



Comparing and contrasting the mathematical education of braille readers in Ireland, Poland and the Netherlands

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Royal Visio, 2020



Co-funded by the
Erasmus+ Programme
of the European Union



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Publication financed by the European Commission under the Erasmus + program.

The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

FREE PUBLICATION

Inclusive education

There is no secondary special school for braille readers in Ireland. They go to a regular school. Primary school children can go to a special school for visually impaired students. In Poland as well as in the Netherlands, braille readers attend special schools (for visually impaired students) or regular schools.

Reading and writing in braille

In Ireland braille readers use a 6-dot braille code. This code is very similar to the UEB - Unified English Braille- code, with some minor changes. The UEB code is also used in other English speaking countries (e.g., USA and England). It is a 6-dot braille code.

In Poland (and some other countries), the Marburg code is used. This is also a 6-dot braille code. Some braille readers use LaTeX.

In the Netherlands, strict rules apply to writing an expression or equation in a linear notation. e.g. x^2 is converted to x^2 . This linear notation is very similar to the notation in Excel. The conversion from the linear notation to the braille notation depends on the braille table that the braille reader uses. In the Netherlands, braille readers can choose between different braille tables. In secondary education, most braille readers use an 8-dot braille table.

Assistive devices for reading and writing

In Ireland, braille readers use braille on paper or a braille display. The braille display consists of <48 braille cells. They write with a braille type writer or with a laptop.

In Poland, braille readers use braille on paper. They also use braille sense.

In the Netherlands, braille readers, in secondary education, read mathematics on a braille display. Many braille readers use braille in combination with speech synthesis. They write on a laptop.

Advantages and disadvantages

An Irish teacher mentioned "The student have instant access to their required equation/problem through Braille. They can read the material themselves and break it down into relevant components to assist their understanding of the concept. They have the ability to revise their work through Braille, rather than the spoken word and can gain a more in-depth understanding of a topic". A disadvantage is: "The braille code for mathematics is very complicated!! There are so many additional symbols to be learned alongside the mathematical concepts."

A Polish teacher mentioned that an advantage of their notation is that it is quite short. A disadvantage is that there is little resemblance to the notation that people who can see use.

A Dutch teacher mentioned that the notation supports communication with people who can see, but doesn't help much to understand mathematics.

Examples

Numbers

In Ireland and Poland braille readers use a number sign. For example the number three is represented #3 | .:| " | { | .:| is the braille character for number sign)

In the Netherlands, the representation of numbers depends on the braille table used.

Plus- and minus-sign

In Ireland the plus-sign is represented as | · | ∙ | and the minus-sign as | · | ∙∞ |

In Poland the plus-sign is represented as | ∙∞ | and the minus-sign as | ∞∞ |.

Hence, Ireland use always two characters for rather simple and very common operators. That makes the expression longer.

Again, in the Netherlands, the representation depends on the braille table used.

Expression

Representation of $\frac{1}{4}$

Ireland: | ∙∞ | ∙ | ∙∞∞ | {#a/d} The notation uses one number sign.

Poland: | ∙∞ | ∙ | ∙∞∞ | {14} The notation uses one number sign, and no fraction line. The denominator is “dropped”. This is a very compact way to write the expression.

The Netherlands: 1/4 The representation in braille depends on the braille table used.

Representation of $\frac{2a+3b}{n}$

Ireland: sf 2a+3b/ ef They use a braille character (braille characters) to announce the beginning and end of the fraction. This helps braille readers to get an overview.

Poland: see Ireland

The Netherlands: (2a + 3b)/n

Representation of y^{x^a+b}

Ireland: y^(x^a+b)

Poland: this notations makes a distinction between the first exponent –an exponent of an exponent- and the second exponent.

The Netherlands: y^(x^a + b)

The notations of Ireland and Po the Netherlands are similar to the notations in Excel and, therefore, support communication with people who can see.