



Research on the NYC SIFE-*Destination Math* Program

Abstract

An analysis of achievement and implementation data from the New York City Board of Education's Students with Interrupted Formal Education (SIFE) grant program for English Language Learners (ELLs) was completed in May 2007. This program included the use of the *Destination Math* technology-based courseware in before- and after-school programs at 13 NYC school sites during the spring 2007 semester.

Findings from Quantitative Data

Quantitative data analysis by Interactive Educational Systems Design (IESD) and statisticians at the Center for Research in Educational Policy at the University of Memphis yielded the following findings:

- Significant achievement gains. There was a statistically significant improvement in mathematics skills from pretest to posttest for all students and for those who completed *Destination Math* benchmark assessments in either Spanish or English.
 - = The effect size (ES) for those completing both pretests and posttests in English (.40) was nearly twice the size for those completing both tests in Spanish (.22).
 - = Across all social science research, an ES of .22 would be considered a small effect and an ES of .40 would be considered a moderate effect in terms of practical importance. However, given the prior academic circumstances of SIFE students, the gains for both the Spanish-functioning and English-functioning students are noteworthy.
- Positive effect of using *Destination Math* in regular classroom instruction. The use of *Destination Math* in regular classroom instruction—in addition to its use before and after school—had a major positive impact on students' math achievement.
 - = While students who did and did not use *Destination Math* in regular classroom instruction both had significant increases in achievement from pretest to posttest, the effect size for the student group that included *Destination Math* in regular classroom instruction (.43) was nearly twice that of students without *Destination Math* in regular classroom instruction (.23).

Findings from Qualitative Data

Based on data from teacher logs, surveys, and interviews, the *Destination Math* SIFE project manager and IESD analysts concluded the following:

- *Destination Math* journal writing The vast majority of the teachers for whom data were collected (94%) reported assigning math journal writing on a regular basis.
 - While students were engaged in *Destination Math*, they were able to keep an ongoing journal to document their own mathematics learning that included: key academic language (CALP), what challenged them mathematically, how they solved particular math problems, and how their learning experience unfolded as they used *Destination Math* on a regular basis.
 - The teachers reported that many students developed their language skills while gaining a deeper understanding of math concepts and procedures through math journal writing.
- *Destination Math* print activity usage About two-thirds of the teachers for whom data was collected (65%) reported assigning *Destination Math* print activities on a regular basis. These activity sheets feature skill-building and application items in a combination of fill-in, multiple choice, and brief constructed response formats.
 - Having students complete a printed activity sheet as a follow-up to work with *Destination Math* online served an important accountability and formative assessment. Student submission of the completed activity sheet alerted the teacher that the student had completed the online tutorial, was on task, and had or had not gained mastery of the content.
 - The print activities became a focus of students’ journal writing and their mini-conferences with the teacher (discussed below)—both of which were opportunities to exercise their communication skills while expressing their understanding of math content.
- Mini-conferences with the teacher All but one of the teachers for whom data was collected (97%) reported holding individual student-teacher mini-conferences during every SIFE session—while the other students worked independently. During these mini-conferences, students were able to identify areas where they needed help and to exchange ideas with their teachers while they reviewed their math journals and *Destination Math* activity sheets. The conferences fostered learning in a non-threatening environment.
- Knowledge Share Circles (Accountable Talk). Accountable Talk, a methodology discussed in the NYC Department of Education “Principals of Learning,” refers to students discussing their academic work in small collaborative groups. In the SIFE program, Knowledge Share Circles stimulated students to discuss with classmates what they were learning during their *Destination Math* time, what challenged them, and areas where they needed help. This collaborative learning forum increased students’ mathematical understanding, as well as, build key literacy skills.

Conclusions

Based on the findings summarized above, IESD researchers conclude the following:

- The SIFE-*Destination Math* program is an effective instructional solution for ELL students with interrupted formal education. The findings presented here are preliminary and tentative, based mostly on an instructional treatment group-only, pretest-posttest research design—a design that cannot establish a causal relationship between student experience with *Destination Math* and math achievement gains. IESD recommends continuing the program and, if feasible, conducting comparison group research (e.g., with randomized assignment of students or at least matching of student groups by prior math and language ability.)
- There is preliminary evidence that the impact of the SIFE-*Destination Math* program can be maximized by the following:
 - Using *Destination Math* in regular classroom instruction—in addition to its use before or after school
 - Having teachers assign math journal writing on a regular basis
 - Having teachers regularly assign *Destination Math* print activities
 - Having teachers hold individual student-teacher mini-conferences on a regular basis

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Quantitative Research Team

Interactive Educational Systems Design (IESD) is recognized in the educational publishing and educational technology communities as a leader in research and analysis. Founded in 1984 by **Dr. Jay Sivin-Kachala and Ellen Bialo**, IESD's clients include education market publishers (print- and technology-focused), technology hardware manufacturers, government agencies, non-profit institutions, and school districts. IESD custom-designs and implement evaluation research on educational programs, products, and services, including quantitative and qualitative research techniques. We also develop research-related marketing materials for educational publishers, and conduct education-focused market research. Clients related to evaluation of education programs, products, and services have included NCS Learn, New School University, Laureate Education/Canter & Associates/Walden University, and Roads to Success, and Scholastic Education.

Dr. Sivin-Kachala received his doctorate in Technology in Education from Teachers College, Columbia University. Ms. Bialo also received her graduate degree in Educational Psychology from Teachers College, Columbia University. Dr. Sivin-Kachala and Ms. Bialo will collaborate on the development data analysis protocols, will lead the research staff, and will be responsible for data analysis, report writing, and overall project management.

Collaborating with IESD will be the data analysis team at the **Center for Research in Educational Policy** at the **University of Memphis**, Tennessee, under the direction of **Dr. Steven Ross**.