Name(s)	Project Number
Sonia Sachar	**S1421**

Project Title

Adaptive Visual Spatial Representation Based Trigonometric Learning System

Abstract

Objectives/Goals

This project addresses the need to enhance math learning to prepare students in secondary education in STEM. The project was created to teach trigonometry by incorporating visual spatial diagrams using the unit circle with a modified spaced learning algorithm to address each student's individual learning needs.

Methods/Materials

The application was created on a mobile platform as it is used by high school students in this sample group for the study. A lesson plan was devised to implement a self-learning algorithm to teach a subset of identities among trigonometric expressions involving the sine and cosine functions. To compare different types of learning methods, four learning systems were created: rule-based, rule space-based, visual spatial based and space-based visual spatial. A lesson test was designed and implemented to run pre-tests and post tests, and performance results were tabulated.

Results

The results proved that the post-test scores were thirty-seven percent higher in users who used the visual spatial space-based learning method compared with control group users who used the rule based method.

Conclusions/Discussion

In conclusion,these results from the experiments are significant in understanding how different learners can be taught and how adapting a specific learning style to each individual improves one's performance. Moreover, when visual spatial learning is combined with space-based learning the best retention of these trigonometric concepts is achieved.This system of learning through a utilized mobile application platform is economically feasible and technologically advanced.Implementation of this learning system in classrooms as an enhanced learning tool in trigonometry will address the learning needs of all students, especially visual spatial learners. Thus, students will be better prepared for STEM education careers.

Summary Statement

My project teaches high school students pre-calculus trigonometric concepts on a mobile application using a visual spatial learning approach.

Help Received

iOS Developer Program, Past Research Studies