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Symposium: Mathematical Language in Transitions – From Secondary to Tertiary

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Prepositions: The Linguistic Challenge at the End of School and Its Relevance for Higher Education

As students progress through school, the mathematical content and the language used to express it become increasingly dense. By the end of school, relationships are increasingly represented by prepositions. Understanding prepositions that express relationships is one of the greatest linguistic challenges for learners at the end of school. At the same time, it is a prerequisite for long-term educational success.

Halliday's systemic functional grammar describes these linguistic challenges in great detail. Halliday explains how word types change in technical language. For instance, processes are no longer expressed with verbs, but rather with nouns. For instance, "move" becomes "movement." This phenomenon is relatively well known as nominalisation. However, other parts of speech also change; for instance, adverbs or conjunctions can become prepositions.

I have already examined the linguistic challenges of prepositions for logical relationships in proofs. It became clear that, although prepositions are necessary technical learning objectives, they can initially hinder the learning process. Prepositions such as "according to" prevent the explication of premises in proofs, while other parts of speech, such as conjunctions ("because"), are helpful in making relationships visible ("because of the parallel lines").

In my talk, I will present how linguistic condensation goes hand in hand with content condensation, as with other learning contents, and how language variations are described in empirical studies. As with other learning content, such as the part-part-whole relationship, prepositions also initially make it difficult to understand mathematical concepts.