Mindset and Its Impact on Success in Mathematics

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Abstract

Developmental Education has been a topic for conversation in the UW-System. With a high percentage of students being placed in developmental courses, completion of these courses not only is an indicator of retention at the university but also plays a factor in a timely degree completion. Universities across the system have been working on ways to streamline developmental math so that students can complete their math requirement quicker. In the past four years, Fundamentals of Mathematics (MATH 090) at the University of Wisconsin-Superior has averaged a fall enrollment of 98 students and a spring enrollment of 50 students. With the DFW rate averaging in the 20's for the course, the students tend to lack the mindset that will optimize their ability to grow and learn. This project explores the role of mindsets in the context of developmental math learning. Students assessed their mindsets at the start of the semester and interventions on how to change mindsets occurred with the hopes of improve the completion of MATH 090.

Introduction

This project was a study of the work done by Carol Dweck, among others, and learning how to develop a Mindset in students, who start in developmental mathematics, that will help them find success in college level mathematics. Dweck's book, Mindset: The New Psychology of Success explains two different Mindsets: Fixed and Growth. In the Fixed Mindset, people believe that they are born with a certain level of intelligence and talent. The level of intelligence and talent we have cannot grow; it is fixed. In the Growth Mindset, people believe that they can grow and improve their intelligence and skills. With hard work and good strategies, people are able to become talented at everything they undertake.

Student's Comments on Math Placement

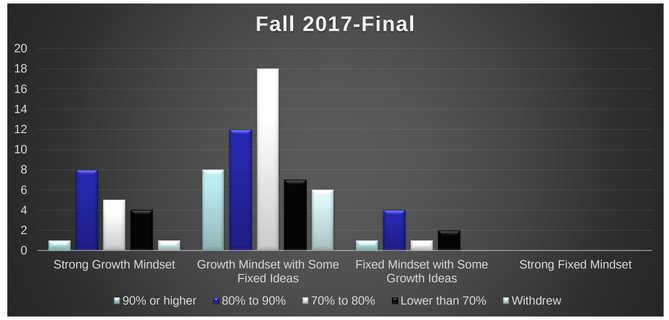
- I struggle very much with mathematics of all kinds and so I think by basic struggle and lack of confidence in my ability to do mathematics affects how well I succeed in it.
- Math is very hard for me. I tend to give up and shut down.
- I have struggled with math my entire high school career. It is something that I do not excel in no matter what I do. That is why I have been placed in this class.
- I become very nervous about learning math and I truly struggle with sticking to it because I always have expected to do badly.
- Math has always been a challenge for me. It's not that I don't pay attention or do my work, it just doesn't click in my head as easily as it can for other individuals. It takes me a little bit longer to truly understand how a problem gets solved in math and the steps to take to get the right answer.
- Math has always been a struggle and I have always avoided it at all costs. Throughout school, I was able to somehow take very little math and be provided with alternative classes to substitute math. As an adult, I feel my intimidation of math in general is not so much cased by failing at it but, it is caused by the fact that I have never truly learned the fundamentals of math.

Results So Far:

In the Fall of 2016, students at the start of the semester were asked to take a Mindset Quiz, which placed them in one of four categories: Strong Growth Mindset, Growth Mindset with some Fixed Ideas, Fixed Mindset with some Growth Ideas, and Strong Fixed Mindset.

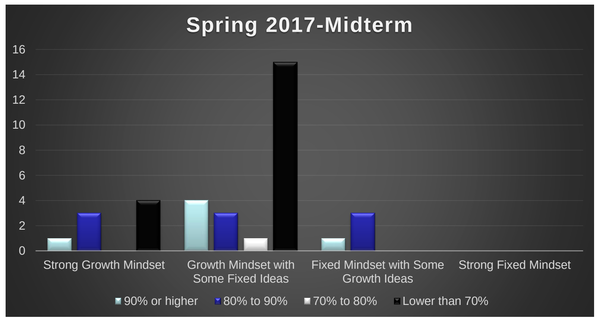
- 73 students took the Mindset Quiz.
- 14 (19%) had a Strong Growth Mindset, 51 (70%) had a Growth Mindset with some Fixed Ideas, 8 (11%) had a Fixed Mindset with some Growth Ideas, and 0 had a Strong Fixed Mindset.

The table below shows the final grade distribution in relation to the student's Mindset.



In the Spring of 2017, students at the start of the semester were asked to take the same Mindset Quiz, but in addition they were asked to do the following question, "Describe in detail your prior experience with mathematics which you believe lead to your placement in this developmental math course." Also through out the semester, students completed lessons about the Fixed and Growth Mindsets. (Final data collection is taking place at the end of the Spring 2017 semester.)

- 35 students took the Mindset Quiz.
- 8 (23%) had a Strong Growth Mindset, 23 (66%) had a Growth Mindset with some Fixed Ideas, 4 (11%) had a Fixed Mindset with some Growth Ideas, and 0 had a Strong Fixed Mindset.



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