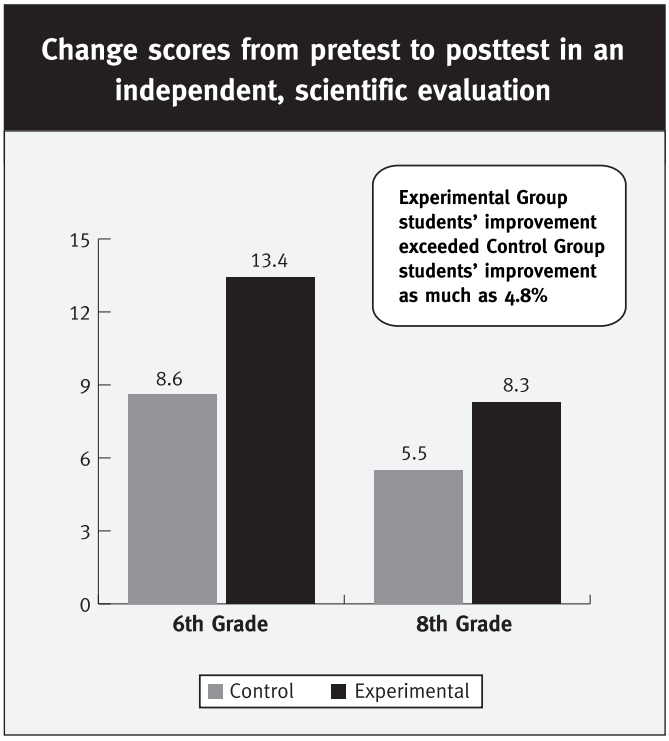
2004 *unitedstreaming*™ Evaluation: 6th and 8th Grade Mathematics in the Los Angeles Unified School District



A Draft Report

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Video streaming, or video-on-demand, refers to the process of viewing video over the Internet. A user does not have to download a file and then play it back; instead, a file is downloaded and viewed. A video player buffer stores the information while the user views the program. Streaming video usually means availability of the video on demand, but it can mean a video broadcast in real time as an event unfolds. With some applications users can download video clips, save them, and include them in multimedia presentations.

unitedstreaming is a video on-demand application, produced by Discovery Education, a division of Discovery Communications Inc., that is designed to enhance lesson plans in a variety of subjects for students in grades K-12. In a recent evaluation of *unitedstreaming* Boster, Meyer, Roberto, and Inge (2002) reported that this application produced gains in 3rd grade science, 3rd grade social studies, and 8th grade social studies examination scores, with no differences found between experimental and control groups in 8th grade science. The purpose of this report is to provide additional information, based on an evaluation of 6th and 8th grade mathematics in 2004 in the Los Angeles Unified School District, concerning the effectiveness of *unitedstreaming*. Specifically, it expands upon the Boster et al. (2002) experiments to assess the extent to which those results generalize to other grade levels and other domains of content.

Method

Participants

The 6th grade experiment was comprised of 2,140 students. Of these students 1,949 completed the pretest (91.1%), 1,933 completed the posttest (90.3%), and 1,746 completed both the pretest and the posttest (81.6%). The 8th grade experiment was comprised of 885 students. Of these students 793 completed the pretest (89.6%), 772 completed the posttest (87.2%), and 686 completed both the pretest and the posttest (77.5%).

Design

Two experiments designed in the same manner were performed. Four schools agreed to participate in both of the experiments. In both the 6th grade and the 8th grade experiments all classrooms in two of these schools were assigned randomly to the control condition and two schools were assigned randomly to the experimental condition. Control students received instruction in the usual manner. Experimental students received instruction with *unitedstreaming* employed to supplement teacher lesson plans.

Instrumentation

The primary dependent variable was student knowledge about mathematics. For an item to be included on an examination, its content had to be covered in both the experimental and control conditions. To ensure this condition was met, three judges reviewed each Content Standard, the relevant material in the 6th and 8th grade mathematics textbooks, and viewed each video clip identified as relevant to the content. Teachers from both experimental and control classrooms also reviewed each examination item for content

and language difficulty. Only items that passed these content validity assessments were included. This process ensured that students in both the control and experimental conditions would have access to the same information, and that the students who viewed the clips would not be exposed to material that was covered only in the clips.

Sixth-grade students in both the experimental and control conditions completed the same 21-item examination at both the pretest and the posttest. The 6th grade examination included between two and six items associated with each of the seven Content Standards taught during the time of the investigation. Eighth-grade students in both the experimental and control conditions completed the same 24-item examination at both the pretest and the posttest. The 8th grade examination included between one and 11 items associated with each of the six Content Standards taught during the time-frame under investigation.

All examination items included four response options, with one correct response and three incorrect foils. The total number of correct answers served as the measure of mathematics knowledge.

Procedure

To participate in the experiments schools had to have the minimum technological requirements necessary to run *unitedstreaming*, provide a paid day of release for teachers in the experimental condition to train, and logistical support in contacting teachers and collecting materials from them.

In mid January experimental condition teachers participated in a one day training session. In that session they learned how to use *unitedstreaming*. At the end of the day they received copies of the pretest mathematics examination, and upon their return to the classroom, administered them to their students.

During the next several weeks the sixth grade teachers were required to show 18 video clips and the eighth grade teachers were required to show 25 video clips designed to support their lesson plans. These clips were selected so that they matched the state Content Standards covered during the course of the experiment. The teachers were allowed to show these clips in any order, at any time, and as many times as they liked. The only requirement was that all students had to be exposed to each clip at least once. A tracking system was employed, and it indicated that all experimental teachers downloaded all the required clips. The teachers were provided Zenith 46 Series monitors to standardize hardware capabilities among schools. After exposure to the requisite, Content Standard mathematics material teachers were required to administer the posttests examination, a task performed prior to their Third Quarter Assessment Examinations.

For two of the schools, one experimental and the other control, the material was covered in a seven to nine week period. The other two schools, one experimental and one control, covered the material in 12 weeks.

Results

Table 1 provides a summary of the results of the 6th grade experiment. From this table one may observe that, on average, pretest control group scores exceeded those of the experimental group [$t(1,744)$= -6.76, p<.001, d=-.32]. Nevertheless, at posttest the groups evinced no difference in mean examination scores [$t(1,744)$=-.08, *ns*, d=.00].

One sample *t*-tests performed on the change score data indicate that both the control group [$t(1,002)$=18.16, p<.001] and the experimental group [$t(742)$=22.48, p<.001] exhibited substantial mean gains from pretest to posttest. Moreover, experimental group gains exceeded control group gains by a substantial margin [$t(1,744)$=6.33, p<.001, d=.30].

In the control group the mean pretest examination percentage was 39.8%, and the mean posttest examination percentage was 48.4%; thus, there was a mean improvement of 8.6%. In the experimental group the mean pretest examination percentage was 35.0%, and the mean posttest examination percentage was 48.4%; therefore, there was a mean improvement of 13.4%. Hence, examining the manner another way, gains in experimental group performance exceeded gains in control group performance by 4.8%.

Table 2 provides a summary of the results of the 8th grade experiment. These data provide no reason to conclude that pretest control group scores and experimental group scores differed on average [$t(684)$= .90, *ns*, d=.07]. At posttest, however, the mean experimental group score exceeded substantially that of the control group [$t(684)$=3.18, p=.002, d=.24].

One sample *t*-tests performed on the change score data indicate that both the control group [$t(295)$=7.13, p<.001] and the experimental group [$t(390)$=10.29, p<.001] exhibited substantial mean gains from pretest to posttest. Moreover, experimental group gains exceeded control group gains by a statistically significant margin [$t(684)$=2.49, p<.013, d=.19].

In the control group the mean pretest examination percentage was 30.0%, and the mean posttest examination percentage was 35.5%; thus, there was a mean improvement of 5.5%. In the experimental group the mean pretest examination percentage was 30.9%, and the mean posttest examination percentage was 39.2%; therefore, there was a mean improvement of 8.3%. Hence, examining the manner another way, gains in experimental group performance exceeded gains in control group performance by 2.8%.

Discussion

Because in both the 6th grade and the 8th grade experiments experimental group mean gains exceeded those of control group mean gains, the data are consistent with the hypothesis that the *unitedstreaming* application enhanced mathematics examination performance. These data are consistent with the results of the Boster et al. (2002) evaluation. They replicate the results of that series of experiments, and they extend them by demonstrating an effect of the application in a different content domain and with a different grade level, 6th grade. Although the magnitude of the effects is somewhat smaller than reported by Boster et al.

(2002), the obtained differences are statistically significant. Moreover, averaged across the two experiments in the Los Angeles Unified School District, experimental group performance exceeds that of the control group by 3.8%, a figure likely to be of practical import as well.

Nevertheless, this series of experiments is limited in several important ways. Three are particularly noteworthy. First, it is limited by geography and demographic characteristics, taking place in the western United States in a large inner city classroom environment. Second, it is limited by grade level, only two of the thirteen pertinent grades being examined. Third, it is limited by content, specifically mathematics. Combining these results with those of Boster et al. (2002), however, reduces the latter two limitations somewhat, particularly the third limitation.

Finally, it should be noted that these results are preliminary in that they pertain only to a superficial analysis of all of the data collected in the project. The conclusions are stated tentatively, and should be interpreted as such by any reader of this draft report.

Reference

Boster, F.J., Meyer, G.S., Roberto, A.J., & Inge, C.C. (2002). A report on the effect of the *unitedstreaming* application on educational performance. Technical Report.

Table 1

Mean (Standard Deviation) Pretest, Posttest, and Change Scores for the 6th Grade Experiment: Control Group *N* = 1003, Experimental Group *N* = 743

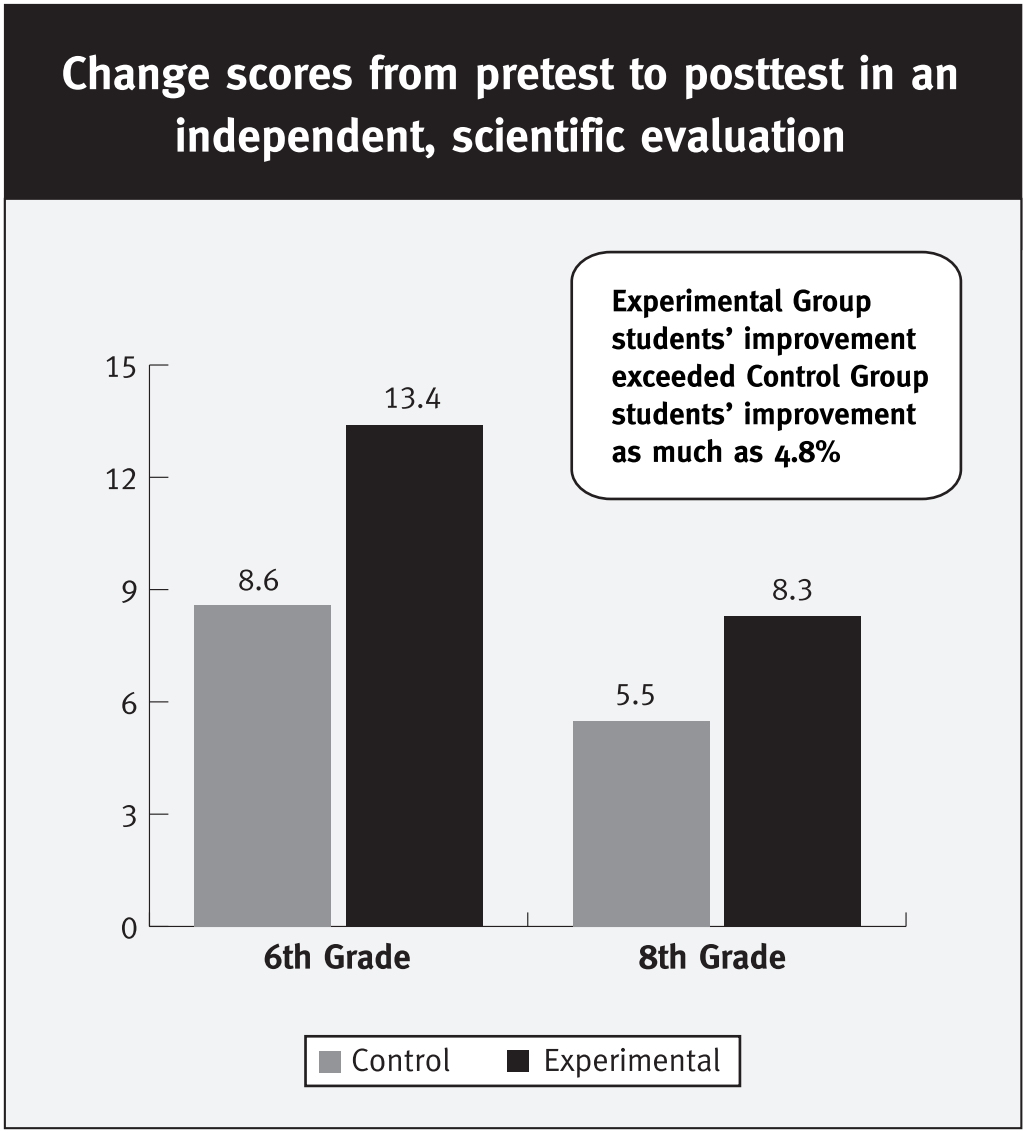
	Control Group	**Experimental Group**
Pretest	9.56 (3.81)	8.41 (3.12)
Posttest	11.62 (4.51)	11.61 (4.44)
Change	2.06 (3.95)	3.20 (3.88)

Table 2

Mean (Standard Deviation) Pretest, Posttest, and Change Scores for the 8th Grade Experiment: Control Group *N* = 296, Experimental Group *N* = 390

	Control Group	**Experimental Group**
Pretest	6.31 (2.47)	6.49 (2.68)
Posttest	7.46 (2.97)	8.24 (3.31)
Change	1.15 (2.76)	1.74 (3.34)

Figure 1


Change scores from pretest to posttest in an independent, scientific evaluation
Experimental Group students' improvement exceeded Control Group students' improvement as much as 4.8%
15
12
9
6
3
0
8.6
13.4
5.5
8.3
6th Grade
8th Grade
Control
Experimental

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