Electronic books for the visually impaired: the Norwegian project

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1. BACKGROUND

1.1 New options in using data technology in production of books for the blind and visually impaired

Braille books have traditionally been produced by typing the printed book in braille on a Perkins Brailler. In the last decades this has been changed. At first the books were typed on a PC and the text transformed to braille by a braille conversion program. Later on printed books were scanned on a scanner with an OCR (optical character recognition) program, which photographed and translated the printed letters into text. The text were then transformed to braille by the braille conversion program.

Data technology is used by many authors, publishers and printing houses. The text printed often exists in a data readable format, as data text. We wanted to get hold of this data text directly from the publishers or printing houses and use it as a basis for printing braille books. We also wanted to produce electronic books on discs or CD-ROM’s for the visually impaired. In 1990 the Royal Norwegian Ministry of Cultural Affairs took the initiative to start various projects concerning the use of new technology in production of books for the blind and visually impaired.

1.2 The main project: “Data technology in production of books for the blind and visually impaired”, objectives and accomplishments

Our objectives in the main project were:

- to give the visually impaired more books to read by making the production of braille books more efficient, and
- to give the visually impaired options, by producing books in braille on paper or discs.

The project also had several other issues, the most important have been:

- to give impulses to the ongoing revision of the copyright law.
- to increase the co-operation between the Norwegian braille manufacturers.

Data technology is the tool we have used to achieve these goals. The main project have been divided in several sub-projects:

- Selecting a new braille production system (1992 - 93)
- Selecting an electronic books system (1993 - 94)
- Producing electronic reference works for the visually handicapped (1994 - 95)

The three first projects have been funded by the Royal Norwegian Ministry of Cultural Affairs, the last project by the Norwegian Governments 4 years plan for the handicapped. This paper describes our efforts and experiences so far in the Norwegian electronic book projects - selecting an electronic book system (part one) and producing electronic reference works for the visually impaired (part two).

1.3 The visually impaired in Norway

Most visually impaired are elderly people (60-70% are 60-70 years or more). Most visually impaired are partially sighted, in Norway only about 900 persons out of a total population of 4,5 million people are blind (braille readers). In primary school (9 years) about 40 pupils are braille readers.

Braille production in Norway

The government is responsible for the production of braille and talking books. All visually impaired are now integrated in ordinary schools, and they need the same textbooks as their sighted peers. Three manufacturers are responsible for producing textbooks for primary and secondary schools and for other education (university studies or practical education). One of those manufacturers (Norwegian talking and braille book library (NLB)) in addition has the responsibility for general library functions for the visually impaired. In addition there are some private enterprises who produce braille, either as a subcontractor for the government producers or for
organisations for the blind.

Funding the PC equipment.
In Norway the National Insurance or public schools provide PCs with the necessary equipment for the visually handicapped. The equipment may be braille display, speech synthesiser, braille embosser, scanner with OCR-program, CD-ROM station, and/or magnifying system; depending on the users problems and needs. All blind youth and quite a lot of visually impaired youth have their own PCs at home and at school. Adults also have this option, and an increasing number of blind adults have PCs at work, and some have one at home as well.

2. THE OBJECTIVES OF THE PROJECT “ELECTRONIC BOOKS FOR THE VISUALLY IMPAIRED”

In part one of this project the main issues were to:

- make a specification of which demands an electronic book for the blind should meet
- evaluate different reading programs for electronic books
- select an electronic book program for the visual handicapped.

In part two of this project the main issues were to:

- produce reference works for adults and children in the selected electronic book software.

We have given input to the ongoing revision of the Norwegian copyright law.

3. DESCRIPTION OF PART ONE OF THE PROJECT

3.1 Main issues

In part one of this project the main issues were to:

- make a specification of which demands an electronic book for the blind should meet
- evaluate different reading programs for electronic books
- select an electronic book program for the visual handicapped.

In order to do this we decided to produce a variety of electronic books and let blind and partially sighted users read them on their PCs. We would also look at the commercially produced electronic books, to see if visually impaired could use those books. We selected users in different ages and life situations that already had got their own PC equipment.

3.2 The project organisation

This project was a part of the main project: “Data technology in production of books for the blind and visually impaired”, and the Royal Norwegian Ministry of Cultural Affairs took the initiative to this project. I was hired as project manager, and the project team consisted of representatives from the Norwegian governmental braille manufacturers (the Norwegian talking and braille book library, Huseby and Tambartun National Resource centres for the visually impaired), user organisations, the Norwegian Publishers organisation, and the Norwegian Directorate for Public Libraries.

3.3 Electronic books systems that were evaluated

We looked to our Scandinavian neighbour countries to see what they had done in this area, and we checked with some Norwegian publishers to find out which systems (text based) were used. We decided to include books produced in Word Perfect for DOS in the experiment, as this is the commonly used text processor for visually impaired in Norway. The data equipment at the users end must be IBM compatible PC, as this is the standard equipment for visually impaired in Norway (at least for all blind data users).

After comparing different systems we decided to evaluate the following systems:

- Textware
- Setxt
- Word Perfect
- Latex.

Setxt was initially developed for a Norwegian school, but was adjusted to fit blind readers using braille displays, and partially sighted using magnifying systems.

We had to drop Textware (the system used by some of the Norwegian publishers for commercial books) because of orders from publishers which filled their capacity and was given higher priority. Latex was tried for one text book in statistics.

3.4 Description of books involved in the experiment

We decided to try a variety of books from different subjects. We also wanted to try all commercially produced books that were produced in a text based system. We had 38 titles produced for the experiment (the whole book or parts of the book) and we also tested 23 titles commercially available.
The following categories were covered:

For children and youth:
- reference works
- textbooks
- general literature
- easy readers
- novels

For adults:
- reference works
- textbooks
- poetry
- plays
- general literature

Within the area of textbooks we produced books for primary and secondary school and for university. Those books included workbooks and textbooks, and covered different subjects.

3.5 The user group

37 users from 10 years to 60 years participated in the experiment; 34 were blind (braille readers), 3 were visually impaired. All the users had their own EDP equipment. Some were experienced data users, and others were inexperienced. They received the books on disc with a read-me file and an installation description in braille and ordinary print. We made a special chapter in the electronic books called "Notes regarding the electronic book" which contained special information concerning the electronic edition.

Short user descriptions for reading books with WP and for reading books with Setxt were made. The young users were helped by their ordinary teachers or parents, while the other users simply followed the documentation. The governmental braille manufacturers and libraries also assisted users on telephone.

The users borrowed the books for three months, and then the electronic books were evaluated.

3.6 Copyright

The present Norwegian copyright law does not have any special paragraphs for electronic books for the visually impaired. We did not use any copy protection systems in our experiment - neither in software nor hardware. The Setxt program makes it possible for the user to copy part of the text into his/her text editor, or to a user file or directly to the printer. The text is scrambled, so the user has to copy text through the electronic book system.

Some publishers use copy protection systems, but several main publishers have dropped it for their commercial electronic books, as copy protection often gives the user difficulties regarding for instance backup procedures.

3.7 Evaluation of part one, conclusion

3.7.1 Advantages and disadvantages with electronic books for the blind and partially sighted

All our users wanted to have the option of reading books in electronic form. All our blind users meant that it was necessary to tailor the text for reading on a braille display. The users appreciated the layout used for the electronic books that were tried out in the experiment.

A few users had problems using 8 points braille. This was inexperienced data users, as 8 points braille is used for the braille display, and is the most practical way for blind people to read braille on the PC. (This is not specific for the electronic books, but is also used with for instance word processing.)

The commercial books gave some problems (even if they were in text modus), especially concerning the use of the soft cursor and also for different menus.

The users appreciated the small volume and quick reference that electronic books gives. Some users were tired and/or got pain in the shoulder because of reading long texts on the braille display. In spite of this trouble they still wanted certain categories of books in electronic form.

Only three partially sighted participated in the experiment. Of those two were positive to the electronic form, while the third preferred talking books, as his sight problems made it very fatiguing to read with a magnifying system. This is of course too few users to draw any conclusions, but we feel that for partially sighted the different vision problems may be important for their use of electronic books. Some will even be capable of reading books in windows.

Setxt

This system has a book-shelf facility. The electronic books are put in an electronic book-shelf. This enables you to search for 1 - 3 words at the same time in several books. This is an interesting facility, especially if you place textbooks in your book-shelf. The users found the search facilities to be easy and fast, and they appreciated the structure in the books (chapters and paragraphs). No special training was necessary to use the Setxt system. Several users would have preferred longer lines (80 pos. instead of 40). This version of Setxt
had no help function.

Word Perfect
Searching is time consuming with big files in WP. Books in WP were easy to read, because all users knew this word processor on beforehand. Workbooks were especially easy to use in this format, because the answers could be filled in easily.

Latex
We tried a textbook in statistics that was written in this text processor. Mathematics for visually impaired using the PC is a difficult field where we are only at the start. Only one blind user with a university level in mathematics tried this book. It looks promising, but we cannot draw conclusions until it is tried for several books and for more users.

3.7.2 Which books were preferred in an electronic form
All our users preferred reference works and textbooks in an electronic form. For the youngest users the workbooks were especially interesting.

The users were of different opinion how (in what media) they wanted to read novels and general literature. Several users would rather read a braille book or a talking book in bed, than have to sit in front of the PC for all kind of reading. Many would all the same like to buy electronic books for the visually impaired. (Perhaps because of the small volume compared with talking books and especially braille books.)

3.7.3 Copyright
The evaluation concluded that the users did not copy the electronic books. At the end of the 3 months period several schools asked to keep the workbooks/textbooks for the rest of the school term.

For the blind and partially sighted the many positive features of the electronic books will open new possibilities. Our project team therefore recommended that the revised copyright law should include a provision to produce electronic books for the visually impaired on the same conditions as for braille books. The Norwegian Publishers association did not support this view, although they express compassion with the difficult situation for visually impaired concerning written material.

The proposition for a revised copyright law includes a provision to produce electronic books for the visually impaired on the same conditions as for braille books, provided that the electronic book is especially prepared for the visually impaired, and not just an ordinary commercial product. The new copyright law will be discussed and decided in the Norwegian Parliament this year.

3.7.4 Problems with conversion from publishers discs
The governmental braille manufacturers made the books in Word Perfect. The text was either:

- converted from publishers discs
- converted from data text prepared for braille production
- scanned on an OCR-scanner or
- written directly in WP.

For the primary school the textbooks were adjusted for blind readers, and for one of the textbooks we made a braille book with crosswords, tactile illustrations etc. to be used with the electronic book.

The books produced in Setxt were made by the Setxt supplier. They preferred to use publishers discs when available.

We have used publishers discs whenever possible in the book production. We also have some previous experience with publishers discs. The quality varies a lot depending on the publisher or printing house. Typical problems are: data that are not complete, chapters or parts of the book that are missing from the file, data that are not corrected. Simple text files without too many tables etc. give the best results. We believe that this problem will get smaller as more publishers and printing houses invest in advanced data systems.

3.7.5 Conclusion
Electronic books represent a very interesting option for blind readers. The advantages are:

- more books will be produced because of lower production costs
- reference books will be possible to make for blind readers
- more choice - books for the visually impaired may be made as talking books, braille books or electronic books.

This is an important step to give visually impaired access to more literature. The copyright legislation should be altered to make this possible.

We concluded that Setxt was well suited to visually impaired readers, but for the youngest readers and those without data experience Word Perfect is a good solution.

3.8 Demands to the layout of electronic books for the blind
As a result of the experiment with electronic books we wrote a short report on demands for commercial production and tailored production. The demands for commercial production are minimum requirements to enable blind users to read electronic books. It is just one page, and is meant for commercial publishers who makes text based electronic books.
4. DESCRIPTION OF PART TWO OF THE PROJECT - "REFERENCE WORKS FOR THE BLIND AND VISUALLY IMPAIRED"

4.1 Main issues

This project is a continuation of the electronic books project (part one) where we decided to go for Setxt electronic book system. In this project the main issue has been to:

- produce electronic reference works for adults and children / youth. Other issues have been to:
- negotiate a contract with the supplier firm that have developed Setxt (Pedagogisk Dataforum)
- get production experience in Setxt.

4.2 The project organisation

This project is funded by the Norwegian Governments 4 years plan for the handicapped. The Royal Norwegian Ministry of Cultural Affairs is the Ministry in charge, and the Norwegian talking and braille book library is responsible for the project. I was hired as project manager, and the project team consisted of representatives from the Norwegian governmental braille manufacturers (the Norwegian talking and braille book library, Huseby and Tambartun National Resource centres for the visually impaired), user organisations and the Norwegian Directorate for Public Libraries.

4.3 Description of books involved in this project

In Norway we have very few reference works for the blind. The present systems for talking books are not suited for reference works. Braille books makes too big volumes to be handy (or sometimes even possible) to use for reference works. We asked the user organisations which kinds of reference works they would prefer, and though the wishes were many, we concluded with:

- a Norwegian encyclopaedia on disc or CD-ROM, the CD-ROM version includes sound illustrations - Kunnskapsforlagets encyclopaedia (one volume)
- a series of 8 reference books for children / youth on disc; the titles are:
  - The European countries
  - Norway and the Northern countries
  - The all Colour Book of Space
  - The all Colour Book of Supermachines
  - The all Colour Book of the Body
  - The all Colour Book of the Earth
  - Knights and musketeers
  - Vikings and Indians.

The encyclopaedia is new this year, it is produced as electronic book in windows by the publishers. Both publishers (Kunnskapsforlaget and Faktum Forlag) has given us the data text on discs. The ency clopaedia will also be offered for sale for visual impaired at the same price as the windows edition. The Norwegian talking and braille book library has transformed the data text to Setxt format. The sound illustration has been gathered and played on a DAT-cassette, and linked to the appropriate references in the encyclopaedia on CD-ROM.

4.4 The user group

35 users (blind and partially sighted) have received the electronic reference books for evaluation. They are from 12 - 60 years old. All users have data equipment. All the adult users have higher education, and they are therefore not representative for the average visually impaired reader. In this way the children and youths are more representative. We want to get the users evaluation on the layout of the books, the Setxt electronic book system and the documentation. At present the books are at the user`s for evaluation.

4.5 Status and description of different challenges during the project period

4.5.1 Obtaining the data text from the publishers

Since the copyright law has not been changed yet, we had to make agreements with the publishers to be able to produce their books as electronic books for the visually impaired. We had no difficul ties in obtaining these agreements; both publishers were eager to co-operate in any way. In fact we got the data text from the publishers without compensation.

We discovered that the data text for the encyclopaedia was not complete, because the tables were missing from the data file. Those tables were given to us later, but they were in a different format, so we decided to write all the tables directly in the text.

The data text for the reference books for the children/youths were to be sent us directly from the printing house - which took 2 months - and consequently the project was delayed.

4.5.2 Negotiating the contract to use the electronic book system Setxt

We negotiated a contract for two of the governmental braille manufacturers. They are using Setxt production and reading system for three years, with an option to extend the period if we at that time conclude Setxt to be the best electronic book system for visually impaired.

We have saved all the texts in ASCII format to enable us to switch to other electronic book systems when the contract expires (or later on) if this decision is made.
The contract specifies the demands for hardware and software at the users end. Norwegian blind and partially sighted PC-users have a great variety in hardware and software, and we want Setxt to comply with all standard equipment sold in Norway. The PC has to be IBM compatible, but the demand for space on the harddisc varies with the different books.

We want to use these three years to get knowledge and experience about production and lending of electronic books at the governmental braille manufacturers/libraries, and the visually impaired users will get used to have books in another media.

4.5.3 Changes to the Setxt program
Phase one of the electronic book project resulted in a three years contract for the Setxt electronic book system. The evaluation gave some input as to changes that would improve the reading system of Setxt. Those demands/wishes were included in the contract on Setxt.

In phase one of the electronic book project the Setxt books were made by the supplier that had developed the system. In phase two we decided to develop our own know-how and make the books ourselves. The Norwegian talking and braille book library have made all the 9 reference books.

During the production process we have tested the program with the reference books. Especially the encyclopaedia was a big challenge. The Setxt system was improved considerably in this period.

The sound illustrations that were to be included in the encyclopaedia also made it necessary with changes to the Setxt system. We have experienced satisfactory co-operation with the Setxt supplier.

4.5.4 Production experience
The Norwegian talking and braille book library has made all the 9 books in Setxt.

The encyclopaedia was a complex job, even though we used the data text from the publisher. In this reference work we have met many problems from different areas. Mathematics, foreign languages, all kinds of different special characters are included in this book. It contains about 7 - 800 c

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Electronic Books for the Visually Impaired: The Norwegian Project. Retrieved from http://www.ifla.org/contacts/html. Kuniansky, N. (n.d.). E-braille: Making Braille Easy around the World. The purpose of the project discussed in this article was to set up a computerized catalog and distribution database of alternative materials for visually impaired people in Nigeria. The project was based on the need to open wider the gates of information resources, nationally and internationally, to this category of information users by identifying the location and availability of resources throughout Nigeria and creating a database for access and retrieval. Another purpose was to create a template for database entry, which could be replicated by other developing countries.