exam4 software produced by Exegrity². This software runs on the students own laptop (mac or windows), “locks” down the machine preventing access to the hard-drive or internet and provides a simple word processor. All the students taking part in the practice exam were able to provide a laptop, although we had offered to provide loan machines to those who were not able (or unwilling to use their own). Power was provided to each machine if required. The questions were provided on paper, only the mode of writing was changed.

² <http://www.exam4.com/>

Handwritten answers were collected on paper; typewritten responses were collected on USB sticks and printed. Both questions were marked by a single experienced marker, and feedback provided to the students within two weeks.

A total of 55 students attended the practice exam. 25 students typed their first answer, and 30 students handwrote their first answer.

Students were informally observed during the practice examination, making a note of approximately how many were actively writing at different times, and additional information was collected from students before and after the practice via two surveys and a focus group.

In order to encourage students to take the practice seriously, and to try to simulate in some way the pressure of a high stakes examination, two £50 prizes were available one for the best handwritten, and one for the best type written script. One additional £50 prize was to be allocated randomly. In order to be eligible for the prizes students did have to complete both surveys.

Deliverables

It is essential to recognise that the participants in this study were students in the early stages (first semester, first year) of their academic career and still very much in transition from School to University. This was their first experience of formal HE assessment. Nevertheless the findings are likely to be useful and relevant for other institutions

- Where a choice of exam composition mode is available, providing a space for students to “try out” both modes of writing under “safe” conditions is invaluable in helping students understand what feels best for them. Reflections both before and after the exams showed that some students stayed with their original preference but a significant number completely changed their mind, including students who had made a definite (as opposed to a tentative) selection totally reversing their opinion.
- Most students made more detailed plans when hand-writing and did little if any planning when typing. Students were mixed in their views on the value of planning. Some thought planning was beneficial – *“Handwritten I had thought about it before I started so I knew where the essay was going, but less thought was involved in the computer version.”* While others found that planning and the restrictions on re-arranging text with hand-written scripts was detrimental – *“Although the handwritten version is better planned, then you tend to stick to that plan, its not really changed. The typed version develops much more as it goes.”*
However, when we plotted students answer to the question – “I made a more detailed plan when using pen & paper - Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree or Strongly Agree” against their final scores for the hand-written and typed scripts there were no trends. This suggests that students are not good judges of how well planning helps with their final answer.
- When typing students did recognise the value of being able to edit their text: *“It’s a good feeling to know that with typing I am able to insert a thought*

- Practice is important not only to become familiar with the software and the approach to composition: *“I am familiar with gauging my progress in an exam by the number of pages I have written and I did not have the ability to do this with the computer.”* [There is some evidence from other studies that markers may also be influenced by the perceived length of answers.]
- The students were not good at predicting which of their two answers was better, either in advance (based only on composition mode), or indeed having submitted the scripts (where the difference between the question prompts could have been a factor). This perhaps suggests more work is needed for the students to appreciate what is sought in a high quality HE exam-essay response.
- From a linguistic point of view, the typed scripts tended to be more complex using significantly more words of three or more syllables and students tend to type more words than they hand-write. However, these linguistic differences did not necessarily improve the final mark.
- Students are risk averse and taking chances with high-stake exams is not something they will take lightly.

Background

The School of Divinity at the University of Edinburgh has offered students the choice to handwrite or type their essay examinations for a number of courses for a number of years. This followed on from earlier research where it was shown that the mode of presentation had little influence on the final mark³. However, although the choice to type has been widely welcomed, nevertheless many students still opt to handwrite. As staff, we have some concerns that because many students now rarely handwrite other than in exams, electing to handwrite exams may not, ultimately, be the wisest choice. However this is conjecture, we do not have sufficient information about differences in composition strategies or cognitive process when comparing handwritten and keyed exams.

Data collected in an earlier study gives us some indication of why large numbers of students might prefer to handwrite rather than type. Practice is naturally viewed as critical, specifically practice in using computers in a time limited context. The reliability of the technology is a concern to those who have not tried it, but we can demonstrate an excellently robust system, and this concern should lessen with more experience. Typing speed does not seem to be a concern, especially if there is a handwriting options for those who have a strong dislike of typing. Students do however tell us that they are unsure about whether they will be distracted into messing about sorting out lots of little details, rather than getting on and writing down what they need to write, and, rather worryingly, some students believe a good exam essay is fundamentally different from a good coursework essay, they suggest that argument in an exam is less important than demonstrating a knowledge of facts. Hence many

³ Moge N, Paterson J, Burk J, Purcell M (2010) Typing compared with handwriting for essay examinations at university : letting the students choose, ALT J, 18 (1), 29-46

students reject the possibilities offered by word processing, and prefer to do what they have always done before in exams.

Putting it into Practice

Student pressure is likely to grow for computer-based exams as schools and exam boards increasingly move to greater use of computers in exams. Hand-writing exams may not remain the norm and “comfort zone”. HEIs will see this demand grow and it is important that the processes are in place to cope with this demand. The approach described in this study is relevant for subjects where essay responses are mostly text (including many modern languages with a left to right flow of text). It is possible to accommodate diagrams by suggesting that students draw them freehand on paper and submit that separately, but where the discipline requires the student to construct complex equations or make extensive reference to symbols and formulae, this is probably not the most suitable approach.

Earlier work addressed some of the practical and technical considerations of how students could be offered the choice to handwrite or type essay-exams. This study has concentrated on exploring some of the differences students feel between the different modes of writing.

Investment may be required for HEIs considering any move to offering students the option of typing their exam. At the University of Edinburgh, one examination hall has been refitted to allow power to each desk and excellent wireless provision. In addition, when such exams take place in this area, the spacing for desks used by students using their own laptop is wider than normal – this has implications for the number of students such a room can hold. Changes are needed to normal examination start and end routines to enable students using laptops to switch on and submit at appropriate times; invigilators need to be trained in order to feel confident monitoring a multi-mode examination. IT staff are currently also on-hand at these exams to deal with any IT-related issues. However, many of these issues may be only transitory. For example, as battery-life improves, power provision may not be required and as confidence grows the need for dedicated IT staff to be present may not be needed. These are early days, and HEIs considering such a move to need to consider all these practical considerations.

For the School of Divinity, we will continue to offer in some of our courses the choice of typing or hand-writing the final exam. We will encourage staff to consider the option of letting students “try out” both options under “safe conditions” so that students can determine what feels best for them. However, what they think is best for them, may in practice not result in a better performance (and mark).

Although, this research was carried out with students in the early stages of their HE experience it did highlight the need to provide more directed statements on the requirements of essay examinations. Currently, the induction on examination practice is often left until revision week when students are often in “panic mode” about revision. Earlier intervention is required to ensure that students understand the differences between School and HE exams even before they start revising – for example writing a lot on any given subject is not the aim.

Moving on to the actual practice of writing essays exams under examination conditions (irrespective of the mode of writing), we do need to provide students the opportunity to think around topics of what the question means, planning, presentation of the answer, etc. How this can be best met is unclear. Ideally some kind of hands-on workshop or practice session would be best but this is resource hungry and difficult to timetable. This requires further discussion. We will seek further funding to continue our research work in this area to attempt to understand better the processes involved when students type or hand-write.

Embedding

As stated in under the “putting into practice” section, the School of Divinity has already offered and will continue to offer the students the choice of either hand-writing or typing their final essay exam – this practice is already embedded within the assessment processes of the School, and is slowly being adopted by some other schools.

However, this work has highlighted a number of issues that the School needs to consider – these include the inducting of students on the requirements of essay type exams, including planning and presenting their answers. This needs further discussion to find appropriate and timely provision.

Benefits

As Schools move to increased use of computers for exams, HEIs will be under pressure to adopt a similar approach. Our work should add to the growing understanding of the issues around this move and assist the decision making process within different HEIs.

An additional benefit of the approach is that where some students are currently allowed to sit exams using computers as an accommodation, this no longer becomes necessary, and those students can be treated as part of the main student body.

Students' Views

The initial driver for the consideration of this work was from students. Throughout this project we have worked with students and they have been key motivators and informers to our work. Indeed, we have had a number of students approach us “begging” that their courses be included in the School’s offering for exams on computers. Unfortunately, at this stage, we are not always able to accommodate these requests.

Impact

For this particular study, by conducting a practice exam, those students involved had the immediate benefit of having tried an HE exam under safe conditions. Feedback was provided on their script, in addition to the reflections prompted by the research instruments.

However, probably the major impact of this work has been the growing interest from other HEIs on our work. Our successful one day workshop was attended by representation from many Scottish HE and FE institutions. Lively discussion

throughout the day left us all with more questions than answers but did highlight the growing interest and debate around this area.

Issues and Debates

Institutional Issues

- How can a move to exams of computers be resourced?
 - *Student owned laptops are used, laptops should be available on loan for students who are unable or unwilling to use their own machine. Unless students are confident in the battery life for their laptops power should also be provided. Most institutions will now have a robust wireless network . Provision of IT support during the examination may be advisable, especially in the early stages of implementation. An administrator or similar is needed to decrypt the digital scripts and distribute for marking.*
- What are the impacts on regulations – for example, issues around laptop failure?
 - *To date we have seen no major issues and any that might occur will be dealt with via Special Circumstances (similar to any other exam hall issues)*
- What about students with computer-based adjustments for disability reasons?
 - *Currently, all students where they have a computer requirement for exams due to disability reasons, the student would be dealt with through the normal channels. However, on-going investigations may mean that for certain disabilities the use of this software may suffice.*

Teaching issues

- Does giving the students the choice of typing or hand-writing their final script affect the mark given?
 - *Our earlier work has demonstrated this is not the case.*
- How do you equip students so they are familiar with the software and have had an opportunity to try the software?
 - *Currently, we have one optional lunchtime session for all courses where this option is available. In addition, one course elects to offer a practice session in class-time but this does cut into teaching time*

Learning issues

- How do we equip students so they understand fully the requirements of HE exams?
 - *Consideration needs to be made into how best to induct students on exam requirements – this needs to be timely.*
- Should we assume by the time students arrive at University they understand the process of how to answer exam questions?
 - *Our work has demonstrated that students do not fully understand what is required from HE exams or indeed what makes up a good mark.*

Overall issues

- Are timed exams still appropriate?
 - *At no other time do we need to work to such time scales?*
- Are open-book exams more appropriate?
 - *Is memory re-call appropriate? Is how students use and evaluate resources more important – more a case of knowing where to look rather than remembering facts?*

Resources

This work has been disseminated through a number of events:-

- Presentation - “*Handwritten vs typed essay exams: Differences in Process and Product Refer to papers and presentations*”, Mogeys, N and Paterson J. 9th Enhancement Themes conference, Heriot-Watt University, - 7-8th March 2012
- Presentation - “*Typing or hand-writing essay exams: what should students choose?*”, Paterson J and Mogeys N. Pedagogies of Hope and Opportunity: The Higher Education Academy Arts and Humanities Annual Conference, 2012, Glasgow 29-30th May 2012
- Presentation and paper – “*Stylistic differences between typed and handwritten essay examinations*”, Paterson J and Mogeys N, 2012 International Computer Assisted Assessment (CAA) Conference 10-12th July 2012, Southampton.
- Workshop slides - “*Exams make our hands sore*” *How should FE/HE respond*, Edinburgh 23rd May 2012 - <http://www.ed.ac.uk/schools-departments/institute-academic-development/learning-teaching/staff/courses-events/iad/slides>

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