

# Unified Arabic Braille Portal by Mada: Innovative digital resource to reduce braille literacy in the Arab region

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## Abstract –

Given the rise of audiobooks, does braille still have a role to play in the lives of people who are blind or visually impaired? For people who are blind, knowing Braille is the equivalent of knowing to read and write print by someone with sight. It is a unique system of raised dots that can be read by touch. Learning braille means that blind and partially sighted people can enjoy reading for life. Learning braille from a young age helps with literacy, as braille is a much better way to understand punctuation, grammar and spelling than audio (Rex et al., 1994). It is a method of reading and writing that relies on touching prominent dots that the blind recognizes once they pass their fingers over them. The method was invented in the mid-19th century and got its name from the name of its French founder Louis Braille (Mellor, 2006). This paper presents an overview about the Unified Arabic Braille Project which was supported and developed by the Mada Innovation Program.

## Brief about Braille

Braille helped blind children to learn how to read and write and adults who lost their ability to read, due to blindness or vision impairment, continue to enjoy access to books, magazines, and other knowledge resources. Braille is not a language, as some call it, but it is a code that enables blind people to read and write in different languages such as Arabic, English, and French. It is worth mentioning that braille in Arabic is read from left to right and not the opposite as it should be in Arabic text, this is to be in line with the braille reading format of all languages (Foulke, 2013).

In 1892, Louis Braille published a book explaining his method, but his new method initially faced strong opposition from officials of schools and institutes for the blind – even at the school where he worked (Bullock et al., 2009). The blind was learning braille outside of formal school hours. This remained so until France officially adopted braille in 1854, two years after Braille's death, thanks to his students who fought for the adoption of this method. The braille method then moved to different languages of the world, for example, it was first used in the United States in 1860 and Britain in 1868. Braille then was available for Arabic in 1951. The braille method was read in the Arab world from right to left, but after the invention of braille printing machines, all machines were imported and printed from left to right, a general conference was held for organizations caring for the blind in the Arab world to decide to read braille from left to right (Bintaleb et al., 2020).

Braille continued to evolve in terms of both the font and the means of reading and writing. At the font level, the writing method has appeared with abbreviations in all languages, including Arabic, a method that relies on writing one or more words in one or two cells. Abraham Nemeth, a blind mathematician, created the Nemeth Braille Code to write mathematical problems and equations in a unified global style. Recently, computer braille has appeared, which depends on an 8-dot cell instead of six, to accommodate a greater number of signs and symbols, especially computer signs.



Figure 1. Unified Arabic Braille Portal by Mada (<https://braille.mada.org.qa>)

In terms of braille reading and writing tools, here's when the most prominent braille tools appeared:

- In 1951, David Abraham, a woodworking teacher at Perkins American School for the Blind, designed and produced the Perkins paper writing machine, which is still popular to date.
- In 1971, the first braille printer appeared to print computer text on braille paper.
- In 1975, the German University of Dortmund produced the BRAILLEX device, the first device to contain an electronic braille display.
- In 1976, Duxbury Translator was first installed at the Canadian Foundation for the Blind and was the first commercial program to convert plain text on a computer into braille dots, for use by printers and braille displays.
- In 1982, the first electronic braille display called VersaBraille was launched in the United States of America by Telesensory, a device that displays the text written on a computer screen in braille on an electronic braille display.
- In 1987, Braille 'n Speak, the first portable electronic braille notebook to feature a Perkins-style braille keyboard was launched. The great success of this device at that time opened the door for the development of the electronic braille notebooks used today.
- In 1995, Duxbury for Windows was launched, making braille translation available on the Windows operating system.
- In 2004, HumanWare released the Brailiant, the first electronic braille display that could work via Bluetooth.

## Challenges and Advantages

Considering the development of digital technology to access content audibly, such as the screen-reading programs on all computer and smartphone systems, some argue that braille has now become a less important tool for the blind. However, this is not true. More than 150 million blind people around the world still use braille for many reasons. Perhaps the biggest aspect of the importance of braille lies in the literacy of the blind person, in this way they can learn the spelling of words and punctuation and visualize how the text is formatted on the page (UNESCO, 2005).

Audiobooks and other audio media have provided a valuable additional source of learning. Despite that listening is not the same as reading, studies have shown that students who master braille have more reading and writing skills than their peers who do not master braille (Toussaint et al., 2010). Furthermore, braille's importance includes the career aspect. A survey conducted by Louisiana Tech University showed that blind people who can read braille have greater chances of employment (Bostick, 2016).

It is worth noting that braille has also achieved its share of technological development, as technology has facilitated access to braille and become portable in small-sized devices, thanks to electronic braille notebooks and programs that convert plain text into braille, and braille displays that are used with computers. As noted earlier, braille is the only method by which a person who does not have access to printed material can read and write, some of the aspects and areas in which the blind use braille are:

- Reading the Qur'an: Using only braille, the blind can recite the Holy Quran whenever they want. Many institutions provide copies of the Holy Qur'an in braille.
- Careful reading: braille allows the blind to read and examine books and courses in a way that gives more focus on content than listening to audio.
- Learning new languages: One of the areas in which blind people benefit most from the braille method is when they want to learn any new language, especially when it comes to learning the alphabets, words spelling, and sentence structures, this is also useful for training in reading in that language and repeating what is read.
- Taking notes during meetings or lectures: Braille, especially electronic diaries, allows the blind to take notes while in a lecture or meeting, without disturbing others and without distracting themselves by listening to the screen reader program.
- Spell Check: In braille only, the blind can check the texts for spelling and detect writing errors, such as extra spaces and errors related to punctuation, which cannot be achieved by listening to the text. Through this feature, the blind can work in jobs that depend on careful examination of written texts, such as proofreading, translation, paraphrasing content, and programming.
- Providing presentations and lectures: Braille allows the blind to speak to the audience and present lectures, presentations, or explanations in braille to the audience.
- Working with media and audio reading: Braille allows the blind to work in media such as radio and television and allows them to read news and present programs. Braille also helps the blind to work in the Voiceover area.
- Work in jobs that require textual content follow-up: Such as working in customer service centers and company call centers, where the blind can use braille to read what needs to be explained to the customer.

- Perform mathematical processes, especially complex ones.
- Reading the signs displayed in braille: In some countries, the indicative signs are displayed in braille on an equal basis for the blind compared to their sighted peers.
- Learn about food menus in restaurants that provide them in braille: The blind can identify the menu without the need for someone else to read it for them.
- Enjoying games: Blind people can enjoy many types of games by writing on them in braille alongside regular writing, and then they can play these games with each other or with the sighted as well. There is no doubt that this contributes to the greater integration of the blind in society. It is worth noting that there are many companies and websites that sell such games to the blind.
- Knowing medications: Many pharmaceutical companies today print the name of the drug on the package in braille, and thus, the blind can identify the type of medicine directly by reading what is written on the package.
- Labels: Some blind people write in braille on stickers and then put these stickers on the tools or things they always use to easily distinguish them from others and identify them later.
- Writing, memorizing, and reviewing musical notes.

## Unified Arabic Braille Portal by Mada

The aim of the Unified Arabic Braille Portal by Mada Center (Figure 1), is to develop the Arabic Braille table used by assistive technology programs to input and showcase the braille method. As well as to develop the first 8-dot Arabic Braille computer table to support braille abbreviations in the fields of mathematics and science. Braille is the only way that enables blind or deaf-blind people who have difficulty accessing printed materials to read and write using assistive technology. The project will benefit the blind, deaf-blind people, experts, teachers, students, software developers, and assistive technology manufacturers in Qatar and beyond.

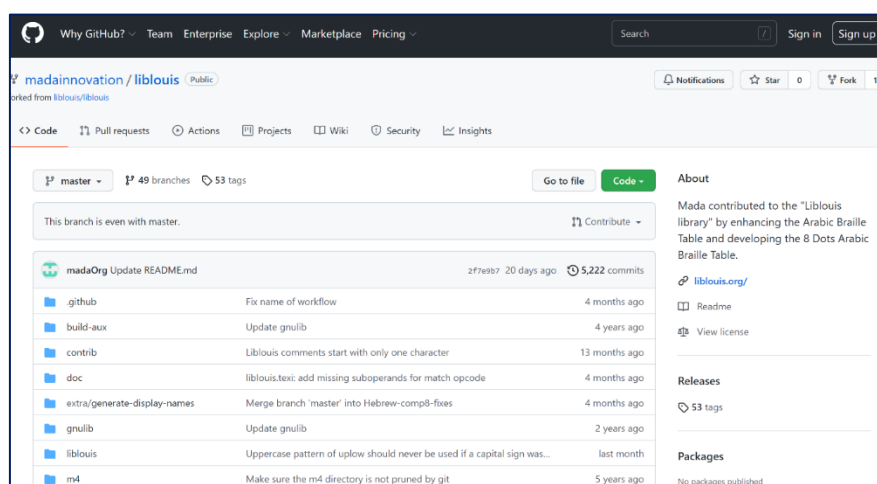


Figure 2. Upgraded Liblouis Library on Mada's Github repository (<https://github.com/madainnovation/liblouis>)

The Unified Arabic Braille Portal ([braille.mada.org.qa](http://braille.mada.org.qa)) (El Ghouli et al., 2020) is supported by the Mada Innovation Program (MIP) (Al Thani et al., 2019). It provides the first Liblouis

software library based on the Arabic Braille table to develop braille writing and reading skills for blind and deaf-blind people [ref] (Figure 2). Furthermore, create the first specialized Unified Arabic Braille website, which will contain detailed references to simple Arabic Braille, abbreviations, mathematics and science, and 8-dot computer braille, in addition to simplified lessons to learn reading and writing in Arabic Braille.

The Unified Arabic Braille was started from the Arabic Braille Reference adopted during the Braille Conference held in Riyadh in 2002. Since 2002, the Arabic Braille was not updated in where Blind persons found difficulties to use the latest innovations and assistive technologies. Nowadays, the upgraded Arabic tables were adopted by screen readers like NVDA and JAWS in addition to accessible books format using DAISY for example (Egli, 2009).

Moreover, the Unified Arabic Braille portal contains a set of resources and lessons about Arabic Braille. The purpose of the portal is to provide digital contents for blind and people who want to learn the Arabic Braille system. The portal also provides a platform to discuss issues and propose new features for the current system. It represents the first specialized Unified Arabic Braille website, which contains detailed references to simple Arabic Braille, abbreviations, mathematics and science, and 8-dot computer braille, in addition to simplified lessons to learn reading and writing in Arabic Braille. Also, Mada Center published the Mada ICT Accessibility and Assistive Technology Glossary (Lahiri et al., 2020) to support and unify the learning activities for Blind students. It is the first dictionary of its kind, which includes terms related to ICT accessibility and assistive technology (AT) in the Arabic language. The Glossary was developed to serve as a vital resource for capacity building within ICT services, accessibility, and assistive technology in Qatar and beyond. Mada's Glossary is essential to educate professionals, researchers, and individuals interested in the basic terms used in these fields. It is considered one of the first initiatives to provide such resources in Arabic.

## Conclusion

Reading and writing in braille have opened the door for the blind towards literacy, intellectual freedom, equal opportunities, and greater privacy and independence. We should not direct children who can read not to learn the alphabet just because they can watch the video instead, as this will undoubtedly be considered a serious deficiency in the educational process. So why do we allow ourselves to use different standards with blind people that prevent them from having the true pleasure and feeling of reading? Braille materials are no longer as big and expensive as they used to be, they have been involved in technology too. A single book, which needed several, large volumes to be printed in Braille, can now be easily carried by the blind person in their electronic diary along with dozens of other books. It is our imperative duty – institutions and individuals – to work hard to spread knowledge among the blind, and to strive in various ways to eradicate the illiteracy of many people who cannot read and write using braille, by facilitating access to it and overcoming all obstacles that may stand in the way of those who wish to learn it.

Mada played a role on supporting the development of the first portal for the Arabic braille to unify all efforts in one place. Persons with visual impairment participated in the feasibility study of the project in addition to the adjustment of the liblouis library. They were contributed in the project directly to ensure that they can benefit of it.

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