

Speaker:

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Position: PhD student

Title: Problem Posing in Consumer Mathematics Classes: Not Just for Future Mathematicians

Intended Audience: High School

Type of Presentation

Preferred: Short Presentation (less than 20 minutes)

Description:

The case study in this vignette examines a program based on problem posing, in six grade 11 consumer mathematics classes, over a 3-year period. Problem posing is recognized as a key component of mathematics (Ellerton, 2013), and is sometimes associated with creativity and giftedness (Bonotto, 2013; Pelczer & Rodriguez, 2011 Voica & Singer, 2013). However, in many curricula, problem solving often dominates over problem posing (Stoyanova, 2003). This focus on problem solving exists, despite research that shows that problem posing improves students' problem-solving skills, attitudes, and confidence, understanding of concepts, and mathematical thinking (Singer, Ellerton, & Cai, 2013); reinforces basic mathematical skills, increases motivation, responsibility, and thinking flexibility (Ponte & Henriques, 2013); and is useful for teachers to assess students' cognitive processes, identify misconceptions, and modify instruction (Ponte & Henriques, 2013). Further, problem posing can play a large part in student motivation (McLeod, 1992). The potential for problem posing as a motivational tool in nonuniversity track mathematics classes has not received much attention.

The case study focuses on students who tend to be unmotivated in mathematics, and, more generally, in school. They often are disengaged in class, have poor work habits, do little or no homework, and see no connection between the mathematics they study in school and their lives outside the classroom.

These negative attitudes towards mathematics often carry over to their attitudes towards mathematics textbooks and other typical resources. The case study describes an innovative program designed specifically to address the concerns noted above. The primary textbook for this course was the local daily newspaper. The students engaged in real world problem solving and problem posing, using the newspaper, on a daily basis.

The research questions were:

How can a program of problem posing, using real-world resources, be enacted in nonuniversity track classes of secondary school mathematics?

What is the effect on student motivation, achievement, and self efficacy, of such a program?

Aspects of the program are outlined through a series of vignettes that illustrate dimensions of the program. Positive outcomes for students indicate the success of the program. An anecdote concerning student engagement typifies the program's impact. The librarian complained that frequently articles had been cut out of the library copy of the newspaper. The students were posing problems based on these articles before they came to class, engaging in mathematical problem posing on their own time. I made an arrangement with the library, that every day, we would take one of the class copies of the newspaper to the library to replace the copy that my students had defaced. I was excited that these students, many of whom had never voluntarily entered the library during their high school years, were actively engaged in problem posing and problem solving. This was an indicator of the program's impact on student motivation and engagement.

Motivating the disengaged student is critical for us, as mathematics educators. This problem posing program was one way to address this problem.