

TEACHER NOTICING FOR PRODUCTIVE GEOMETRICAL REASONING

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It was Fischbein (1993, p. 144) who coined the term “productive reasoning process” whereby, in geometry education “images and concepts interact intimately”. In our ICME-10 paper (Jones, Fujita, & Kunimune, 2012) we showed how teachers use various instructional techniques and strategies to promote productive geometrical reasoning. Within a theory of teacher expertise, what a teacher ‘notices’ during classroom teaching is emerging as an important component (e.g. Sherin et al., 2011). Yet, in terms of how context-specific is noticing expertise, as Schoenfeld (2011, p. 237) queried, there are questions about whether the specificity is “the mathematics being studied”, the students’ perceived capability, the school and its “socioeconomic characteristics”, or “some combination of these, and perhaps other things”.

In our study we focused on what aspects of ‘noticing expertise’ can be identified in geometry lessons taught by an expert teacher of school mathematics at grades 7 and 8. In order to address this research question, we analysed transcribed lesson records from a sample of ten successful lessons taught by Mrs M (a teacher of 20 years’ experience). We particularly examined how she: a) attended to students’ strategies; b) interpreted students’ understanding; and c) responded on the basis of students’ understanding.

We found the following components of ‘noticing expertise’ relating to productive geometrical reasoning: a) selecting different types of solutions, including incorrect constructions; b) interacting with students who were reasoning using visual images or measurements rather than deduction; and c) and interacting with students to encourage what properties can be used to deduce a solution. Such noticing was identified in the all ten lessons. These findings illustrate the form of ‘noticing expertise’ in the context-specificity of the mathematics teacher promoting productive geometrical reasoning.

References

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