

Preface

In mathematics education, researchers bring in interdisciplinary expertise in language and discourse through the lenses of learning sciences to study the relationship between language, discourse and mathematical thinking, as well as the significance of linguistic or semiotic elements of language and discourse in the development of mathematical thinking. Learning mathematics is a challenge for students because of its abstract nature. Moreover, in mathematics, words such as “function” “parallelogram,” and “fraction” have their own expressions and structures to signify complex mathematical concepts, and this adds more of a challenge not only to the understanding of mathematics but also to the communication about mathematics. This study sets out to explore primary pre-service teachers’ geometric thinking and ways they communicate their thinking through discourse, and to investigate the characteristics of geometric discourse and its development.

Drawing on a sociocultural with participationist view, Sfard’s (2008) *Thinking as Communicating: Human Development, the Growth of Discourses, and Mathematizing*, considers learning as moving towards a more sophisticated mathematical discourse through participation and conceptualizes mathematics as a type of discourse. Sfard also offers an analytical framework that mathematical discourse is distinguishable by its word use, visual mediators, routines, and narratives. In learning and teaching geometry, the van Hiele (1959/1985) view learning as moving towards a higher level of thinking and provide a model that describes five levels of geometric thinking, as visual, descriptive, theoretical, formal logic, and rigor, through Levels 1 to 5, respectively. This study has undertaken a translation of the van Hiele model into discursive terms, called *the Development of Geometric Discourse*. Building on Sfard’s communicational approach and empirical data, the study also attempts to address the weakness of the van Hiele model, by proving subtle differences in geometric discourse within each van Hiele level.

The inspiration for the book is to recognize the need for a greater focus on the relationship between mathematical thinking, discourse, and communication to support student learning in today's classrooms.

Discourse Perspective of Geometric Thoughts

Wang, S.

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