Lance Kruse

Curriculum Design Project

September 24, 2015

<<kruse.statementofpurpose.doc>>

Statement of Purpose

**The Problem**

With the prevalence of high-stakes standardized tests permeating schools across the United States, teaching mathematics has focused solely on the presentation of content and has been lacking enough connections to the real world. Teachers claim to have to “teach to the test” in order for students to receive the test scores deemed “passing” for their standardized tests. However, research shows that high quality mathematics instruction is rooted in problem solving skills contextualized to the real world (NCTM, 2000). If teachers want students to excel not only on standardized tests, but also in society, then mathematics should be taught through contextualized real world problems.

**Needs of the Learner**

In order for mathematics to make sense to students it must be grounded in real world connections, allowing the students to begin to understand the complex mathematical concepts that allows students to make sense of the world surrounding them. According to *Principles and Standards for School Mathematics* (NCTM, 2000), through problems that allow applications of mathematics to novel situations “students can learn about, and deepen their understanding of, mathematical concepts” (p. 256). Therefore, students might actually learn more by exploring mathematics in contexts that are intriguing and exciting to them as young persons. Some relatable contexts might include “reading literature or using cellular telephones, in-line skates, kites, and paper airplanes” (NCTM, 2000, p. 256). Additionally, according to Piaget, students in eighth grade are exiting the concrete operational stage and entering the formal operational stage (Kelly, 1999). Students in the formal operational stage are able to think abstractly about concepts, but this is not typically fully functioning until around 15 to 16 years of age (Kelly, 2000). As a result, students in eighth grade are beginning to grapple with abstract thinking but still need rooting in concrete concepts. Therefore, the curriculum, while focusing on abstract concepts, will be rooted in concrete real-world scenarios to provide developmentally appropriate opportunities for better understanding.

**Needs of Society**

 Disliking mathematics is an expected and often-times celebrated concept amongst the general population, which points to a larger issue within our educational system (Persky & Golubchic, 1991, p. 375). Through the emphasis on high-stakes tests, students have previously been taught procedural ideas that lead to a shallow understanding of mathematics instead of conceptual ideas that lead to a true understanding of mathematics (NCTM, 2000). Through the real-world grounded and relevant learning of mathematics outlined in this curriculum design, the general understanding of mathematics should be better grasped and thus create a more educated society.

**Value of the Subject Matter**

 Mathematics, particularly the study of linear functions, can make sense of many real-life situations that are intriguing to students. When studying functions in real-world contexts, students may better “make sense of the underlying mathematical concepts and foster an appreciation of these concepts” (NCTM, 2000, p. 297). However, when functions are taught without any relevance to meaningful contexts, the subject matter attracts an abstract and seemingly useless ambiance. Through problem solving in the mathematics classroom, “students can experience the power and utility of mathematics” (NCTM, 2000, p. 256). The true power of mathematics is not understood until it is used to begin to organize and explain our incredibly complex and profound world. Through understanding functions, students can understand their world and thus appreciate the value of mathematics.

**The Educational Goal**

 This course is designed to allow students to begin to understand the basic foundation of linear functions using real-world examples. Studying functions involves identifying linear equations and graphing them (e.g. *y=3x+*6) to model real-world situations. Students then uncover more characteristics of functions as they encounter more mathematically rich tasks and scenarios. For example, students might be analyzing the graph of a function that represents a loan payment plan and through observing the point in which the line reaches the *x-*axis, a new discussion about “roots” or “zeroes” of an equation might begin and thus launch into a whole neq section of functions. Through grounding all of the learning within real-world contexts, the students are engaged in learning mathematics in a way that is relevant to them, resulting in a deeper appreciate of mathematics and a more mathematical competent society.

References

Chiarelott, L. (2006). Curriculum in Context: Designing Curriculum for Teaching and Learning in Context. Wadsworth: Belmont, CA

Kelley, G. M. (1999). The psychological coding of children's and adolescent's language in relation to Piaget's cognitive stage theory of development. Retrieved from http://search.proquest.com/docview/304547434?accountid=26417

NCTM (2000). *Principles and Standards for School Mathematics.* Reston, VA: NCTM.

Persky, B. & Golubchic, L. (1991). *Early childhood education.* Lanham, MA: University Press of America, Inc.