

Access to Mathematics by Student with Visual Impairment through Nemeth Braille Code

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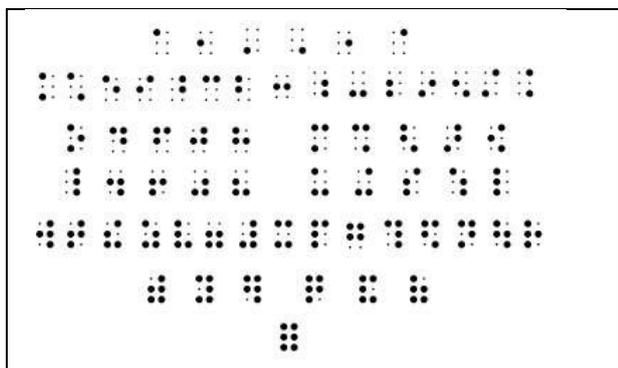
Abstract: *The process of education and attainments thereof has an impact on all aspects of life. It captures capability of acquiring knowledge, communication and participation in community life. It alters an individual's and even community's collective perceptions, aspirations, goals as well as the ability and the means to attain them. A quality basic education better equips girls and boys with the knowledge and skills necessary to adopt healthy lifestyles, protect themselves from maladies, and take an active role in social, economic and political decision-making as they transition to adolescence and adulthood. Eighty percent of information acquired sighted people is through vision. In case of student with visual impairment facing difficulty and acquiring knowledge the area of visual ideas. Teachers should make them to learn converting visual ideas to non visual information through multi sensory approach. Teaching of expanded core curriculum makes the student with Visual Impairment to learn all aspects in life. Mathematics is one of the subjects in class room learning. To make the student with visual impairment to understand the concept Nemeth Code plays major role to access Mathematics. Effective use of Nemeth code makes student with visual impairment to learn all Mathematical concepts. This paper gives an overview of Nemeth Code to learn all the concepts in Mathematics by student with visual impairment.*

Keywords: Nemeth Code, Student with Visual Impairment, Mathematics

1. Introduction

Nemeth Code is a special type of Braille used for math and science notations. The Nemeth Code provides a conceptual framework for the blind to use in transcribing into Braille and solving higher mathematical equations and scientific notations. It uses linear format, spatial arrangements and special symbols to convey the meanings.

Nemeth Braille Code for Mathematics is a Braille code for encoding mathematical and scientific notation linearly using standard six-dot Braille cells for tactile reading by the visually impaired. The code was developed by Abraham Nemeth.



2. Development of Nemeth Code

The Nemeth code, originally developed by Dr. Abraham Nemeth around 1950, is used for transcribing mathematical expressions. Nemeth is used in the United States for elementary math textbooks as well as highly technical material.

Nemeth is essentially a superset of a slightly modified literary Braille. The most notable modification to literary Braille is for numerals, which use the corresponding lower-cell dot patterns rather than the upper-cell ones. Since the lower-cell dot patterns are the same as the punctuation marks, Nemeth requires the use of a Punctuation Indicator for changing back to that symbol set as well as a Numeric Indicator.

Nemeth Braille Code for Student with Visual Impairment to learn Mathematical concepts: Related Reviews:

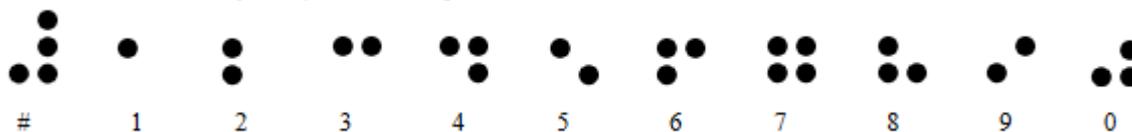
⠠⠨ ⠠⠠ ⠠⠡ ⠠⠢ ⠠⠣ ⠠⠤ ⠠⠥ ⠠⠦ ⠠⠧ ⠠⠨ ⠠⠩ ⠠⠪
1 2 3 4 5 6 7 8 9 0

Kapperman and Jodi (2002) described a software tutorial that can be used by people who are blind to learn the Nemeth Code of Braille mathematics notation. The program was designed for use with the Braille Lite, a note taker that has speech and a refreshable Braille display, manufactured by Freedom Scientific. **Hui-YingHung (2008)** investigated the state of Braille literacy in Taiwan. Research on teachers' attitudes and perspective about Braille instruction in the U.S including reading medium selection, personnel training, Nemeth code, Assistive Technology, and beginning/primary Braille instruction was carried out. DeMario and Lian (2000) reports the results of a survey of teachers of visually impaired students in Illinois and Massachusetts that asked the teachers to rate their perceived competency in transcribing math materials into the Nemeth code and their need to so. Results indicated a significant difference between mean ratings competency and need by respondents for 23 of the 55 math skills on the survey. Penny and Amato

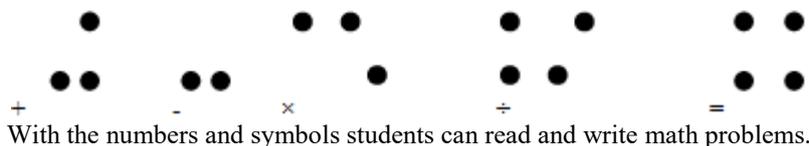
(2004) examined the preparation and use of the Nemeth Braille code by 135 teachers of students with visual impairments. Almost all the teachers had taken at least one course in the Nemeth code as part of their university preparation. In their current jobs, they prepared a variety of materials, primarily basic operations, word problems, tactile graphics and fractions.

3. Access Nemeth code by Student with Visual Impairment

Many years ago there was a blind man named Abraham Nemeth who wanted to go to college and take math classes. He needed a way to write math problems in Braille. The literary Braille code, the one we use for words, let him write numbers, but there weren't Braille characters for writing symbols we use in math like a "+" sign or a "-" sign nor were there characters for writing really hard math problems



Here are some other symbols that are used in Nemeth code.



With the numbers and symbols students can read and write math problems.



4. Learning Nemeth Braille Code

Abraham Nemeth wanted to do more than write simple math problems. He wanted to be able to use Braille to write problems in algebra, geometry, and even calculus! So, he had to take the 6 dots in the Braille cell and find many creative ways to use them so everything mathematical could be put in Braille. This is one reason why he put the numbers in the bottom of the Braille cell. This way a Braille reader would not confuse the letter "a" with the literary Braille number "1". In the Nemeth code "1a" is written and "c3" is written.

There are a lot of rules about how to write Nemeth code. Students not only have to learn how to do the math, but they have to learn the rules for reading and writing it in Braille too.

5. Conclusion

Mastery of Nemeth code will make the students comfortable in mathematics. Doing well in Mathematics will help the learners to score high marks and get top ranks. This will help the visually challenged student to get recognition from peer group. This will also help them to develop self esteem. Therefore it is necessary to access Nemeth code by students

or ones that had both letters and numbers in them like $4x - (7x + 5) =$ or ones with exponents like $10^2 \times 12 =$ so he invented his own Braille code. It was named after him, just like Louis Braille had the literary code named after himself. The Nemeth code is intended to reflect the appearance, presentation or syntax of mathematics more than its semantics. This allows a Braille transcriber to transcribe mathematical texts with little knowledge of the underlying mathematics.

Braille readers use the Nemeth code when they are in math class. In the literary Braille code the numbers are written by putting a number sign in front of the first 10 letters of the alphabet. In Nemeth code we do the same thing, but the numbers are "dropped". They are in the bottom part of the Braille cell.

with visual impairment to do mathematical calculations independently.

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