

## Connecting Writing and Contextual Development with Mathematics in Introductory College Math Courses

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Students in elementary mathematics courses such as Math for Future Teachers, Precalculus, and Calculus predominantly view mathematics as procedural. Topics are traditionally taught emphasizing skills with little or no context. Applications are often relegated to a few problems within homework assignments, and intuitive developments of mathematical concepts are usually not provided. Some, if not a large proportion, of students memorize processes rather than understand concepts and ideas. Further, students often view Mathematics as irrelevant and overly abstract and esoteric. Adding to this, elementary math courses are often taught by motivating students that they will need the Mathematics later in a subsequent science or engineering course. Students will eventually learn why the material they are learning is important. But many times that future capstone event does not occur.

Addressing these issues is of vital importance. For example many urban universities train future teachers with courses taught in a manner that offers little relevance to their future profession. Teachers predominantly view Mathematics as procedural, largely because that is how their mathematics courses are presented. This in part explains why K-12 mathematics is also taught in the same algorithmic, process-based way.

Incorporating writing and contextual development of concepts, such as the connection between Math and Music, can improve the learning experience for students. In this talk I will present some examples of how to use these ideas in elementary mathematics courses.

Writing can be used to enhance problem solving and the ability of students to articulate precisely and concisely. Including writing assignments, writing prompts, and math problem poems can benefit student learning. Writing assignments are not always appropriate in all math courses, but they are quite useful in courses such as a problem solving methods course for prospective teachers.

Writing prompts are questions that typically ask students to interpret and explain ideas pertaining to specific math problems. Writing prompts can be implemented throughout any mathematics course.

Math problem poems are problems posed in a poem format, and are often comical or silly to provoke student interest. Examples of math problem poems and a student writing contest for the best math problem poem will be presented.

An example of a contextual development of a mathematical topic is to guide students to discover properties of trigonometric functions by studying vibrating strings and signals. The topics of amplitude and frequency can be addressed within a Music and Science context, which provides students with a reason to learn the material now and not just for some course that students will take in the future.

The connections between Math, Writing and Music are wonderful ways to explore topics in elementary mathematics courses. Students are actively engaged, learn material more deeply, and are motivated to discover new ideas.