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Kevin C. Moore* (kmzipsgolf@gmail.com), 1522 S River Dr, Tempe, AZ 85281. *The Role of Angle Measure and the Radius as a Unit of Measurement in Developing Coherent Understandings of Trigonometric Functions.*

This study investigated precalculus students' conceptions of angle measure, radian as a unit of measurement, and trigonometric functions, as the students engaged with research-based precalculus materials. The precalculus curriculum focused on developing quantitative and covariational reasoning abilities, as well as other understandings deemed foundational to trigonometry. This included engaging students in making meaning of applied problems, identifying varying and fixed quantities in an applied context, and formalizing the quantitative relationships conceived from the problems' context. Results from this investigation revealed that ideas of angle measure and the radian are foundational for developing coherent understandings of trigonometric functions across the various contexts of trigonometry. Specifically, these ideas were necessary for reasoning about the geometric objects of trigonometry (e.g., right triangles and the unit circle). Many student difficulties resulted from the mental images they developed of the quantities and their units of measurements. It was revealed to be important that the students conceived of the quantities and the meaning of the units used to measure these quantities (e.g., radians) before reasoning about relationships between the quantities. (Received September 15, 2009)