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Phonological Analysis of JSL in the Academic Context

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ABSTRACT

What do we know about phonological and grammatical features related to teaching an academic discipline from a linguistic perspective? Teaching academic disciplines (e.g., mathematics, science, social studies) includes specialized vocabulary and concepts. This poses a problem for teachers of the deaf who are not fluent in a sign language and not knowledgeable in specialized subject matter. Teachers often opt for fingerspelling or select signs that are semantically and conceptually incorrect. Research has consistently shown that teachers who understand the similarities and differences between the two languages in terms of their linguistics are likely to deliver a more authentic, coherent, and successful literacy instruction through a sign language. For teachers who use a sign language, they need to have knowledge and skills in phonological features of sign words.

In this study, five 2 to 3-minute mathematics instruction videos in Japanese Sign Language (JSL) were analyzed linguistically using JSL phonological and grammatical features through the ELAN program. The videos were made by a Deaf math teacher who is a native JSL signer and has a degree in mathematics. The investigators used the data to answer the following questions:

1. Which JSL phonological parameters variables of handshapes, locations, movements, orientations, and non-manual markers are demonstrated with high frequency during the math instruction?
2. Which patterns and relationships between the specialized words (JSL) and the specialized math concepts are evidenced in the data?
3. What are some examples of JSL grammatical features used to demonstrate the math concepts?

The findings show that there are JSL word families in mathematics which share phonological similarity in terms of handshape, movement, or location. One JSL word family example is the use of the clawed handshape (see Figure 1) in sign words for different types of a mathematical set (i.e., separated sets, intersection set, and union set).

Figure 1: Clawed 4-handshape with extended thumb

A wide range of JSL grammatical features were employed in the delivery and they were conditional on the context of the delivered information. Fluency in JSL with

knowledge of mathematics allows one to incorporate the wide range of grammatical features. Two unexpected findings in the study are the low number of initialized signs and of finger-spelled words. The study findings have implications in deaf education as we are learning how sign language can be used to teach subject matters effectively. Teachers who understand their sign language linguistics will be able to deliver specialized words and concepts in sign language clearly. As a result, deaf students are able to learn a subject matter through academic JSL.