

Title: How to Make a Braille eBook Reader

Presentation Track: General

Presentation type: Demonstration

Presentation Length: 60 minutes

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Short Abstract/description

Open Braille hardware has been pioneered to improve the literacy skills of blind people and to make the production of Braille technology more inclusive.

Extended Abstract

Braille readers and rehabilitation professionals will find “Canute”, an affordable Braille eBook reader, reshapes expectations of Braille technology by delivering a multiline Braille display built from off-the-shelf components, open source software and community engagement.

It has been suggested by the National Federation of the Blind that up to 90% of employed blind Americans use Braille regularly - yet less than 10% of blind schoolchildren can fluently read Braille. Developing robust usable and affordable braille technology is an essential ingredient in reversing this decline.

Single line piezoelectric-based Braille products continue to cost thousands of dollars - requiring blind people to be beneficiaries of public or private subsidies. Braille devices based on so-called "smart materials" have yet to be proven sufficiently reliable in real-world applications. Other efforts to produce affordable Braille technology have restricted ambitions to producing single line 20-cell units costing in the region of \$15 per cell. Canute demonstrates the cost of electronic Braille can be reduced to approximately \$1USD per cell, putting Braille within the budgets of blind individuals.

Attendees will learn about the simple mechanical principles that make Canute possible. You will discover off-the-shelf components and mainstream workshop tools used in Canute's construction. By publishing Canute's design, production and repairs will be possible in the field minimising cost of ownership and reducing downtime.

Braillists themselves have been encouraged to take an active part in Canute's development. Canute runs open source software written in Python enabling sighted and blind programmers to develop custom applications.

Throughout 2014 and 2015 Bristol Braille Technology tested each Canute iteration with Braille readers across the UK and Ireland. Prototype units were loaned to blind people for use in their own homes. Feedback from Braille readers was collated and channelled in to the next iteration.

Canute is designed to function as a standalone eBook reader, analogous to a Kindle, eliminating the need to have an always-on connection to a computer or smartphone. Content is preloaded, and reading is not interrupted by software alerts and notifications.

Canute displays up to 16 Braille lines at any one time. Multiline Braille conveys page layout and formatting that is problematic on single line units. Readers with access to multiple braille lines can potentially acquire skills previously only available through hardcopy. Examples include:

- Develop braille skills by arranging the alphabet over several lines to show the simple repeating pattern that underpins many Braille characters.
- Display braille page layout with paragraphs, bulleted lists, headings and page numbers to reinforce formatting skills.
- Interpret tabulated data such as tables, calendars and spreadsheets.
- Develop math skills by showing arithmetic working, times tables, simultaneous equations and matrices.
- Read musical arrangements containing multiple voices.

This session is suitable for:

- Individuals relying on Braille to access books.
- Educators and training professionals supporting Braille learners.
- Braille advocates seeking to reverse the decline in Braille literacy.

Prior knowledge of braille is not required but may be useful.

Learning Objectives

- Discover the true retail cost per cell of refreshable braille.
- Appreciate the values and priorities that guide the design of braille technology developed by a social enterprise.
- Recognise strengths and weaknesses of braille devices that refresh by line and those that refresh individual dots.
- Articulate three benefits of multiline electronic braille.
- Describe three hurdles encountered by students developing braille skills.

References

Braille Initiative National Federation of the Blind: <https://nfb.org/braille-initiative>

Bristol Braille Canute on GitHub: <https://github.com/bristol-braille/canute-ui>

Braillists community group: <http://braillists.org/>

Bristol Braille Technology CIC: <http://bristolbraille.co.uk/>