

# SmartStep: A Classroom Study

Research Protocol

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## Research Question:

This study will investigate the effects of a kinesthetic, computer-mediated approach to teaching basic math skills to 1<sup>st</sup> grade students. The investigation will be conducted at the Frank J. Carasiti (FJC) Elementary School in Rocky Point, New York. The present study, conducted in the context of a regular math class, will be concerned with the following research question:

What effect does a kinesthetic, videogame-like application have on the numbers and operations skills of the treatment group as compared to the control group?

## The Application:

SmartStep is an educational multimedia software program that helps K-5 students learn and practice basic math skills. Similar to hopscotch or jump rope, this application uses physical activity to reinforce basic math skills (like skip counting). The software uses a dance pad as an input device.

SmartStep allows teachers to create student rosters and develop unique math exercises; and allows teachers to review student progress. The teachers' program shares a database with the students' program, so lesson plans can be targeted to individual students or groups of learners. The database saves games, manages logins, and records student performance data.

## The Study Population:

The study population is a convenience sample of the twenty-four 1<sup>st</sup> grade students in Mrs. Jennifer Meschi's math class in the fall trimester of 2010 and the winter trimester. Her math class is a non-inclusion class that meets every day in her classroom from 1:15 until 2:30. The demographic data collected for the group will be:

M/F

Age (Year and Month)

Race

ESL (Y/N)

Free & Reduced Lunch (Y/N)

**The Classroom Teacher:**

Mrs. Meschi's title is Technology Integration Specialist, with a MS from Stony Brook University's Department of Technology and Society. She does not have an assistant teacher for her 1<sup>st</sup> grade math class.

**The Study Site:**

The computer lab (Room 133) has 25 student computers (Windows XP), one instructor machine connected to a Smartboard, and Internet access. Technical support is provided by a network administrator at Rocky Point, and by a district-based support staff person.

The curricular material used for the 1<sup>st</sup> grade math class is called RealMath by the publisher SRA (a division of McGraw-Hill).

**The Treatment:**

The study will take place over the first and second trimesters of the school year (approximately 15 weeks each). The study population will be divided into a treatment group of 12 students and a control group of 12 students. The roles of the 2 groups will switch after the first trimester. The groups will be divided to achieve the best balance of the 5 demographic characteristics identified above.

One class per week the treatment group will work with the SmartStep application. The treatment group will be further divided into 2 teams of 6 students each, using 2 systems running SmartStep simultaneously. The SmartStep exercise sessions will take approximately 24 - 30 minutes, with each member of the team getting 2 minutes of addition drills and 2 minutes of subtraction drills, for a total of 4 minutes each week, or 60 minutes total over the course of the trimester.

The NY State mathematics standard the study will test in the first trimester is, "1.N.28 Operations: Demonstrate fluency and apply addition and subtraction facts to and including 10". The treatment group will work on 0 – 3 for the first 5 weeks, 4 – 7 for the second 5 weeks, and 8 – 10 the last five weeks. The NY State mathematics standard the study will test in the second trimester is, "2.N.17 Operations: Demonstrate fluency and apply addition and subtraction facts to and including 18". The treatment group in the second trimester will work on 11 – 13 for the first 5 weeks, 14 – 16 for the second 5 weeks, and 17 – 18 the last five weeks. A pre- and post- paper test will be administered to the treatment and the control group at the start and end of each trimester, respectively. The pre- and post- tests will follow standard NY State assessments.

**Data Collection:**

A relational database will be used that has 3 tables: User demographic information, User performance data for SmartStep, and User pre- and post- test data. A user index number will be generated by the teacher, and all tables will key on that index number. User

performance data will be collected locally on 2 separate systems running SmartStep. Exercises will be time and date stamped, and keyed to the user's index number. Data will be backed up and merged each week.

**Study Permissions:**

Mr. Kenneth C. Crawford, FJC Principal, has approved conducting the study. A waiver of the IRB approval from Stony Brook University is sought based on these facts:

1. The researcher will not have direct contact with the study subjects, and will not be able to identify them as individuals.
2. The study is being conducted in the context of a regularly scheduled math class.

**Outline of Study:**

- I. Research question, hypothesis, study design.
- II. Literature review.
- III. Methodology and procedures for data collection and analysis.
- IV. Data analysis and presentation of results.
- V. Summary and discussion of study results, implications for practice, and recommendations for future work.