



Research into student writing on computer: a qualitative and quantitative comparison between pen and paper and computer as modes of writing.

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This paper describes an investigation into the effects of choosing either traditional methods or computer technology on the writing process and the final text. Much work has been done on the effect of choice of mode, pen and paper or computer, on writing but a large amount of this research was conducted when computers were not found in most homes and did not play the full role they play in most of our lives today. Added to this, tools are now available as standard with any word processing package but to what extent are these tools employed by students in their writing? The purpose of this project has been to see how the tools of word processing are used by students who have grown up with the technology and to see how they use both the language system and the technology system. Data collected from pre-Masters students, mainly from the Far East and Middle East, studying in Cardiff University, and second year undergraduates at the Universidade de Aveiro in Portugal was examined with regard to the process of writing, the resulting texts and the writers' preferences.

Keywords mode of writing; hand-written; word-processed

1. Introduction

A number of changes have taken place since computers have become standard equipment for students at university. The first of these is that students are often expected to submit their assignments in an electronic form. This means that the students usually have access to a number of aids that are part of most word processing packages but it also means that the teacher can conduct research on students' writing. This paper aims to show to what extent students take advantage of these aids in their writing.

Despite the availability of computers, there are still some areas of students' work that continue to be produced using traditional pen and paper, mainly in assessment. It follows then that students still need to be able to organise their thoughts on paper as well as on-line. What differences are found in students' use of these two means of writing? Is there a difference in output such as the amount that students write with these two modes? Does the use of the word processing features such as spellcheckers contribute towards greater accuracy? Do students have any clear preference for one mode over the other? These and other related issues will be addressed in this paper.

Much work has been done on the effect of choice of mode, pen or computer, on writing [1], but much of this research was conducted a few years ago, when computers were not found in most homes and did not play the full role they play in most of our lives today. The purpose of this project is to see how the tools of word processing are used by 'students who have grown up with the technology' by investigating writing practices and preferences among non-native speaker language students on a first degree course at the University of Aveiro. The principle research questions are:

- 1 What effect does the choice of mode have on the different stages of producing a written assignment?
- 2 If students have a preference for either pen and paper or computer, what are their reasons?

- 3 Do students producing written work by computer use the tools at their disposal in fine-tuning their end product?
- 4 Does the choice of mode have any effect on the choice, quality and quantity of the language produced?

2. The theoretical framework

Nobody can doubt Snyder's contention that computers have entered our lives and affected most areas of them [2]. She also maintains that electronic technologies alter "how language ... is produced, processed and used", how it is generated, manipulated, stored, retrieved and revised [3]. However in terms of writing, specifically of creating academic texts, computers have both supporters and denigrators. Negroponte, a vocal upholder of new technologies, argues that our lives will become easier as 'the tools to work with and the toys to play with will be the same' [4]. On the other hand Snyder refers to Castells view [2], that computers cause life to become more confused, and others who believe computers are a further form of social control. Computers certainly seem to have a motivating effect on students producing text in the classroom: I have frequently observed students who would do anything rather than put pen to paper to write a composition, happily typing long essays via their keyboards.

Computers with their ability to offer corrections to their users would seem to be democratic in levelling the playing field. However, my personal teaching experience has suggested large discrepancies in computer literacy. Snyder [2] suggests that the availability or otherwise of computers can "make the impact of students' differential socialisation and enculturation experiences more severe.

Kirtley [5], writing in 2005, has been forced to remind herself that all her students are not 'savvy computer users' and many 'lacked computer experience and access'. She considers a question that is of central importance to this project: how do students feel about composing on their computers? She also argues that teachers need to make sure their students have the skills and facilities they need to take advantage of technological tools. Hawisher and Selfe [1] found that "writers bring their routines and patterns of writing with them" but wondered whether students who have learnt most of their writing processes on computers would develop more revision strategies. The students taking part in this investigation have all grown up in the computer age and so should be able to provide an insight into these questions.

3. The research

The data was collected in 2006, in the Department of Languages and Culture at the University of Aveiro. Two second year language classes agreed to participate in the project, LRE (Línguas e Relações Empresariais) and LAE (Línguas e Administração Editorial). Both groups study three or more languages – at least in their first two years – as well as aspects of business and IT related to their course. It must be said that, at least in terms of English, the students' language levels vary greatly

Both groups' use *Longman's Market Leader Upper Intermediate* which is well supported by on-line material. Approximately 15% of classes are held in a computer laboratory. Written homework and assignments are expected to be submitted electronically, although some exceptions have been made during the year. Most students have access to a computer away from the University, and since January 2006 they all have access to the Department's computer rooms when they are not in use.

4. Data collection and analysis

The intention was to collect data suitable for both qualitative and quantitative analysis, consisting of two written texts produced by each participating student and questionnaires completed by everyone involved.

It was fundamental to the project that the two written texts be comparable, and so a highly controlled procedure was followed on both occasions. Preparatory work was carried out in pairs, using onestopenglish.com's *News Lessons for English Teachers* [6, 7]. This consists of pre-reading vocabulary work, text comprehension and language exercises, and is intended to provide language, context and ideas for the written text to be produced afterwards. A 45 minute time limit was substituted for a word limit for two reasons: to allow analysis of the number of words provided and due to the difficulty of accommodating students working at very different speeds. They were strongly encouraged to leave time for reviewing their work. Dictionaries could be consulted.

The great difference between the two days was the mode used for both the pre-task preparation and the writing of the text. On the first occasion the News Lesson was photocopied for each pair who worked through it together. They then wrote their texts individually using pen and paper. For the second part of the data collection, the whole process was conducted through computers: again the participants completed the preparatory tasks in pairs, sharing a computer. The final texts were prepared individually by computer, using one of the Department's computer labs with a wide range of word processing tools.

On completion of both texts, participants were asked to complete a brief questionnaire. This focused partly on individual information about the student but principally on the stages they had gone through in producing the text, giving opportunity both to list and comment on the process.

The texts produced have been analysed in terms of the language used, accuracy and number of words written to provide both qualitative and quantitative results regarding the effect of the choice of mode. The questionnaires provide both numerical data and comments regarding the other three research questions, relating to the writing stages, personal preferences, and the use of word-processing tools.

5. Results

Although thirty four students from the two courses took part in the project, several did not complete both texts and have therefore been excluded from any comparison of texts. Therefore the final sample of pairs of text considered and analysed consists of seventeen members of LRE and eleven from LAE.

Each of the four initial research questions will now be considered in turn.

1 What effect does the choice of mode have on the different stages of producing a written assignment?

Slightly more than half the participants (15 out of 28) reported following either exactly the same stages, or going through a largely similar process. Of the other thirteen, six referred to writing a first draft when writing by hand, whereas they all started straight in to writing a word document on the computer.

Comments reflect differences in terms of contemplating the task and planning. One LRE student referred to using a dictionary for the written version but not when typing electronically. Three respondents mentioned that they found it easier to organise their text using a computer. Two others considered it useful to be able to do further on-line research while writing their text. Several respondents commented on the help provided by word processing tools, saving time both on writing and correcting. Others referred to auto-correction. Several people commented that using a computer was quicker. Nobody suggested the opposite to be the case.

2 If students have a preference for either pen and paper or computer, what are their reasons?

48% (including most of the male students) preferred writing with a computer compared with 28% (all women) who preferred pen and ink. 7% declared using a mixture of mode; planning and writing drafts with a pen, then writing the final version on a computer. 21% had no preference.

The most common advantages given for using a computer were the spell checking function, grammar suggestions and being easier and faster. Other reasons offered included the ease of reorganising text, cleanliness, saving paper, wordcount, presentation and improved concentration. One person found that ideas flowed more easily when using a computer. The supporters of traditional pen and ink writing mentioned a range of reasons for their view; that they were more inspired, that it is more personal or romantic, they have difficulties with computers or find using them tiring.

3 Do students producing written work by computer use the tools at their disposal in fine-tuning their end product?

The questionnaire asked participants to comment on the use of the following word processing functions: Spellcheck, Grammarcheck, Cut and Paste, and Wordcount. All the above were used by some students with the most popular being Spellcheck used either manually or automatically (reported by 79%). Second most popular was Wordcount, mentioned by 38% possibly surprisingly as the task was limited by time rather than by the number of words. Grammarcheck was used by 31% and Cut and Paste by 17%. Two students also reported using some formatting functions.

Most found Spellcheck useful. One commented that “we can learn a lot from this function” while many found it very helpful in terms of writing correctly. The majority were not particularly positive about Grammarcheck, although some found it very useful in pointing out possible errors or overcoming doubts.

Cut and Paste was well received with references to the ease with which changes could be made. No-one referred to taking words directly from the article using this function. Although Wordcount was not particularly relevant to this activity, many were clearly anxious to know if they had “too many words”.

4 Does the choice of mode have any effect on the choice, quality and quantity of the language produced?

This research question calls for analysis of the texts produced by both modes. Due to limitations of time this analysis was to be limited to the following:

- a) Does the completed text contain specific language appropriated from the preparatory news item?
- b) Are there any differences in the percentage of language errors in the two texts? This analysis is divided into spelling errors (or should I say non-standard spelling) and other errors.
- c) Are texts longer or shorter depending on the mode? Is there any difference in sentence length?

Regarding specific language: a major part of the preparatory work focused on vocabulary contained in the newspaper articles. My expectation with this piece of analysis was that students would import less of the given vocabulary when using pen and ink, not having a cut and paste facility. However the opposite had proved to be the case in the earlier Cardiff study with half the words from the pre-reading exercises being used, several of them repeatedly. This finding is echoed by the Portuguese data. Maybe this indicates that it was easier to make repeated reference to a paper version of a newspaper text than an electronic one. It could also indicate that the students perceive cut and paste facilities as ‘stealing’ in a much more direct way than taking words from the article and writing them longhand in their own texts.

- b) To analyse spelling errors the texts offered by the 17 LRE students were analysed in detail. When writing with pen and paper (with access to dictionaries if they chose) they made an average of 2.1 spell-

ing mistakes (0.875 mistakes per 100 words). Unsurprisingly when using word processing, this fell to 0.6 mistakes (0.229 mistakes per 100 words), almost exclusively wrong words, for example mistaking 'loose' for 'lose'.

In terms of other language errors, the difference was less dramatic, indicating that Grammarcheck is not such a strong ally. The number of errors dropped from 16.8 to 16.5 with the switch to computers, from 7.00 errors per 100 words to 6.36 per 100 words. This suggests that Grammarcheck is of some limited use in terms of flagging up errors.

c) Twenty eight out of thirty eight students wrote more with the computer than by pen. Of these eleven wrote dramatically more and one dramatically less. The average text written in the 45 minutes allowed was 239.7 words with pen and ink and 269.7 words on a computer.

Less dramatic was the difference in average sentence length: this rose from 22.0 words to 23.2 words when a computer was used, with the students with stronger and more confident control of English consistently writing shorter sentences than their colleagues. Seventeen out of 28 wrote shorter sentences when writing with a pen.

6. A comparison with the results obtained with Far Eastern and Middle Eastern students studying on a pre-sessional pre-Masters course at Cardiff University

The same trends were repeated with the Aveiro undergraduates as had been illustrated by the pre-Masters Far-Eastern and Middle-Eastern students in Cardiff. In both studies a sizeable majority favoured writing using a computer. The total number of words written during the controlled time was greater when using a computer in both cases; more dramatically so in the Cardiff Study. The average sentence length was less when writing with pen and ink and the number of language errors more.

7. Conclusion

The principal intention of this investigative research project was to find out if the choice of mode plays any significant role in producing written text, using a research group consisting of students who have all grown up in the computer age. . The most useful findings would appear to be those relating to student writers' preferences, and their use of word processing functions. There seems to be support for a mixture of mode, doing preparatory work, planning and drafting with pen and ink before typing a final 'clean' version. The apparent indication that computer users compose more and write longer sentences would seem worthy of further investigation.

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