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Refocusing Students on Study Habits: Seeking Achievement beyond Mathematics Exams

A Curriculum Design Project by: Esther Shephard | Western Oregon University

Introduction

As many educators now utilize proficiency-based grading, student achievement is heavily measured according to assessment results. However, achievement in high school mathematics classrooms is seen through other lenses as well. This curriculum project explores multiple factors influencing overall student achievement through study habits. Actions to meet this purpose include the use of metacognitive strategies, motivation, and collaboration.

The proposed unit covers Common Core State Standards for trigonometry, and it incorporates planning for teaching students about growth mind-set, neuroplasticity, collaboration, reflection, goal setting, learner-centered tasks, using Interactive Notebooks, and boosting study habits and achievement therein.

Guiding Research Questions

- What are noted results (positive and negative) from shifts to standards-based grading?
- Are student efforts decreased when grading is more heavily weighted on test scores?
- Which research-based instructional strategies support improved study habits?
- Does studying effectively impact mastery of mathematics standards?
- Can educators increase student achievement, beyond assessments, through refocusing on study habits?

Discussion

- Students need educators to continue to support them in recognizing and utilizing effective study habits. Providing a lesson, homework, and tests is not enough to lead students towards high levels of achievement.
- This curriculum was constructed to offer multiple avenues from which students can build up their self-efficacy and motivation, grow together as problem-solvers, and acquire metacognitive strategies that will not only assist them in mathematics, but throughout life.
- Students are encouraged to discover a broader definition of achievement as individuals studying mathematics.

Literature Review & Connections

- Standards-based grading - grading may only reflect test results, without influence of work habits, conduct, and effort in practicing concepts (Scriffiny, 2008)
- Persistent problem - students, of various backgrounds and abilities, often lack the understanding and practice of beneficial, effective study habits (Burney & Cross, 2006; Dueck, 2011; Hong, Wan, & Peng, 2011; Hwang, Chen, Shadiev, & Li, 2011; Rothery, 2007; Watkins & Stevens, 2013)
- Metacognitive strategies (long-range planning, persevering, self-assessing, and making sense of mistakes) and differentiation supports stronger study habits (Manninen, 2014)
- Collaboration and improved self-efficacy utilized for student growth (Dueck, 2011; Wood & Bandura, 1989)
- Finding value, competency, and autonomy – psychological needs (Ryan & Deci, 2000)

Special Right Triangles
EQ: What are the side length relationships in special right triangles?

Questions

45°-45°-90° Triangle

30°-60°-90° Triangle

tan 60° = 1.732 = √3
What does tan 60° always equal?
Trig to find long side.
x = 10 tan 60° = 10√3 = 8 * tan 60

What does sin 30° always equal?
sin 30° = 1/2

Summary

Reflection – Big Ideas

- No matter which high school a student attends, there will be standards-based grading, traditional-based grading, or some combined model in their mathematics classroom. This is a given parameter in which teaching, learning, and assessment must take place, but there remains flexibility in how instruction is delivered.
- This curriculum offers a flexible approach in providing instruction that aims to empower students and assist them in experiencing achievement beyond any assessment results.
- When educators are teaching students the details of concepts such as trigonometry, they can also provide guidance in how to obtain the successful study habits needed to become life-long learners.

Methods

Utilize curriculum designed for improved study habits through motivation, collaboration, and metacognitive strategies.

- Team building activities to create and nurture a safe learning environment
- Explicit instruction in growth mind-set and neuroplasticity to broaden students' awareness and increase their self-efficacy
- Interactive Notebooks to creativity collect notes
- Vodcasts for accessing content multiple ways and multiple times
- Plicker cards for immediate feedback
- Inquiry method in lessons to turn students' focus away from a final outcome and towards valuing process
- Use of homework is purposeful practice – look for engagement

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