

# **Nuts & Bolts of Nemeth Code within UEB Contexts: Examining the Impact of Professional Development and the Accuracy of Materials Produced for Middle and High School Braille Readers**

A professional development program developed and taught by  
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## **Project Goal**

To analyze data from the pre-workshop survey, pre-test/post-test, post-workshop survey, and work samples to document changes in participants' understanding and skills related to the Nemeth Code within UEB Contexts.

## **Content of the Three Online Sessions**

### **Session 1: Symbols Used in the Middle Grades**

- Grouping symbols (e.g., brackets, braces)
- Negative numbers
- Absolute value
- Signs of comparison (e.g., less than or equal to, not equal to)
- Exponents (e.g., superscript indicator, baseline indicator)
- Number line symbols (e.g., open circle for point not included, bold shaded line segment)
- Nemeth Code switch indicators

### **Session 2: Symbols Used in Geometry**

- Shapes (e.g., shape indicator, triangle, right arrow)
- Signs of comparison (e.g., not congruent to, perpendicular to)
- Degrees
- Pi (Greek letter indicator)
- Prime and double prime

### **Session 3: Symbols Used in Algebra 1, Algebra 2, and Advanced Math**

- Vertical bar (e.g., magnitude, determinants)
- Infinity
- Superscript with superscript indicator
- Enlarged grouping symbols

- Set theory (e.g., empty set, union)
- Greek letters (e.g., beta, sigma)

### **Study Participants Completed**

1. Pre-survey (Demographic and Nemeth knowledge items)
2. Pre-test (20 item multiple choice test)
3. 6 hours of synchronous online instruction
4. Post-test (20 item multiple choice test)
5. Final assignment (12 math problems to braille)
6. Post-survey (Nemeth knowledge items and rating of sessions)

### **All 17 TSVIs Improved Skills from Pre to Post-Test**

Pre-test:  $M=11.18$  ( $SD=4.33$ )

Post-test:  $M=16.70$  ( $SD=2.49$ )

Difference in scores:  $M=5.53$  ( $SD=3.32$ )

Pre-post test scores statistically significant ( $t=6.87$ ,  $p=0.00$ )

### **High Areas of Need Based on Study Findings**

Use of Nemeth Code symbols in secondary math  
 Use of opening, terminating, and single-word switch indicators  
 When and how to divide math between lines  
 Clarification on the use of punctuation with Nemeth Code Within UEB  
 Contexts  
 Rules for the use of contractions within words

### **Common Errors in the Final Assignment Transcription**

#### **Formatting**

Dividing problems between pages  
 Not centering the title  
 Formatting problems incorrectly

#### **Literary text**

Omitting words  
 Misconfiguring letters and groupsigns  
 Selecting the wrong groupsign

#### **Punctuation**

Misconfiguring the mathematical comma  
 Using the punctuation indicator rather than ending Nemeth Code and transcribing the punctuation mark in UEB

#### **Nemeth Code**

Not using the baseline indicator after exponents

Incorrectly transcribing lines and lines segments  
Misconfiguring numbers, signs of comparison, and/or grouping symbols

### **Switch indicators**

Not closing Nemeth Code properly  
Misconfiguring switch indicators  
Not properly spacing with switch indicators

### **Single-word switch indicators**

Misconfiguring the single-word switch indicator  
Using a single-word switch indicator in front of each word in a group of words between 2 math elements

### **Math placement**

TSVIs made between 1 to 5 errors when given 9 or 10 opportunities

### **Math divided correctly across lines**

14 TSVIs made at least 1 error (number of opportunities varied up to 11)

### **TSVIs' Confidence and Knowledge of Resources Increased**

- 13 out 17 TSVIs increased their confidence in preparing Nemeth Code materials.
- 12 out of 17 TSVIs increased their knowledge of resources to use when preparing materials in Nemeth Code.

See the article by Herzberg, Rosenblum, Osterhaus, Larkin, & McBride entitled Synchronous Professional Development to Support Teachers of Students with Visual Impairments in Learning Nemeth Code Within Unified English Braille Contexts in the *Journal of Visual Impairment & Blindness*.

### **We have other resources.**

Visit us at Project INSPIRE

<https://www.pathstoliteracy.org/resource/project-inspire/>