

TEACHERS' RESPONSIVENESS TO STUDENTS' UTTERANCES IN MATHEMATICAL CONTEXT

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Abstract

Research and professional rhetoric suggest that awareness to, and understanding of, students' mathematics learning and thinking are central to good. Consequently, the development of such awareness and understanding has in recent years, become part of the "pre-service and in-service" teacher education curriculum. But, improving teachers' understanding of what their students say, write and do still leaves the problem of how teachers may use this understanding to make better instructional decisions. This is not an easy task, as research suggests.

A review of the literature provides only limited information on the ways teachers in general, and expert teachers in particular, attend to students' utterances during mathematics lessons. Most studies have been conducted as part of an intervention program, involving a small number of lessons. Moreover, information on the ways mathematics teachers respond to students' utterances during mathematics lessons is often derived from studies that do not specifically focus on that. This study focuses specifically on the nature of a teacher's ways of responding to students' talk and action during a relatively long period of regular mathematics lessons. Additionally, this study investigates the possible influence of the teacher responsiveness on the central mathematical teaching move.

This research is based on a case study of an expert high-school mathematics teacher. The research was qualitative and quantitative. The quantitative analysis was used to support the qualitative results. The teacher's responsiveness was analyzed according to the whole-class work and according to four different teaching settings: (1) teaching different mathematical subjects; (2) teaching different kinds of students; (3) teaching for different purposes – Introducing new content, Working on the main topic, Reviewing content introduced in previous years, Reviewing content introduced in the year of the research and Extending beyond the main topic; (4) teaching parts of lesson that were triggered by, built or followed on, students' talk.

From the data analysis, the teacher taught the central mathematical teaching move almost in two stages: individual work and whole-class work. During the individual work, the teacher helped students and learned about their ways of doing mathematics. During class work which follow the individual work, the teacher invited students to share their mathematical ideas with their peers.

This strategy provided the students with opportunities to present their ideas and examine them. From the analysis we see that the teacher focused class discourses on students' utterances.

In this research we found that the teacher's responsiveness had well defined characteristics. Indeed, the teacher responded to students' utterances using five different responses: elaborating talk, accompanying talk, accompanying talk with elaborating, expressing puzzlement or confusion and opposition. The most common teacher's response was elaborating and accompanying talk with elaborating. Accompanying talk occurred considerably less, and the teacher rarely expressed puzzlement, confusion or opposition when responding to students' talk.

The analysis of the teacher's responsiveness in different teaching settings shows that a similar character of responsiveness (only in Reviewing content introduced in the year of the research components, the most common teacher responses were accompanying talk).

From the research findings it can be stated that the teacher was highly attentive to students' utterances and that all the whole-class work comprised of mathematical activity which was triggered by, built or followed on students' talk, was mainly due to the teacher's responsiveness to students. The lesson parts that were triggered by, built or followed on students' talk amount to 25% of the mathematical activity during the classes. In addition we found that all the Reviewing content introduced in previous years, 60% of Reviewing content introduced in the year of the research and of Extending beyond the main topic and 20% of Working on the main topic were initiated by students' utterances. In Introducing new content there were no parts initiated by students' utterances. On the contrary, in Introducing new content the teacher used opposition to save the framework of the new content. This means that the contribution of students' utterances was very small in components of essential mathematical subjects (Introducing new content and Working on the main topic).

This research supplies information about the way an expert teacher responds to students' utterances and about the way it contributes to the central mathematical teaching move during regular mathematics lessons. This information is important to researchers, to those involved with the pre-service training of mathematics teachers and to those involved with the professional development of mathematics teachers.