



A STUDY OF THE USE OF A TECHNOLOGY BASED SOLUTION TO IMPROVE MATH SCORES

Program Used: TenMarks Math
2011

Study sanctioned by
University of San Francisco

The TenMarks Math program is individualized for each student, and assigns an individualized “playlist” (curriculum) for each student.

EXECUTIVE SUMMARY

Background and Purpose

During the 2010-2011 school year, the University of San Francisco’s School of Education sanctioned a study at Everest High School, a suburban charter school in Redwood City, CA, to evaluate the effectiveness of TenMarks Math, a web-based instructional program designed to support educators and engage students. TenMarks Math is intended for use in both classrooms and at home and can be used in numerous ways, from introducing a new lesson or topic to refresh knowledge on a topic learned in an earlier grade to reviewing concepts before a test.

The TenMarks Math program is individualized for each student, and assigns an individualized “playlist” (curriculum) for each student, mapped to his or her specific needs. The playlist consists of albums (concepts), which in turn contains several tracks (topics). All content is aligned to state standards, and each track is assigned as an interactive worksheet of practice problems with video explanations and hints for students who need them.

The goal of the study was to evaluate the effectiveness of TenMarks Math and to understand whether a technology-based solution can compliment differentiated instruction in the classroom to increase positive student outcomes.

The findings indicate that students using TenMarks Math made significant improvement in their math skills over a 6-week period as compared to students who did not use TenMarks Math.

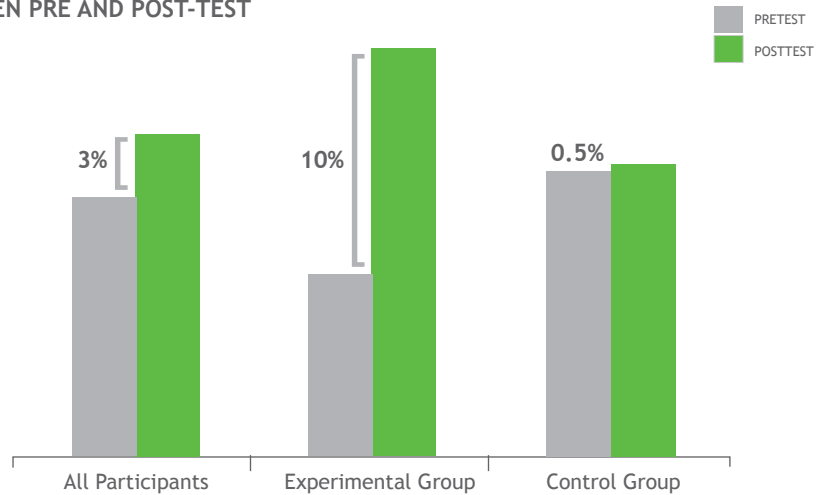
Study Design

Approximately 150 students in 9th and 10th grades at Everest High School participated in a controlled study of TenMarks Math effectiveness. Using a quantitative quasi-experimental methodology, this study compared the growth in math scores between students using TenMarks Math (Experimental) and students who did not use the program (Control). Students in the experimental and control groups were well matched in ability and demographically (48% Hispanic, 46% Caucasian, 6% other minorities; 38% on lunch assistance).

Students in both groups took a 50-question pre-test at the beginning of the study period to obtain a baseline measure of math skills. Based on their scores in the pre-test, students in the experimental group were assigned individualized curriculums in the TenMarks Math program. Teachers encouraged students in this group to complete the assigned interactive worksheets and related instruction on TenMarks and continued their usual classroom instruction. Students in the control group only received classroom instruction without the benefit of the TenMarks Math program.

At the end of the study period, students in both the experimental and control groups took a post-test. The results from the pre-test and post-test were compared statistically to determine the level of growth in math skills.

FIGURE 1: PERCENTAGE OF INCREASE IN MATH SCORES BETWEEN PRE AND POST-TEST



Pre and Post Results for TenMarks Math Users

Students who used TenMarks Math showed substantial improvement in math skills during the course of the study—an average increase of 10% in their scores (see Figure 1). Although students only received six weeks of differentiated instruction using TenMarks, the amount of growth achieved during that period is equivalent to between one and two grade levels of growth when compared to the national sample of students included in the Stanford 10 norm group (Harcourt Assessment, 2002).

While analyzing the pre and post-test results, another pattern emerged. Students who completed more of their playlist in the TenMarks Math program showed a greater increase in their post-test scores when compared with their pre-test scores.

While the growth achieved by students using TenMarks Math is an important indicator of its effectiveness, a more complete way to assess growth is to compare the growth achieved by students in each of the two groups.

Comparison of TenMarks Users to the Control Group

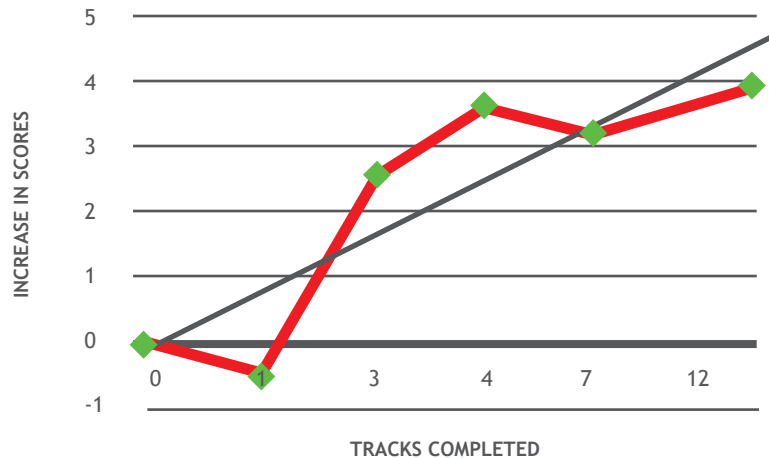
The study compared the gains made by students using TenMarks Math to the control group using a statistical procedure known as one-way analysis of variance (ANOVA). This analysis compares differences as if the two groups were identically matched in initial math skills. Students using TenMarks Math showed statistically greater gains (significance at $p = .077$) in math skills than those who were not using TenMarks Math.

The study also compared the number of tracks completed and the pre- to post-test difference in scores and found a significant difference. A linear regression analysis showed an R Square correlation of .66 between the number of tracks completed and average increase in scores within the experimental group (Figure 2).

TenMarks Math was found to be equally effective for boys and girls; for students of different ethnicities; and for students receiving special education services through IEP and 504 plans. The interaction between TenMarks Math use and gender, ethnicity and special education status was not statistically significant.

Although students only received six weeks of differentiated instruction using TenMarks, the amount of growth achieved during that period is equivalent to between one and two grades.

FIGURE 2: INCREASE IN SCORES BASED ON NUMBER OF TENMARKS TRACKS COMPLETED



Students using the program increased their math scores between 3% and 36%, or by an average of 10% for the whole experimental group.

Teacher Perceptions of Effectiveness

At the conclusion of the study, participating teachers were interviewed regarding their perceptions of TenMarks Math. More than 90% of teachers believed that TenMarks Math was good or excellent at increasing students' cognitive and intellectual growth. All teachers felt that TenMarks Math was good or excellent at improving students' attitudes toward school and learning. All (100%) of the teachers indicated that they would definitely recommend TenMarks Math to others.

SUMMARY

Students who used TenMarks Math showed substantial growth in math skills during the course of the study, increasing their math scores between 3% and 36%, or by an average of 10% for the whole group. When controlling for students' initial ability using analysis of variance, students using TenMarks Math achieved substantially greater gains in math skills than students who did not use TenMarks Math. TenMarks Math users finished the study period with scores that were on average 10% higher than the Control group.

TenMarks Math was found to be effective at both grade levels included in the study (grades 9 & 10) and was equally effective for boys and girls; students of different ethnicities; and both students receiving special education services and those not receiving this service.

Students received approximately 6 weeks of instruction using TenMarks Math, yet the amount of growth achieved is equivalent to between one and two grade levels of growth when compared to the national norm group.