Student Problem-Posing During Open Mathematical Inquiry

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Problems presented in mathematics classrooms often focus on routine tasks with students practicing mathematical techniques demonstrated by the teacher. However, this does not reflect the problem-solving process in the real world, and students often find it difficult to connect school mathematics with authentic contexts. The need to provide students with opportunities to transfer their mathematics learning to authentic situations is imperative and has been noted in the Australian Curriculum Mathematics. One way to achieve this is through open mathematical inquiry. During open inquiry, students must devise questions based on a stimulus, locate additional information to answer their questions, and make decisions regarding the methods or materials they want to use.

This paper discusses findings from a study of Year 5 students' perceptions of problem-posing during a two-week open mathematical inquiry. This single instrumental case-study was conducted with one class (n=17) and findings were developed based on the student perspectives from that one 'bounded' case. The first author led an investigation that required students to develop their own questions based on a video stimulus centred on a tennis theme. Students worked in pairs or groups of three to investigate their own questions and present their findings. The triangulation of semi-structured interviews, video observations, and student work samples demonstrated that while students perceived themselves to be skilled at problem-posing, the video observations and work samples told a different story.

Initially, during the 'wonder phase', the students were encouraged to pose mathematical questions; however, of the recorded 54 questions, only four were linked to mathematical concepts (e.g., area, perimeter, and money) for investigation in the classroom. The students were provided with support and scaffolding throughout the two weeks but seemingly did not recognise this support when reflecting on their experience. It was beyond the scope of this project to fully understand why some students felt confident to problem-pose even though the evidence indicated they needed scaffolding and support. However, it was noted that during the study the students reported experiencing high levels of autonomy and competence need satisfaction (Zorn et al., 2022) and this may have contributed to high levels of self-reported efficacy, confidence, and ability to problem-pose.

References

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