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Questioning as formative assessment and its quality measurement

Veronika Hubeňáková and Dušan Šveda

Pavol Jozef Šafárik University in Košice, Faculty of Science, Košice, Slovakia, veronika.hubenakova@student.upjs.sk,
dusan.sveda@upjs.sk

This paper presents the tool for measuring the quality of questioning in mathematics classes. Its construction is based on video analysis and interviews with teachers. Actually, we identified five different categories within the constructs of questioning. These rubrics have potential to be used in research and in teacher education

Keywords: Questioning, formative assessment, quality measurement tool.

BACKGROUND

Education in Slovakia has recently overcome a lot of changes. They were forced by poor results of Slovak students in PISA measurement. Unfortunately, this reform movement seems to miss its goal. The last mathematics PISA measurement revealed significantly worse Slovak students' results in mathematics when compared to previous measurements (NÚCEM, 2012). Influential reasons of this failure are unchanged teachers' practice and beliefs while the content and the aims of mathematics education were modified.

THEORETICAL FRAMEWORK

We consider questioning to be the one of the most important teachers' skills. As pinpointed by Aizikovitsh-Udi, Clarke and Star (2013), the questioning is not only an issue of good questions, further, there is a strong importance of the way the questions are asked, timing and number of times each question is asked. Webb (2004) claims that classroom discussions present an ideal opportunity to explore students' understandings and to inform instructional decisions. In good questioning, a teacher asks questions – to gain information about students' knowledge, misconceptions, etc. – provides feedback and/or asks the next question

based on elicited evidence. Therefore, the questioning fulfils the definition of the formative assessment introduced by Black and Wiliam (1998).

METHOD

At the beginning, we have reviewed scientific literature on the topic of formative assessment and prepared theoretical rubrics to describe different quality levels of the questioning (and three other constructs, connected to formative assessment).

The next step was to videotape four high school teachers with positive beliefs about inquiry based teaching. We found out the importance of this in our previous research (Hubeňáková & Šveda, 2013). Each teacher could say which topics are good for her to be videotaped, thus there are four different topics recorded, one for each teacher. Now, we are at the beginning of their qualitative analyses. The teaching passages of each class are fully transcribed. We use the software NVivo10 for their precise analyses. The next step will be the discussion with the teachers to choose the rubrics that are useful for them.

RESULTS AND IMPLICATIONS

We have found five different categories within the construct of questioning up to now: if and when are procedural versus conceptual questions asked; who is asked procedural versus conceptual questions; who is questioned; who answers questions asked to whole classroom; teachers reply on wrong answer. Elaborated rubrics are available upon request via email.

The implications of this work are in the research and in the teacher professional development, as well. We will be able to quantify the differences in teachers'

questioning practice and this enable us to observe its influence on students' results and beliefs about mathematics. Hopefully, such information provides us with a good way how to enhance teachers' questioning.

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