# Playing With Words: Evaluating Word Processors with Children

Matthew Horton
Department of Computing
University of Central Lancashire
Preston
UK
mplhorton@uclan.ac.uk

Janet C Read
Department of Computing
University of Central Lancashire
Preston
UK
jcread@uclan.ac.uk

Gavin Sim
Department of Computing
University of Central Lancashire
Preston
UK
grsim@uclan.ac.uk

**Abstract:** This paper describes a small pilot study that looked at the immediate usability of two commercial word processors used by children. The study compared an application which was designed for children against one predominately used by adults. The children's performance was assessed whilst carrying out six key tasks. The results showed that there was a small difference in the usability of the two products but also highlighted that several simple word processing tasks were difficult for the children to complete. The paper discusses the findings and suggests areas for further research.

## Introduction

The work that is reported in this paper was a pilot study comparing children's performance when carrying out some basic editing tasks between two different word processors. The first word processor was Softease Textease which is a word processor designed specifically for use in the classroom, and also the one that is used within the participating school. The second word processor used was Microsoft Word 2003 which was not designed specifically for children but is still used extensively within the UK primary school system.

With the growth of home computing and the introduction of computer suites in UK primary schools, children are being introduced to computers at a much earlier age than was previously the case (DfES, 2003). Whereas computers in the home are used mainly for games (Kerawalla & Crook, 2002) and browsing, the main uses of computers in schools are largely for Word Processing, Sound Manipulation, Spreadsheets, Databases and Drawing/Desk Top Publishing (The Standards Site, 2006).

Recently, there has been a lot of interest in the ways in which children interact with computer technology, with the research area of Child Computer Interaction becoming recognised within the HCI community. This research in Child Computer Interaction is often focused on the effect that the technology has on the everyday tasks that children do, as well as suggesting guidelines for good design (Read & Horton, 2004; Read et al, 2004).

### Bloated Interfaces

Competition within the software market has led to many companies creating software with more and more features to try and get the edge. This behaviour is fueled by a belief that the more features that are added to a piece of software, the more the consumers will feel they are getting value for money, and therefore the more likely consumers are to buy their products. This has led to software becoming bigger and more complex and has lead into a research debate as to whether bigger is actually better (McGrenere & Moore, 2000; McGrenere, 2002).

Bloated software has been defined as "*the result of adding new features to a program or system to the point where the benefit of the new features is outweighed by the impact on technical resources (e.g., RAM, disk space or performance) and the complexity of it's use*" (Thagard, 1992). An extensive research study by (McGrenere, 2002) comparing task performance using bloated software against less feature intensive software has shown that novice user have found it easier to complete tasks using a piece of software that has less features and is simpler to use. This research has however focused on adult users and there appears to be little research on the effects of bloated software on children.

One way of counteracting the effects of bloated software is multi-layered interface design. Multi-layered interfaces within software allow the user to choose the complexity of a piece of software from different layers that exist within it. This technique allows novice users to start with a simple version of the software without the confusion of many features and complex menus. Once a layer has been mastered the user can move on the higher layers with more features (Shneiderman, 2003). Current research into multi-layered interfaces examines the enhancement of the interfaces for different levels of user (McGrenere, 2002; Shneiderman, 2003), again however this research has not focused on children.

The research reported in this paper is part of a bigger study into the effects of bloated software on children's performance and their ability to learn and carry out basic tasks using a piece of software. The research is particularly timely as research by the authors has found that whilst many schools do use software that is designed specifically for children, there is still a great number who also use, or solely use, commercial software that has been designed for adults. This adult software is traditionally far more complex with far more features than its child friendly counterparts.

## Method

To test out the hypothesis that children would find 'simpler' software easier to use, a small experiment was devised to compare the performance of children on two word processors. The two products chosen were Microsoft Word and Softease Textease. The former is an adult centered product; the latter is designed for use with children.

### Sample

The sample consisted of ten children of both genders aged between seven and eight, who were all recruited from a single class within a UK primary school. The children had a range of ability and, as ICT is covered as part of the national curriculum, they all possessed basic computer skills.

### Procedure

The experiment was between subjects; upon entering the classroom, each child was allocated to one of the two conditions, Word (Group A) or Textease (Group B). It was hypothesized that the children would perform better with Textease as they had prior experience of using this application in the classroom and as it had less features. The children all used the same specification laptop and conducted the experiment at the same time. The children were

each given the same six editing tasks to carry out on the same pre-written piece of text using the specified software. These tasks were selected as they are all requirements for successfully completing ICT Key Stage 1 of the UK National Curriculum. The text that was chosen was the nursery rhyme Humpty Dumpty as this is a very popular rhyme that was familiar to the children. By using such a well known rhyme and allowing them to read and even sing the rhyme at the beginning of the task it was hoped the children would feel more at ease before they began. The six editing tasks were:

Task 1. Change the colour of the word horses
Task 2. Change the size of the word wall
Task 3. Make the last line bigger
Task 4. Change the word wall to ball
Task 5. Underline the name Humpty Dumpty
Task 6. Try and write the first line of a different Nursery rhyme.

During the tasks, the researcher stayed alongside the children to ensure that they were comfortable with the activity but he did not offer any assistance in completion of the tasks. The children were instructed that this was not a test and anything they found too hard, they could skip.

Camtasia Studio screen capture software was used to record the user interaction with the application. In addition, at the end of the editing tasks, each child's work was saved in its completed format.

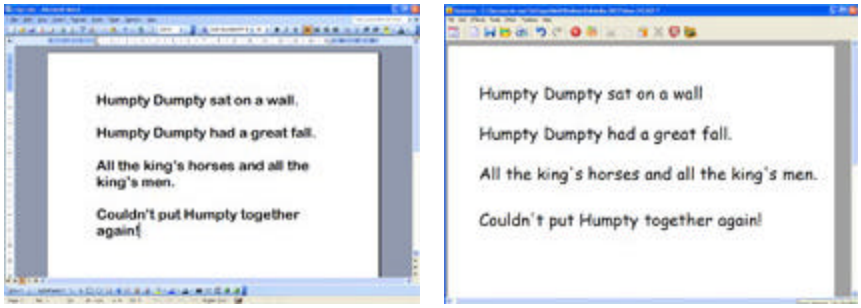


**Figure 1:** Screen shots of the nursery rhymes on the different interfaces before they had been edited (MS Word on the left)

## Results

The table below shows the results from the study. Each tick represents a task that has successfully been completed according to the task sheet. Each bracketed tick represents a task that has been completed but not as required, or has been attempted but not fully completed. The spaces represent tasks not attempted.

| | MS Word Group | | | | | Textease Group | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 |
| Task 1 (colour) | ✓ | ✓ | ✓ | ✓ | (✓) | | (✓) | ✓ | ✓ | ✓ |
| Task 2 (size) | | | ✓ | | ✓ | (✓) | ✓ | (✓) | | ✓ |
| Task 3 (line) | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ |
| Task 4 (change) | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Task 5 (underline) | | ✓ | (✓) | ✓ | ✓ | | (✓) | ✓ | (✓) | (✓) |
| Task 6 (write) | | (✓) | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ |

**Table 1:** Results of task completion from the study

It was hypothesized that the children would perform better using the Textease Application however this did not prove to be the case. From the results shown in Table 1 it is clear to see that the children performed slightly better using Microsoft Word 2003 than using Textease. Examining the children in each group as a whole 73% of the tasks were completed using Textease compared to 80% using Word. This gap increases if we take out tasks that were not completed correctly to only 53% and 70% respectively.

## Discussion

The study was very small and with so few children it is difficult to make generalizations. However, there are some interesting observations that can be carried into future studies. These are summarized here in three headings, task complexity, experimental design, and software familiarity.

### Task Complexity

The tasks that were chosen were not all equally difficult, however, they were all classified to the same level within the curriculum. None of the children who attempted tasks 3 and 4 made any errors making these tasks seem relatively easy to complete and the results bear this out across both applications. Tasks 1 and 6 had small, insignificant, variation across the two applications and possibly caused some problems for some children but tasks 2 and 5 were the most interesting. In task 2, which was to change the size of the writing, some children used capitalization which had the effect of making the size appear bigger but actually did not count as a successful outcome. This could be due to the children's misunderstanding of the task requirements or it may be that the capitalizing to make bigger behaviour was inherited from the school – the children may have been shown this as a solution. In task 5, underline, several children found underlining a single word difficult. Although the icons used to perform this task were virtually identical, within Word it is visible on the main toolbar and easily accessible whereas in Textease the function is hidden within a 'text effect' option off the main toolbar adding an extra layer of complexity. Further work is needed to see how familiar children are with selection processes to further understand the difficulties with underlining.

### Experimental design

The experiment was presented to the children with some flexibility. As the outcomes in Figure 2 show, the children were given some lassitude in determining what was bigger, in deciding what colour to use and in adding their own writing at the end. The choice of the nursery rhyme seemed sensible as it avoided any complexity associated with reading skills.

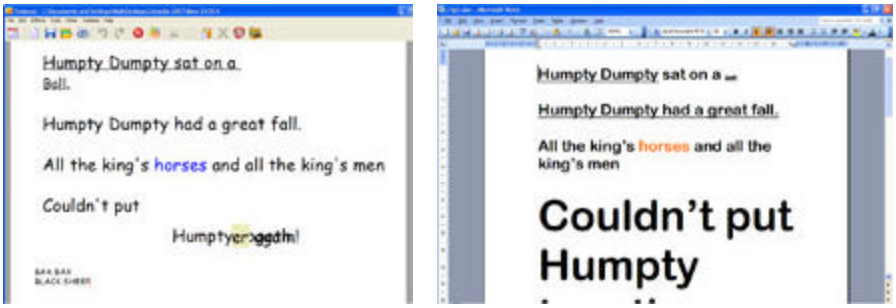


**Figure 2:** Children's completed worksheets

As the study was between subjects it is difficult to get a feel for how the two products compared but a second study is planned, using two similar but different task lists across two word processors in a within subjects study. It is considered important to leave the children with some choices to make but clarity about what constitutes 'bigger' might need to be added.

**Software Familiarity**

The present study did not establish software familiarity and this was a limitation. In future work, the authors need to be able to determine how familiar children are with the software they are using. One alternative is to compare against a new software product that the children have not seen before. Although the children were familiar with Textease having used it in the classroom environment, some of the children may have had prior exposure to Word at home. Also there are similarities between the icons used within the two applications therefore knowledge gained in one is transferable to the other.

For young children, there is no clear method for easily establishing their prior experience of an application. In a study by (Sim & Horton, 2005) the children had difficulties in accurately recollecting their computer usage when asked in a questionnaire therefore other methods may need to be established.

## Conclusions

Within schools, children are often exposed to software which is designed predominantly for adults with only a small percentage of applications designed specifically for themselves. This study examined two word processing applications targeting different audiences to establish if the children could successfully complete a range of tasks. In many ways, the study was inconclusive but as a pilot study it raised several interesting issues that can be factored into future work.

Two of the tasks proved problematic for the children, especially within Textease, these being underlining words and changing the size of words. The layout of the Textease toolbar hides a great deal of functionality which may not be evident to the children compared to Word where all tasks could be completed from the main toolbar. Without conducting pilot studies it is difficult to gauge whether the right language is used to convey the tasks required and the complexity of completing these.

In the HCI community, when performing usability studies, behavioural modeling techniques can be applied to establish user errors within the interaction. This can be based on the number of mouse clicks, keystroke logging, or task completion time for example. Previous studies by the authors have identified that children tend to act in a more random manner to adults therefore predicting their behaviour using existing modeling techniques may be unfeasible. In conducting experiments with children it is difficult to gain the rigor of an empirical study designed for adults, as this has to be offset with the children's emotional and physical needs.

## Further Work

Following on from this study, a larger study will be undertaken taking into account experiences gained from this pilot. The authors also plan to carry out similar comparative studies between other word processors that are used within the UK school system. Drawing from the findings from these studies of the existing word processing applications and taking direction from the existing research on multi layered interfaces for adults, a multi-layered word processor will be designed and implemented that provides children with different features depending on what key stage they are at.

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