Nature of Students' Meanings of Angle Measure and Trigonometric functions in an online interactive forum

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In an online environment that promotes self-learning and online interaction between teacher and students, this poster proposal presents the nature of students' meanings of introductory trigonometry while they interact with each other. Students' communication in the online interactive forum is crucial as their reasoning influence others to make their own meaning of the problem. The poster proposal also presents the difficulties students encounter in developing trigonometric understandings when they work online independently.

Keywords: Online Forum, Interaction, Angle Measure, Trigonometric Functions, Proportional Reasoning

Introduction and Research Questions

Trigonometry has been a difficult mathematical idea for students and using geometric objects only to make sense of angle measure is not helpful to make proper connections between angle measure and trigonometric functions. Moore (2013) discussed the issue of how without having a robust understanding of the process of measuring an angle and how the structure of the unit relates to this process make little sense to students. For this study, I observed students' interactions in an online undergraduate precalculus course that is focused on quantitative, covariational and proportional reasoning. Mathematical ideas here are supported by animations and videos leveraging students' conceptual images. Wallace (2003) addressed the importance of online community as without it an online course is a mere source of information. In the online precalculus course, students were encouraged to use the online forum to discuss their understanding of trigonometric ideas introduced in their online lessons and homework. This proposal investigates the nature of students' meaning making of trigonometry and difficulties they encounter based on their online forum discussion threads. The primary research question driving this study is-

• How do students explain their understanding of angle measure and trigonometric functions to help others who post specific lesson/homework problems addressing that they are having trouble getting it?

Methods and Results

I observed interactions among teacher and 14 students and 4 of them only provided explanations to others but never asked for help. I used grounded theory (axial coding) (Strauss and Corbin, 1990, 1998; Strauss 1987) to categorize and subcategorize students' nature of explanations and difficulties for introductory trigonometry ideas. As findings from this study, a limited number of students were having difficulties to reason quantitatively because of their habit of using Google for help and using SOH CAH TOA for trigonometry was not applicable directly for the problems in this curriculum. A larger number of students who worked through their lessons and watched videos attached in the lessons were successful to provide meaningful explanations that connects angle measure and trigonometric functions and reflect their quantitative and proportional reasoning. Some students struggled to reason proportional relationship among quantities like angle measure and subtended arc.

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