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Improving the Problem with Problem Solving

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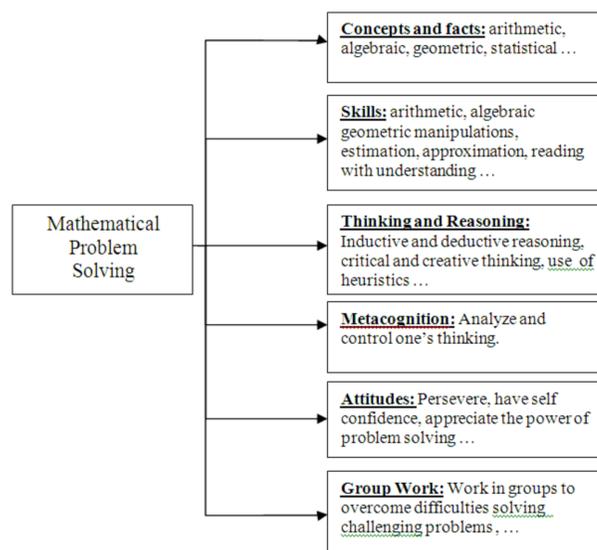
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Introduction

As a prospective math educator who will be teaching in the upcoming spring semester, I was concerned with the idea of preparing my future students for college math courses. I decided to research the effects of teaching students how to appropriately use problem solving strategies in math. My research led me towards looking at the benefits of students becoming better problem solvers and how teachers can accommodate students towards developing the necessary skills.

Methods

The first part of my research was done by finding articles pertaining to the readiness of high school students entering college who plan on taking collegiate level math courses. For the second part of my project, I researched the benefits of students who learn about problem solving strategies and ways for teachers to incorporate these strategies into their daily lessons.



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Findings Part 1

- “50 percent of students don’t pass college algebra with a grade of C or above, according to a recent report from the Mathematical Association of America.” (Shakerdge, 2016)
- The National Council of Teachers of Mathematics conducted a survey from 2011 to 2015 in order to research the teaching of Calculus 1 at the postsecondary level. Their researched showed that around 80% of students who believed their previous math courses had prepared them for Calculus 1. This percentage dropped to an average of 50% by the end of their course term.
- NCTM’s top ten student-reported instructor practice had, “My calculus instructor helped me to become a better problem solver” as number 3 on their list.

Findings Part 2

- Problem solving does not work as a separate course. It needs to be integrated into a math class in order to have the most effect.
- Problem solving helps students become “independent learners.”
- It is important that teachers develop a problem solving culture in their classroom, because it is not taught in just a few lessons.
- Learning to become an effective problem solver requires long term effort and practice.
- By providing open ended questions and facilitating meaningful discourse, teachers can create a problem solving environment conducive to the students’ learning.

Problem Solving Example

Modular Arithmetic: Jerry has 44 boxes of soda in his truck. The cans of soda in each box are packed oddly so that there are 113 cans of soda in each box. Jerry plans to pack the sodas into cases of 12 cans to sell. After making as many complete cases as possible, how many sodas will Jerry have leftover? Complete the problem two different ways.

Conclusions

- Students have a higher chance for success in collegiate level math courses when they have developed a strong background implementing problem solving strategies.
- Problem solving strategies are beneficial in areas of life beyond mathematics.
- Educators have the biggest impact towards students becoming effective problem solvers.
- Working with peers is commonly the most effective form of developing problem solving because it leads to meaningful discourse, which in turn, leads to the development of multiple understandings.

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