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Playful computer writing
Grade 1 - 3
(6-9 Years)

Writing to Read

1999 - 2002

(2002 - 2005...)

Arne Trageton
Stord/Haugesund University College
5409 Stord
Norway

arne.trageton@hsh.no
www.hsh.no/home/atr/tekstskaping

Abstract

The start of this action research project was presented at ICCP 2001. Research about computers in school is common, but few study playful computer writing for 6-9 year olds.

Problem: Will playful computer writing and delayed handwriting to grade 3 give better writing results? Through playful computer writing in 14 classes in Norway, Denmark, Finland and Estonia children learned themselves writing and reading in grade 1(6 year olds). Traditional primers in grade 2 became unnecessary. They produced their own primers by playing "Publishing house" and "Newspapers office". In grade 3 the children composed books in different genres and advanced newspapers. The writing stimulated intensive reading.

Results: The qualitative development above is documented by 7500 texts and 60 edited videos. PC classes showed higher level in composing fairy tale and factual prose than handwriting classes, significant on $p>0.001$ level. The handwriting tests showed significant higher quality in the PC classes on $p>0.001$ level.

The results lead to changes in literacy learning. The strategy spreads to hundreds of classes in Norway, Denmark and Sweden.

The first year of this project was presented at the ICCP conference in Erfurt, Germany (Trageton 2001). The project is now finished. Because of the new audience I shortly repeat the background, the main research problems and a brief repetition of the development in grade 1. For details, I refer to my earlier paper at ICCP.

Background

The Norwegian National Curriculum (L97) order creative activities play and work as main learning methods in informal learning for the 6-10 year olds. (Trageton 1997b). L97 demand also digital literacy and writing on PC. Up to now computers in schools have been misused in a *consumer* ideology based on traditional school and behaviourism (Erstad 1998, Healy 1999). The child as a *producer* and communicator of knowledge is the ideal in our National Curriculum; reflecting a constructivist and social - interactionist view on learning (Piaget/Vygotsky, Lave & Wenger 1991, Ludvigsen 1999). This lies much nearer to a play ideology. There is surprising little research about creative computer writing. In ERIC, the well known pedagogic database, I found in 1999 20 000 research projects about computers in primary schools, but the combination «computer projects + *writing*» gave only 115 projects! 20 of these were for the age group 5-9 years, mostly from the huge American WTR ("Writing to read") project, realized in many American States for 5-7 year olds (Chamless & Chamless 1993, Driscoll 1997, Singh 1997).

My pedagogical view is quite similar to WTR. I believe like Chomsky (1971) that writing is easier than reading for most children. Therefore writing should come first. Handwriting however is too complicated for 6-year olds. Computer writing is easier and the tool for writing outside school. Through their own computer writing, the children also learn to read through their own text productions. Later they also read and understand the computer texts produced of their comrades and in different books in the class library.

In contrast to WTR, however, teachers and children in our project are stimulated to use a more playful and informal approach to learning. WTR use a much more complicated and costly technology. We use old, recycled computers. The schools get these computers very cheap or free.

The project was a 3-year action research project in 14 classes, mostly in Norway, but Denmark, Finland and Estonia were also represented. The Norwegian classes dominate the presentation. The children were followed from grade 1 to 4. All schools had 2-10 recycled, cheap computers placed in corners in the classroom, only equipped with a simple word processing program.

Research problems:

1. *How to use computers in creative writing for grade 1. - 4. ?*
2. *How to build a digital database of the children's text production over 3 years?*
3. *How to build networks between schools and communities for spread of the innovations?*
4. *Will concentration around computer writing in grade 1 and 2, and delaying the formal teaching in handwriting to grade 3 give better results in written language?*

Play – Writing - Computers.

Our major “play rhetoric’s” (Sutton Smith 1997) is play as development (Piaget/Vygotsky tradition). Quite opposite the “child as consumer” attitude, a main characteristic of play is the child as *culture producer* (Huizinga 1938, Sutton Smith 1990). Preschool level dominate the play research. Relatively few research projects document the effect of play in educational setting in *Primary School* (except for instance Retter 1983, Hartmann 1988, Hall & Abott 1991, Moyles 1995, Pessanha A 1995, Trageton 1997, Christie et al. 1999, Wassermann 2000, Lillemyr 2003).

Christie /Roskos (2001) give a review of the long tradition for combining play and early literacy in American research. Their view corresponds with the total learning climate I want in my project in lower primary school. Ervik (2004) uses related ideas in *upper* primary school.

What about computers? Most of technological computer research projects in school are dominated of a consumer ideology, far from play. Few give an analysis about the relation to early literacy and play. Liang and Johnsen (1999) give a research review over the relation between technology - early literacy – play, and conclude that computer software may give valuable development and learning for the 5-8 year olds also, *if the children become producers in tune with play criteria:*

- Positive affect
- Intrinsic motivation
- Process more important than product
- “As if” or non-literal attitude
- Exploration

I would add that for the 6-10 year olds not only the process, but also the product becomes more important for a long lasting high quality play activity (Trageton 1997a, b).

They have following demands to software:

- Open ended problem-solving oriented
- Developmental appropriate in practice
- Strong relation to play

Among very few programmes filling this criteria is tool programmes like simple word-processing most important. Here the children have billions and billions of possibilities to play with variable combinations and messages by only pushing 26-29 letters!

Methods

Naturalistic observation and video recording in the classes over 3 years (60 edited videos)

Collecting the text productions of the children into an electronic database (7500 items)

Reports and interviews of the class teachers

Questionnaires for children and parents in the end of the project

Qualitative development

Grade 1. (Trageton 2001)

Through 1500 texts from Grade 1 (6 year olds), we mapped the development of spontaneous computer writing for the first time in the Nordic countries. The development was rather similar to the better-established research in spontaneous handwriting development (Sulzby 1982-1990) but goes faster, because some steps in handwriting do not exist, and computer writing is easier for young children. The results are similar to Schrader's (1990) in USA. Through playful writing the children had learned 24 capital letters and 20 minor letters as the average score. Karlsdottir (1998) concluded that letter knowledge by 7 year age was the most important factor to predict reading ability in grade 4. During grade 1 the children gradually produced small texts, stories, and exchanged letters. They learned reading through their own writing. (The detailed development was presented in ICCP in Erfurt 2001).

Grade 2 (Trageton 2002)

The children knew most of the letters and had written themselves to read in grade 1. The formal teaching of letters and reading by ABC books traditionally used in grade 2 in Norway became unnecessary. The children simply continued to write and read. The playful writing/reading (Liang & Johnson 1999) exploded in the beginning of the school year. The children, working in pairs, became assistant "teachers" for their comrade, discussing technical problems and content in the writings. The dialogues became very important for oral language development (Helleve 2001). Capital letters were now regarded as childish. They used minor letters as in "real books". 2700 texts from grade 2 gave background for analysing the development in grade 2. Newspaper production, reading books and letters to comrades within or outside their own class were the most important genres in grade 2. Frame play (Broström 1995) was much used. It is an advanced form of dramatic play, where the children in beforehand make a plan for a play theme of high complexity for the whole class. This is a fruitful play form for 6-8 year olds.

To play "Newspaper office" for instance with editor, journalists and lay out people became an inspiring challenge. The printed letters gave professional layout. What font and size of the letters? 4 columns or 8 columns? One newspaper had 12 pages, with national and local disasters, sports, jokes, school activities, working for a child centre for homeless children in Brazil, and comic stripes.

In playing “Publishing house” production of ABC-books became popular. They made easy readers of different levels, suitable for the different reading levels in their own class. The teacher was “the publisher” while “the authors” wrote books about different themes, from classical fairy tales to modern science fiction. One class produced 100 easy readers in two months, 5-15 pages, richly illustrated with their own drawings. These books were included in their class libraries besides the professional books for different reading levels and interests.

The background for writing/drawing in grade 1-3 was longstanding theme organized cross subject projects (Trageton et al. 1999) where creative activities, play and drama were dominating learning methods. This had a very positive effect of the richness of the text productions. Ervik (2004) found similar effect for upper primary school.

Grade 3 (Trageton 2003 a)

The children continued to write and read within central genres at a more advanced level, divided in more sub-genres. Both the background playing as learning method and the writing became more serious and disciplined.

Newspaper productions documented raised standards. The classes studied different professional newspapers thoroughly, and had serious discussions about the choice of content, picture placement and size, titles, ingresses and plain texts. The total newspapers might be 20 pages, richly illustrated of their own elaborated drawings. Rich variation of content, objective handling of complicated, controversial national and international matters showed high journalistic level.

One example: One class critically reviewed their newspaper production in grade 2. This year demanded a more advanced level. They studied the main professional newspapers thoroughly and had a hard discussion about what should be the main news on the front page, and formed as an appetizer for the inside of the newspaper. The main news in November 2001 was chosen to be: “Bombing in Afganistan”. The two collaborating journalists had a lively discussion about how much of the content should be placed on the front page, and what should be spared for the longer article inside. Here is the front page (in translation):

We think it is silly that USA bombs Afganistan, because they hit civilians. Osama bin Laden makes it bad for his people. He think that God will forgive him, and he think he can do as he like. More at page 3! (Illustrated with a drawing of the cruel face of Osama).

At page 3 the journalists made a long elaborated article with facts that in Norway 50% was against the bombing, 39 % for, but the Parliament was for bombing. The illustration was a detailed drawing of the bombing. Above this article, another journalist group presented an

article about the background for the bombing, illustrated with the planes hitting the twin towers in New York. The total newspaper consisted of many pages full packed of varied stuff, systematically organized, richly illustrated.

Book productions expanded strongly in variation, length and seriousness within factual prose and fiction, many subgroups and creative blending of genres. The boys were often inspired of action, films, comics, horror books, while the girls loved fairy tales and romantic literature. Dramatizing script ideas played before writing, and drawing the story before or during writing heightened the quality. Long lasting cross-disciplinary themes were stimulating for joyful writing. An example: A 2-month theme “To Fly”, included science, social science and mathematics, built around by art and craft activities and play. The writings varied from Greek mythology to birds to modern airports. The process orientated writing strategy (Hoel 2000) raised the quality. Here computers have their greatest advantage. The first draft got constructive response from the computer-fellow and the teacher. The children might then produce 2. version -> response 3. version -> up to the 10. version of books of 20-60 pages without problems. The record was 104 pages! In handwriting this would be boring and almost impossible. Oral response is still dominating, but written response gave now good results. The 8 year olds read longer and more complicated books, often several hundred pages. This in turn gave the children ideas for their next book. An example: Two boys specialised in reading cowboy books and wrote a fascinating cowboy novel on 20 pages. A journalist in the biggest newspaper in Norway was so impressed of the quality that four pages with illustrations were printed over two newspaper pages!

In factual prose their experiences with animals were often the background. Paired with intensive library reading the productions became interesting books about hamsters, sheep, horses, cats, rats, frogs, goldfish and so on.

Another genre of writing was to make reports and book reviews of professional authors and of the books of their comrades. Two boys read Harry Potter I & II (about 700 pages) and spent 5 afternoons with the computer, because they wanted to write an elaborated resume of the book!

Denmark, Finland, Estonia

These classes showed similar development. But while the Norwegian 6 year olds in grade 1 continue in the same school in grade 2, the children in the other countries changed from preschool for the 6 year olds to school for the 7 year olds. The children shifted both institutions and teachers, and discontinuity became a problem.

The *Danish* grade 1 (7 year olds) started first in the middle of the year because of late installations of computers in the classroom, and with new teachers. The writing level was lower than in the Norwegian classes. But in grade 2 (similar to grade 3 in Norway) the children show almost the same level as Norwegian classes. The teachers felt that computer writing made it easier for the multicultural children to learn Danish as a foreign language.

The *Finnish* class had Swedish as their mother tongue. The children changed physical environment from “preschool/kindergarten” for the 6 year olds to primary school, grade 1 for the 7 year olds, like in Denmark. But the preschool teacher was allowed to follow up the children in grade 1 and 2. Their writing level was high, and their reading skills impressive. Finland scores usual high on international reading tests and on library free reading.

In *Estonia* the project became a preschool project for the oldest children in the 3-7 year olds group. The level of writing was amazing high. For example one 6 year old started to write a book about a bull and a cow. The preschool teacher expected the book to be 10 pages before ready! In the end of the project a classroom teacher tried to follow up the work in grade 1. (Lang 2003). In Estonia it is expected that the child have learned to read from the parents or preschool before starting school as 7 year olds.

Videos – Electronic database

18 of the video recordings are chosen and reedited to give a representative view of the total development. These are published on three VHS cassettes or DVD disks for grade 1, 2 and 3. Small video examples are published on the website for the project, one of them with English text. From the collection of text productions in the electronic database about 1000 are chosen as representative for the development in grade 1-3, systematized and published on the same website.

Reports and interviews of the class teachers-

Questionnaires for children and parents

I have chosen not to report the results from these research instruments here, but both the class teachers, children and parents experiences were valuable supplement to understand the development. All parts were very positive to the methods and results of the project, and give a strong stimulation for expanding the ideas to new classes and schools.

Quantitative evaluation of writing level

The qualitative development descriptions above were based on 7500 texts, 60 edited videos, direct naturalistic observations and teacher reports (Trageton 2003b). What about quantitative evaluation? Hypothesis 4 on page 3 was:

Will concentration around computer writing in grade 1 and 2, and delaying the formal teaching in handwriting to grade 3 give better results in written language?

International *reading* tests (IEA) are regarded relative valid and reliable, but *writing* tests are more controversial. The IEA writing test for grade 6-9 found it difficult to compare countries because of cultural disagreement of what was a "better" written composition, and what genres they ought to test (Purvis 1992). On a national level, however, England for instance gives some guidelines for writing for Key stage 1 (9 years) "The implementation of the National literacy strategy" (DEE 1997). USA has a long tradition of evaluating the quality of children's texts (Gorman et. al 1988). Evaluation of the American computer-writing to read project (WTR), used different scales for 6-7 year olds (Chamless & Chamless 1993). Christie et. al (1999) has developed another type of scale based on the narrative complexity in *dramatic play*. I found this scale very interesting and useful also to measure the complexity of the written dramatic stories the children produced. Different states of USA present norms for "good" writing. "Pennsylvania State Curriculum in Writing" developed detailed guidelines from Kindergarten to grade 6. A specification for grade 3:

1. *Composes pieces that develop a problem or central idea and flow from beginning, middle to end*
2. *Adapts writing style/form to maintain focus on topic, purpose and/or audience (stories, letters, journals, poems, plays)*
3. *Includes literacy elements in narratives (characters, setting, problem, major events, solution)*
4. *Write complete sentences (subject + verb) using end punctuation appropriately (Periods, exclamation points, question marks) most of the time*

In Norway there was strong resistance in using a predefined set of norms. We used a holistic evaluation based on connoisseurship (Eisner 1996).

Quality in creative writing. End Grade 3.

8 "PC classes" and 9 "handwriting classes" got two 40 minutes writing tasks: "Make a fairy tale" and "A visit to the dentist". The handwritings were transcribed to computer text and mixed randomly with the responses from PC classes. Two experienced teachers in teacher

education scored independently the *content quality* of 594 texts from 1-4, where the highest score is 4. The agreement between evaluators was high.

Results:

	Dentist visit			Fairy tale		
	Boys	Girls	Total	Boys	Girls	Total
PC classes	2.16	2.54	2.33	2.27	2.43	2.32
Hand-writing classes	1.78	2.28	2.05	1.85	2.24	2.05

The results show clearly higher scores for the PC classes in both writing tasks by boys and girls, highest difference for the boys. All differences are significant at $p < 0.001$ level. The boys' scores are as expected lower than girls, but in 4 classes the mean score was alike.

Reservations:

1. The comparing classes are statistically only a stratified sample to get as equal background as possible in geographical district, class size, social class and teacher background
2. An experiment always tend to get better results (Hawthorne effect)

The results goes in the same directions as Keetly (1997) in his comparison of PC writing and handwriting.

Handwriting test

The most controversial in the project was delaying the formal teaching of handwriting to grade 3. Would this delay be negative for handwriting? A test compared the quality of the handwriting between "PC classes" and traditional "Handwriting classes". Two experienced specialists on handwriting in primary school, independently made holistic assessments of the quality of the handwriting on a scale 1 – 4, where 4 is best. The agreement between evaluators was high.

Results. Quality of handwriting

PC classes: 2.74
 Handwriting classes 2.45

How many words written in a minute?

PC classes 4.35
 Handwriting classes 4.91

In spite of delayed formal teaching and much shorter training time in handwriting, the PC classes showed *better quality* of the handwriting, but a bit slower speed. Both differences are significant at $p < 0.001$ level. The delay was most profitable for boys. Why? The best explanation I think is that the fine-motor skills was better developed one year later. The children (especial the boys) had therefore less problem to copy the handwriting standard, and were therefore more motivated to do their best.

Conclusion

Developing new methods for literacy learning in lower Primary School are the main results, and have resulted in a textbook for teacher students and teachers (Trageton 2003 b). 3 years experience in 14 classes document the development.

Since Huey (1908) there is nothing new in reading methods. Reading education has in a hundred year discussed what is best: The phonic method, the word method or the whole language method. All three methods starts with *reading*, writing comes later.

But in my project READING-and writing teaching was *revolved* 180 degrees to WRITING- and reading learning. Writing is easier than reading. (Clay 1975, Chomsky 1982, Sulzby 1982-1990, Hagtvet 1988). Using the computer as the writing tool instead of the complicated handwriting made this “revolution” possible. The letters in writing/reading became identical, and the correspondence writing/reading easier. Instead of boring technical training in handwriting the children could concentrate of the *content* in their writing. The results are in tune with the huge American project “Writing to Read” (Chamless & Chamless 1993). However, their equipment and strategy was too complicated and costly (Singh 1993). The Nordic project used only simple computers, and the project had a more playful strategy.

Høyen (1996) stress decoding as the central factor in the reading definition:

Reading = decoding x understanding

When the child is writing to read however, the start is the easier *coding* of own understanding and thoughts:

Understanding x coding x decoding = reading of meaningful text

When the child is writing/reading a meaningful text grown out of his own imagination and thoughts, he will in addition use combinations of the phonic method, word method and the whole language method, understanding the total meaningful text. This is the theoretical

explanation why “Writing to Read” seems more effective than starting to read foreign texts from an ABC primer (Willows 1988). The task becomes more intrinsic motivating for the child, and has more of the characteristics of the play described on page 3-4.

Future implementation and research

Because of the positive results and the simple and cheap technology, the ideas are now spreading quickly, much helped of digital networks. Many communities in Norway started new projects 2002-2005 to replicate and improve this playful literacy strategy for grade 1-4. My preliminary results are now re-evaluated of master students in “ICT and learning” on a larger scale in Bergen (Vavik 2003, Salomon 2003). 40 schools (out of 60 totally) follow now the same strategy. 2000 children are here involved. Several ongoing or completed master thesis (for example Helleve 2001, Grimsø 2003) pave the way for later doctoral studies. A special new area is computers in multicultural settings. A school in Oslo with 21 different nationalities and Urdu, Arabic, Turkish and Somali as main mother tongues have got two-language keyboards, for instance Arabic and Norwegian letters. The Arab child make Arab letter strings going from right to left, changing to Norwegian letter strings from left to right on the same computer. The child write an Arab sentence in Arabic, read it loud, and with the help of the teacher translate it to Norwegian, and type it down from left to right. Such the 6 year olds learn the two languages parallel. In grade 2 and 3 they produce reading books in two languages: Arabic-Norwegian, Urdu-Norwegian etc.

Many countries show interest in writing to read by computer. In addition to courses in Norway, I have a lot of courses for teachers in Denmark and Sweden, where many schools also started this playful literacy learning. My textbook for teacher education is translated to Danish and Swedish and will be published in the end of 2004. The project is presented at other international research conferences, for instance NERA (Nordic Educational Research Association), TASP (the American play research organisation) and 13th European Conference of Reading.

Reading and reading tests have dominated the international literacy debate. Instruction books in reading and writing are dominated of reading. Our Ministry for Education have now also funded development of *writing tests* for grade 4, 7 and 10 (Berge et al 2003). These tests will be obligatory in all Norwegian schools 2005, besides the reading tests. This will pave the way for a new “Centre for WRITING research” parallel to the existing “Centre for READING research”. To focus more on the *Writing* part of literacy research will hopefully gradually

give better balance between writing and reading, and connect language education much tighter to creative play as a necessary background for creative writing, both fabulous stories and factual prose.

The “back to basics” trends in most of the European Countries focusing formal learning in language and mathematics are now threatening the strong position for creative play in the Norwegian school. Through my project I try to convince also politicians that a playful child is a necessary key factor in literacy learning, also digital literacy.

I invite ICCP people in different countries to start parallel innovations followed by researchers believing in a strong connection between play, literacy and computer writing.

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