# Automated Braille: the Good, the Bad and the Fabulous

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## Abstract

If someone had told me ten years ago that I could access nearly any book I wanted and that I could even read it in braille I would never have believed it. Automated braille translation (such as Apple’s built-in braille support) has gone a long way towards making this a reality. Having said this, generating braille without human intervention does have its drawbacks. When is automated braille a viable option, when is it problematic and when is it quite simply a dream come true? In this paper I will discuss the technical aspects of braille automation. I will also provide an overview of the advantages and disadvantages of automatic braille translation.

## Introduction

Whether you are a braille reader, a transcriber or an educator you have probably been asked about the effect of technology on the production and use of braille. There are many responses to this question but one thing is clear: technology has completely changed the landscape for braille readers.

At the 6th General Assembly in Baltimore I gave a presentation on the automated production of transactional documents (such as credit card statements and phone bills) and I have incorporated some of that material in this paper. Rather than focus on personal and confidential information I will discuss the various ways that automated braille is produced. I will also provide an overview of the advantages and disadvantages of these methods. Finally, I will offer suggestions to help braille readers become more proactive in gaining access to information in braille.

## Manual Versus Automated Transcription

Before discussing the benefits and challenges of automated braille, it is important to understand what is meant by manual versus automated transcription. Normally when we think of manual transcription the slate and stylus or a Perkins brailler may come to mind. However, manual transcription also includes software such as the Duxbury Braille Translator, Braille 2000 and BrailleBlaster. The reason for this is that even though a program like Duxbury does many things automatically, intervention by a transcriber is still required. This is not a drawback in any way. It allows for a great deal of precision when converting print into braille, which is an invaluable feature of these programs.

Manual transcription is best suited to static material, which can be anything from a textbook to a restaurant menu. Brochures, train schedules and user manuals would also fall into this category. Complex material such as STEM content should be transcribed manually by a certified braille transcriber, especially in the context of educational and testing material.

Static documents do not contain personal and confidential information such as that which is found in transactional material, nor does the content change on a regular basis.

### Two Types of automated Braille

Throughout this paper I will be referring to two approaches to braille automation. The first is achieved by means of an application developed specifically for a given brand and document type. The application extracts the text based on its location on the page in the source file (PDF, AFP or another print description language). The application looks for specific text, font types or images and applies the tag that will produce the correct output. For example, if a style sheet has been applied it can be used to identify the text that should appear as an h1 or an h2. The application converts the file to XML and then applies proprietary CSS commands to convert to alternate formats, including braille. The software applies braille rules based on the language of the document and whether contracted or uncontracted braille is required.

In this way a large number of files can be transcribed simultaneously, saving both cost and time. These applications convert each file with no human intervention. They can also produce accessible PDF, large print, audio and e-text. As with conventional print, the automation of the process greatly reduces the potential for human error. The challenge for braille readers is that this process only deals with very specific kinds of data. Moreover, if you have questions or concerns about the way your statements are transcribed you do not have direct access to the service provider. Banks, insurance companies and telecommunications providers generally don’t want their clients to know who is producing the accessible versions of their statements, any more than they would advise their sighted clients as to which printers they use.

The second type of automated braille is the kind of on-the-fly braille conversion that happens when pairing a braille display with an iPhone or connecting to a PC. In this case, the screen reader manufacturer builds braille support into the software so that the information spoken by the screen reader can also be read on a braille display.

The reason I consider these to be two separate ways of automating braille is that application development focuses on specific documents and converts them to actual braille files. These can be either electronic or hard copy format. Screen reader braille support (sometimes called instant braille) is more generic. It takes a wide range of input – from emails and texts to Word and EPUB files – and renders it in braille as soon as the user accesses the content. Any braille user who has ever copied Word files to a notetaker or paired a display with an iPhone to read books and send text messages can attest to the many ways that instant access to braille can revolutionize daily life. The main disadvantage for braille readers is that we must all rely on manufacturers to ensure that their products conform to braille rules and that translation tables are updated as needed.

## How Automated Braille is Generated

Regardless of the software used to generate braille output, the basic premise is the same. Braille rules have to be coded into the software so it will know how the output should appear. This is especially true for contracted braille. For example, the program needs to know that the “ea” in “tea” cannot be contracted but the “ea” in “teatime” can. It needs to know that “brl” represents “braille” but that this contraction can’t be used in symbols-sequences such as print/braille and brailleliteracycanada.ca. Generally the application will employ a dictionary to deal with exceptions or issues that are difficult to code. A website such as rbthydro.com will use the “th” contraction and may have to be added to a dictionary to force uncontraction of these letters.

In both approaches, there is no certified transcriber making modifications to the content. Because of this, the braille output is dictated by the input received and the automated tool converting the original information into braille. Unfortunately this means that typos are not corrected and a poorly designed print document will directly affect the quality of the braille output. In other words, if the original document is convoluted and difficult to follow, the braille version will be the same.

### Transactional Document Guidelines

As noted in 2016, Braille Literacy Canada (BLC) has developed guidelines for the production of transactional documents such as credit card statements and phone bills. If you would like a copy of this document please send an email to info@blc-lbc.ca.

The following topics are addressed in the guidelines:

* Placement of Terms and Conditions;
* Truncated text;
* Cheque images, pie charts and any other visual information that is difficult to convert into braille;
* Remittance vouchers;
* Printed information that may be included for identification purposes;
* Foreign-language words in an English context; and
* Binding versus stapling of embossed statements.

This is by no means an exhaustive list of the issues covered in these guidelines, but it gives an idea of the decisions that producers are required to make when implementing automated transcription of personal and confidential information.

## UEB and Automated Braille

The implementation of UEB has had a definite impact on braille automation.

First, the one-to-one correlation of print to braille symbols means that there is less in the way of contextual symbol use that would require manual intervention. For instance, a dollar sign is represented by dots 4, 234 regardless of the type of material. Likewise, a period is dots 256 whether it appears in a decimal, a web site or it’s just indicating the end of a sentence.

The overall consistency of UEB rules generally makes aspects of the code easier to build into automated tools. Contraction use – or non-use, as the case may be – as well as grade one and numeric modes are just some examples of this. Capitalized passages, on the other hand, can sometimes present a challenge. Where a transcriber could treat the lines of a fully capitalized street address as individual elements to be capitalized separately, an application may treat the whole thing as one passage if it is all included in one address tag. In addition, where a transcriber might choose to terminate the capitalized passage after the closing punctuation an automated tool will generally terminate it immediately following the final capitalized letter, even if it would flow better if the termination sign were placed at the very end of the symbols-sequence.

The concept of following print has also affected the automation process. UEB’s increased emphasis on following print means that there are generally fewer braille-specific conventions that need to be implemented in the software, such as the spacing and use of punctuation. This may not seem important, but depending on how the document was originally designed and which program was used it can be a significant issue.

A final aspect of UEB that I’d like to touch on is the creation of new symbols. UEB has incorporated a number of symbols that are being used in print with ever-increasing frequency. The addition of arrows, shapes and transcriber-defined symbols ties in to the principle of a one-to-one correlation of symbols and makes it easier for automated conversion software to follow print.

## Benefits and Drawbacks

As is the case with nearly every aspect of technology, there are both benefits and drawbacks to braille automation.

Automating the process of braille transcription not only saves time but is also more cost-effective. When a specific application is used to convert personal and confidential statements into braille, hundreds of pages can be processed in seconds. It is less expensive to build such an application than to manually transcribe each statement individually. When a braille reader connects a refreshable braille device to a computer or a mobile phone, content is instantaneously made available in braille. The reader doesn’t have to pay for the document to be transcribed or wait for it to be completed.

Advancements in braille-related technology have resulted in a dramatic increase in the quantity of braille that is available. Although this is tremendously beneficial for braille readers it is also important to consider the drawbacks of automation.

Anyone who is familiar with braille recognizes that there are contexts where code or formatting rules require human (or manual) intervention in order to be applied correctly. In the automated transcription process this intervention is not possible. I am not referring here to errors that lead to ambiguity of content. Anything that affects the readability of the information must be resolved in the application by the developers or manufacturers.

The vast majority of printed material is created without a thought for document accessibility, so it’s important to know when automation is appropriate and when content should be sent to a certified transcriber. Documents containing paragraphs and simple lists or tables lend themselves well to automation. However, elements such as complex tables, pie charts and images require the intervention of a transcriber to ensure that content is properly formatted and information is conveyed accurately to the braille reader. This is especially true for technical material, such as mathematics and science textbooks.

File complexity is a major factor in determining the best way to access the content in braille, but it is certainly not the only one. From the perspective of customer communications, public-facing information such as brochures and user manuals would be transcribed once and then embossed upon request. On the other hand, statements containing variable data can be produced more efficiently through an automated process.

From the perspective of a braille reader, it may depend on the purpose of the document. When reading for pleasure the braille errors that can result from automation may not be such an issue. However, if you’re conducting research or planning to use the document in a presentation it is likely more important that the braille is transcribed and properly formatted. Textbooks and tests, as well as information specifically geared to young children or beginning braille readers are examples of material that would require manual transcription.

## Electronic Versus Hard Copy Braille

Although this paper focuses mainly on the way that braille is produced I wanted to briefly highlight the issue of electronic versus hard copy braille. There are many situations where refreshable braille is more practical than hard copy, just as there are many situations where it is more efficient for a print reader to use an electronic file. However, just as print readers sometimes want a physical document to work with, braille readers likewise will sometimes need or prefer an embossed version. Whether it’s because the reader does not have access to appropriate technology or because they don’t want to risk running out of battery in the middle of a presentation, or because they just like turning pages, there are certainly circumstances when hard copy braille is a better option.

## Creating Your Own Electronic Braille

One of the greatest benefits that computers have brought to braille readers is direct access to original content. This by no means eliminates the need for certified transcribers, but it does give braille readers the opportunity to play an active role in creating their own accessible documents. The following suggestions are based on workshops that Braille Literacy Canada has hosted and on questions we’ve received from our members.

**Learn about the transcription process.** If you’re looking for ways to increase your access to braille, one place to start is to learn more about the process of converting print into braille. Print material is becoming more complex and includes an ever-increasing variety of visual elements. Font variations, icons, as well as tables that contain paragraphs, bulleted lists and images – these are common occurrences in conventional print documents. In addition, many of the documents we have to convert are poorly designed in their original format. An understanding of the input file can give braille readers a better idea of the time, cost and skill involved in transcription.

**Learn how the software works.** You don’t need to be a certified transcriber to learn the basics of braille transcription software and create some of your own braille files. This is particularly true for content that is mostly text, with very little in the way of lists or tables. BrailleBlaster, which was developed by the American Printing House for the Blind, is a free transcription software that can be downloaded at [www.brailleblaster.org](http://www.brailleblaster.org). You can import Word and .txt files into the software and create a .brf file. If you have access to the Duxbury Braille Translator this is another excellent option for creating your own .brf files.

**Make the most of your technology.** The BLC info mailbox often receives questions related to refreshable braille technology. The most frequent are requests for help using a braille display or notetaker. I have not included a comprehensive list of websites in this paper, but applevis.com is a great resource for anyone who uses Apple’s accessibility features. Google and Microsoft are also working to augment their accessibility-related products. Several manufacturers have listservs for users and most offer accessible manuals, quickstart guides and online tutorials.

Although there is a plethora of resources available online there is also a wide range of variables to consider. Which braille device does the user have? Are they connecting it to a PC, a Mac or a Smartphone? Which screen reader and version do they use? A particular braille command will not necessarily work the same way on every device, so the user needs to be willing to experiment and play with their braille display to determine what works and what doesn’t. This may sound like an obvious statement, but it is not uncommon for users to be hesitant about doing this, perhaps because of the cost of the device and a concern that they might “break something”. It is highly unlikely that pressing the wrong button will cause any significant damage. The trial and error method is usually the best way to learn how your technology works and how to take full advantage of what it has to offer.

**Be persistent.** If you really want a particular document or book in braille, start with your usual sources. Maybe this is a library or agency that normally provides material in braille. If this doesn’t work, check with other braille readers you know and go online to see what might be available. Even though there is not nearly enough material being converted into braille I have often been surprised at what does exist when I’ve taken the time to be persistent and explore different options. It is my hope that with advances in technology and changing legislation the options for accessing braille will continue to increase.

## Conclusion: Looking Ahead

The advent of refreshable braille has had an immeasurable impact on the vitality of the code, and it is safe to say that the proliferation of lower-cost displays will serve to make braille more accessible and practical than ever. Given the incredible changes that have occurred in the last several years it is hard to imagine what will be available to braille readers 20 years from now. Having said this, one thing I believe is certain is that we will need to be willing to think outside the box. The traditional ways that we transcribe and access braille are constantly changing and this is a trend that will continue in the years to come.

## References

Guidelines for the Production of Transactional Documents. Braille Literacy Canada, 2016.

The Rules of Unified English Braille Second Edition 2013. International council on English Braille