

K-3 TEACHERS' LEARNING OF QUESTIONING

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Questioning – knowing the characteristics of good questions and asking such questions to facilitate students' thinking – is an important aspect of knowing how to teach mathematics because appropriate questioning is needed in many pedagogical situations. For example, posing a question and listening to students help understand and respond to students' ideas and support their thinking.

In this presentation, we provide a report of fourteen beginning K-3 teachers' learning of how to ask questions as part of the results from a teacher professional development project that was conducted during the 2000-2001 academic year. The presentation includes the teachers' discussions on questioning throughout the project and some evidence that suggests the improvement of their questioning techniques. In addition, we discuss factors that helped the teachers know what to ask.

Throughout the project, the teachers discussed how to ask questions as a way of communicating with students to help them better understand mathematical meaning. They talked about different types of questions (e.g., conceptual and procedural) and corresponding students' responses. They also looked at specific examples from readings and shared experiences from their classrooms. While sharing their ideas, the teachers had opportunities to develop similar ideas about what constituted a good question as well as their understandings of what to ask and why. As their discussion proceeded, they wanted to ask specific and focused questions, such as "How do you explain to a kindergartner or someone else? Tell me more about what you did and how you came up with that answer." They also wanted to pose questions that could allow every student to get involved in discussions and to think about what others did and what they did as well.

The teachers' responses to pre- and post-Pedagogical Content Knowledge Tests (PCT, see Kim, 2002) presented the improvement of the teachers' ways of asking questions. The teachers provided concept-oriented questions to understand students' thinking, to further investigate and clarify their solution methods, and to help them understand and solve problems. They also provided diverse and focused questions to encourage children to participate in class discussions and comprehension questions to open up the discussions. On the other hand, the teachers' responses to the PCT indicated that the teachers' questioning techniques were closely related to their understanding of the mathematics they taught and the purposes of the materials and tasks they used. This suggests that the teachers' learning of the content they taught help them better know what to ask.

References

Kim, O. K. (2002). *K-3 mathematics teacher professional development from individual and collective perspectives*. Unpublished doctoral dissertation, University of Missouri, Columbia.