
Kids and Writing: Have Pens had their day?

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Abstract

Kids around the world are now using tablet PCs and are no longer writing anything with pens. There are more than a million tablet devices for every million people and so the world is changing. We studied the use of pens and tablets with kids in four different countries and found that pens are on their way out.

Author Keywords

CCI, children, pens, tablets

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Background Work

Pens have been the main writing implement for the last many years with children being taught from an early age to write with a crayon, then a pencil and then a pen [1]. The act of handwriting was taught in schools to children [2] and good handwriting was assessed in school as an important competence [5]. Handwriting has recently moved from something associated with paper to something associated with touchscreens [6] and several people have researched what happens when children write with styluses and pens on touch devices. [4].

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Not studied to date however is whether or not the proliferation of tablets into the needs of small children is affecting pen use. And in particular – the HCI and CCI community is not equipped with the data it needs to design writing systems of the future. Our work fills this gap by studying how children write in the tablet age.

The Study

We did experimental work, observational work and some ethnography style work. We looked at children writing and we tested children writing. Each of three different studies is described here as Study 1: Experiment, Study 2: Observation, Study 3: Ethnography.

Study 1 was an experiment. Children came to the lab and used either a pen or a tablet to write some words about their holidays. We measured how many words they wrote and the time taken to derive an EFFORT score which was:

$$EFFORT = \frac{\text{number of words written}}{\text{time taken}}$$

We also asked the children if they were happy doing what they did – so we could understand their satisfaction with the task. We did this with two groups of children.

For Study 2 we went to a school and observed two classes of children writing in a regular classroom session. In each class we let half the children use a tablet device instead of their usual pen and pencil. We took notes about what we saw. Some children didn't finish as they were going to swimming lessons so we

only got finished writing from 28 children. We made notes when:

- Children seemed bored
- Technology broke
- Children looked happy
- Technology was being used in exciting ways

Study 3 was an ethnographic study as we asked parents to comment on their own children's writing at home. Parents were recruited through the university staff email list. Each parent was given a diary and asked, over a three week period, to record the child's preferences, the time the child took doing writing activities, the product used (pen or tablet) and the general mood of the child using a three point scale that was excited, calm, sad.

Results

The results are presented here in three sections. One for each of the three studies.



Figure 1 - child writing

In study 1 it was shown that the effort of using the pen was significantly greater than the effort of using the tablet. The results are seen in Figure 2.

	Number doing pen	Effort score	Number doing tablet	Effort score
Group one	14	2.1	12	3.2
Group two	18	8.2	32	12.3
Average	16	5.15	22	7.65

Figure 2 - table of results

The higher the effort score the better the experience as it shows the children wrote a lot of words in a much faster time. The results show that children in Group 1 were better at writing than those in Group 2. This could be because the children in group two came from a private school. The results also show that the tablet is clearly better for writing as it is much faster.

for the pen for all the children. This is probably because the tablets were novel to the children.

In Study 2 the evaluator did get a bit overwhelmed making notes so the data was a bit messy. As this was an observational study aiming to find out what happened this wasn't considered to be a problem.

Against the headings, the main observations about children seeming bored were that those using the pen

were often seen looking up at the ones using the tablet. The writing they were copying was 40 words from the Hobbit - many children seemed to get a bit distracted about half way through the task and many lost their place.

Broken technology was a problem for the pen group and the tablet group. One child said his pen had stopped working and then grabbed his neighbour's pen causing her to cry. Two children had problems with the tablets just shutting down.

Happiness was captured every two minutes during the task with a tick box against pictures from the Smileyometer [3]. For each child up to 30 ticks were gathered over the writing task. These were then analysed into five categories; staying happy, staying sad, fluctuating, going from sad to happy, going from happy to sad. Table 3 shows the results.

	Year 2 pen	Year 2 tablet	Year 3 pen	Year 3 tablet
Staying happy	1	9	2	3
Sad to happy	2	1	1	1
fluctuating	4	1	3	2
Happy to sad	2	1	3	2
Staying sad	2	2	2	2
TOTAL	11	14	11	10

Figure 3 - tablet happier

From this table it is clear that the children were happier in the tablet groups.

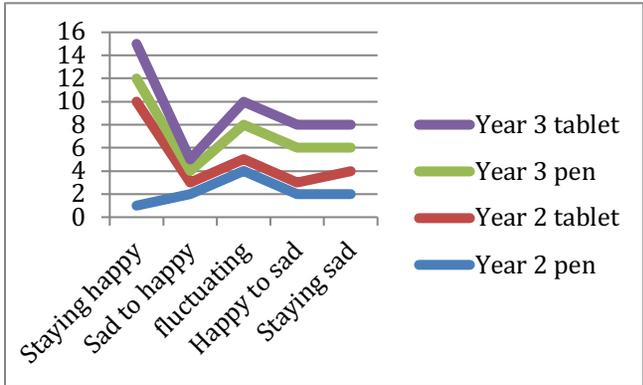


Figure 4 - graph of results

By applying a multipleir or 5,4,3,2,1 to the scores according to the linear scale presented we can see a sgnificant difference with scores for the pen being 61 and the tablet being 87.

In the technology used in exciting ways we asked the evaluators to note when the technology was being used for a non-writing task. It was shown that the pen was often used for drawing and scribbling out but also for poking other children and for poking oneself. The tablet was not used in suc exciting ways. This might have been because the children were told to be careful with thm as they were new to the school. The teacher in the class kept an eye on the children using tablets to make sure they behaved well.

The results from study 3 are in the next table. Excited was coded 3, calm,2 and sad 1. Time is in minutes. The product was T or P for tablet or pen.

	mood	time	product
C1	3	17	T
C1	3	12	T
C1	2	28	P
C1	3	7	T
C2	2	35	P
C2	2	17	P
C3	3	12	T
C3	3	18	T
C3	1	4	P
C3	3	22	T
C3	3	35	T
C4	3	12	P
C5	2	12	T
C5	1	14	T

Figure 5 - children observed writing

The average for the Tablet is 2.7 and for the pen is 2 showing that children prefer the pen. The amount of writing done by the children was similar in both cases. Note that the mother of child 4 said that she didn't want to use the tablet so the study stopped after she wrote the one time.

Conclusion

A triangulated study has been done in two different countries with children aged between 5 and 9 and this has shown overwhelmingly that the tablet is a better product for children's writing. Although children might not write more with the tablet they clearly enjoy it better and it is less effort.

This work will contribute to a much greater understanding of designing interfaces for children in the future. The children need products that keep them engaged (the pen did not) that are easy to use (as the pen was) and that keep them excited (as the tablet did).

Further work will look at some of the cultural differences in Finland and Vietnam to try to better understand the differences in effort as found in study 1.

on Human-computer interaction with mobile devices and services ACM, 171-174.

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