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Incorporating Polya's Problem Solving Process: A Polytechnic Mathematics Module Case Study

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Abstract : School of Mathematics and Science of Singapore Polytechnic offers a Basic Mathematics module to students who did not pass GCE O-Level Additional Mathematics. These students are weaker in Mathematics. In particular, they struggle with word problems and tend to leave them blank in tests and examinations. In order to improve students' problem-solving skills, the school redesigned the Basic Mathematics module to incorporate Polya's problem-solving methodology. During tutorial lessons, students have to work through learning activities designed to raise their metacognitive awareness by following Polya's problem-solving process. To assess the effectiveness of the redesign, students' working for a challenging word problem in the mid-semester test were analyzed. Sixty-five percent of students attempted to understand the problem by making sketches. Twenty-eight percent of students went on to devise a plan and implement it. Only five percent of the students still left the question blank. These preliminary results suggest that with regular exposure to an explicit and systematic problem-solving approach, weak students' problem-solving skills can potentially be improved.

Keywords : mathematics education, metacognition, problem solving, weak students
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