

Study

Research Report: The Wireless Writing Program 2004-2005

Prepared for: Peach River North (SD 60), Fort St. John, British Columbia, Canada

Author (s)

Dr. Sharon Jeroski, Research Director, Horizon Research & Evaluation Inc

Description/Research Question(s)/Major Findings

In September 2003, Peach River North (SD 60) implemented a Wireless writing program. 1,150 6th and 7th grade students received iBooks. 17 schools and 37 teachers participated in this 18-month pilot project. The plan was designed to see if the Wireless Writing Program “improved student achievement, motivation, and learning skills through the integration of technology with writing instruction.” Students, teachers, and parents were given surveys. Student achievement data was also collected. A random sample of student writing was selected for intensive analysis. The results were very impressive:

- In 2005 students sustained gains from the first year of the program in 03-04.
- 88% of students met grade level expectations.
- Nearly half of all students reached the top two levels of achievement; a 10% gain from 2004-2005.
- The longer students were in the program the more successful they were.
- The gender gap difference of 10%, girls higher than boys, closed to an insignificant 1%. 88% of boy’s proficient compared to 89% of girls.
- Improvement in writing occurred in meaning (ideas and details), style (language and sentences), and form (organization). The use of conventions did not dramatically improve. The author interprets this to mean that the gains were even more significant given that they were not just about grammar and spelling.
- Students report an increasing use of revision skills.
- Teachers, students, and parents strongly endorse the Wireless Writing Program.

URL

www.prn.bc.ca/Wireless_Writing_Program.html

Keywords:

Writing, middle school, students’ achievement, gender gap

Study

The Impact of Maine's One-to-One Laptop Program on Middle School Teachers and Students: Phase One Summary Evidence Research Report # 1, February 2004

Author (s)

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Description/Research Question(s)/Major Findings(s)

From 2002-2004 the state of Maine provided all 7th and 8th grade students (over 34,000) and their teachers (over 3,000) with laptop computers. All 243 schools and teachers received technical assistance and professional development for integrating technology into the curriculum. The research design predicted changes in three core areas: 1) Teachers and Teaching; 2) Students and Learning; and 3) School and Community.

Questions were constructed for each of the core areas:

Teachers and Teaching

What is the impact on teaching behaviors and instructional practices?

What is the impact on the content and rigor of curriculum and instruction?

What is the impact on teachers' own professional development?

Students and Learning

What is the impact of students' skills in acquiring and constructing new knowledge?

What is the impact on student achievement?

What's the impact on Maine's digital divide?

School and Community

What is the impact on school structure and leadership?

What is the impact on school culture?

What is the impact on families and communities?

These were questions the research team planned to answer over a number of years. In phase one of the research, the team focused on the following three questions:

- 1. How are laptops being used?**
- 2. What are the impacts of the laptops on teachers and students?**
- 3. What obstacles, if any, have schools, teachers, and students encountered in implementing the laptop program?**

To answer these questions researchers used both quantitative and qualitative data. Evaluation evidence was collected using: 1) online and paper surveys of teachers, students, principals, superintendents, technology coordinators, parents, and teachers leaders, 2) site visits where interviews were conducted with school personnel, students, and parents, 3) classroom and team meeting observations, and 4) analysis of various documents including school policies and procedures, school website documents, memos, lesson plans, student work, local school evaluation data, and content meeting evaluations.

Evaluation results of the initial phase of research included:

- Teachers are using the laptops in a variety of ways, and most often in developing instructional materials, conducting research related to instruction, and communicating with colleagues.
- Teacher usage is 20-30% higher for teachers who have advanced technology skills or have participated in four or more training sessions.
- Students report using laptops most frequently in finding information (90%), organizing information (63%), and taking class notes (57%).
- Student use of the laptop for completing class work is higher for those students who take the laptop home.
- Over 70% of teachers surveyed reported that the laptops helped them to more effectively meet their curriculum goals, and individualize their curriculum to meet particular student needs.
- More than 80% of teachers reported that their students were more engaged and involved in their learning and produce higher quality work.
- More than 70% of students reported that the laptops helped them to become more organized, and allowed them to complete their work more efficiently and with better quality.
- Teachers reported that all students are more engaged in their learning and more motivated to learn, particularly at-risk and special needs students.
- A sample of 9th grade students who no longer have laptops say their work volume and quality has declined.
- Teachers report a need for more technical support and more professional development.

URL

<http://www.usm.maine.edu/cepare/mlti.htm>

Keywords:

Middle school, one-to-one computing,

Study

Great Maine's Schools Project: One-to-One Laptops in a High School Environment
Piscataquis Community High School; FINAL REPORT 1, February 2004

Author (s)

Mitchell Institute – Bill and Melinda Gates Foundation

Description/Research Question(s)/Major Findings(s)

The Mitchell Institute, with funding from the Gate's Foundation, conducted this three year study from 2002-2005. While the research findings are valid for Piscataquis Community High School, the authors caution that the results cannot be necessarily generalized to other high schools.

In 2002, all 285 students in grades 9-12 along with their teachers received a laptop computer. The school is wireless and all students are expected to take a rigorous and heterogeneous, as opposed to tracking, college preparatory curriculum.

Results of the three year study found that:

- 1) Strong evidence that the laptop program improved both students' and teachers' computer skills and enhanced access to educational resources.
- 2) Strong evidence that the laptop program improved both student motivation and interest in school.
- 3) The majority of students and teachers believe that the laptop program has improved the quality of students work and has had a positive impact on student achievement. At this time, however, the study did not look at student grades or test data.
- 4) The findings indicate improved interaction among students and between students and faculty. This finding mirrors evidence from the statewide middle school laptop initiative.
- 5) While the study did not show evidence of major shifts in classroom practices, students report that since the program began they are able to: a) explore more topics on their own, b) write more, and c) do more classroom presentations demonstrating their work. Teachers report that students are more independent regarding exploration of topics, that the textbook is becoming less of a primary guide and that direct instruction is occurring less often.
- 6) Teachers indicate that the laptop program has leveled the playing field for students of differing abilities. They state that at-risk low-achieving students have had the greatest number of improvements as a result of the program. They also state that while high-achieving students have seen limited gains they have seen no decrease.
- 7) One of the potential benefits of 1:1 computing is the opportunity for students to personalize their learning. 86% of teachers and 46% of parents report that the laptop program has had a positive impact on providing students with more

personalized learning experiences. The majority of students and teachers report that students explore their own topics far more than before the laptop program was initiated.

- 8) While there were no major disadvantages reported about the laptop program it should be noted that teachers and parents cited three areas of concern: a) potential for distraction in the classroom, b) non-educational and/or inappropriate laptop use by some students, and c) technology failure that interrupts planned class activities.

URL

http://www.mitchellinstitute.org/Gates/pdf/One-to-One_Laptops_Report.pdf

Keywords:

High school, one-to-one computing,

Study

Laptop Use by Seventh Grade Students with Disabilities:
Perceptions of Special Education Teachers
Maine Learning of Technology Initiative
Research Report #2
February, 2004

Author (s)

Walter J. Harris, Director of the Maine Education Policy Research Institute; University of Maine Office.

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Description/Research Question(s)/Major Findings(s)

The Maine Learning Technology Initiative provided laptop computers to all seventh grade teachers and their students. Teachers also had professional development and all buildings were wireless. In May, 2003, late in the first year of state-wide implementation, “a survey was mailed to all middle school special education teachers (N=749) to gather information about their use of laptops and their perceptions of the use of laptops by their students.” Of those special education teachers who had seventh grade students, 207 or 28% responded.

Overall, “the teachers viewed the laptops as highly beneficial to their students with few exceptions.” Specific findings follow:

- 1) Special Education students’ engagement in their learning increased. Their ability to work independently increased as well as class participation, class preparedness, and interaction with teachers and other students.
- 2) Special Education teachers and parents found their students to be better organized. Filing material electronically was easier than filing paper.
- 3) Special Education teachers found improvement in both the quality and quantity of writing. The laptops removed the “motor coordination challenge of writing” and the work of the special education student looked as good as the work “of their non-disabled peers.”
- 4) Special Education teachers found that the laptops benefited the majority of students regardless of disability, however, some teachers did find that some students who were highly distractible, partially sighted or blind did not benefit as much as other students. Other teachers found these same students benefiting from the laptops.

The study concluded that special education teachers found the laptops to be beneficial for their students, but cautioned that the teachers should “carefully match the characteristics and challenges of using the laptop to the skills, learning styles, and frustration tolerance levels of their students.”

URL

<http://www.usm.maine.edu/cepare/mlti.htm>

Keywords:

7th grade, middle school, special education, student engagement, writing

Study

Hanau Model Schools Partnership, 1998

Author (s)

North Central Regional Education Laboratory

Description/Research Question(s)/Major Findings(s)

The Hanau Model Schools Project was a three-year collaborative effort between the Hanau Schools, four schools serving the children of military personnel in Hanau, Germany, TERC, an educational research group and development organization, and the National Science Foundation. The purpose of the project was to: 1) Infuse technology into the curriculum as a tool for learning as opposed to an end product, and 2) Promote exemplary teaching practices with technology in all classrooms through ongoing professional development. The schools total approximately 1,390 students and are diverse in terms of “race, socio-economic status, and mobility”. The schools take on the look of American schools in structure and share an emphasis on national standards. The three year project, 1995-1998, began with a year of planning followed by two years of implementation. It is important to note that the entire school community was involved in the planning and in the development of goals. In years two and three, there was a heavy emphasis on staff development. Researchers Feldman and McNamara (1998) noted the project’s impact on student achievement and classroom practice. “In addition, the wealth of picture information documents that teachers are more likely to place students in collaborative groups, that students are working on more extended projects, that research including Internet resources has exploded and is included as part of student reports, and the amount and richness of writing has increased.” In addition, there was a significant increase in SAT scores. Overall, it appears that the careful attention to planning, the partnerships, the staff development, and the teachers’ willingness to examine their teaching practices resulted in positive student gains.

URL

<http://www.ncrel.org/sdrs/areas/issues/methods/technology/te8lk18.htm>

Keywords:

Elementary, middle school, high school, staff development, achievement gain

Study

Meta-analytic studies of findings on computer-based instruction, 1994.

Author (s)

Kulik, James A., University of Michigan.

Description/Research Question(s)/Major Findings(s)

The major questions addressed in Kulik's meta-analysis were: 1) How can technology influence student performance?, 2) How can technology improve student motivation, attitude, and interest in learning?, and 3) What strategies result in effective instructional applications of technology? Kulik's meta-analysis examined the results of over 90 studies. He found an average effect size of .32 which is statistically significant. Major implications of this study follow:

- 1) Students learn more in courses which involve computer-based instruction.
- 2) Students learn faster in courses which involve computer-based instruction.
- 3) Students have more positive attitudes towards instruction in courses which involve computer-based instruction.
- 4) Students have more positive attitudes towards computers as a result of courses which involve computer-based instruction.
- 5) Students attitude towards subject-matter is unaffected by the use of computer-based instruction.

Finally, Kulik states the benefits of computer-based instruction are more effective when the teacher makes decisions about how they are used in a tutorial type fashion as opposed to master learning programmed instruction, learning packages, class management packages,,etc.

URL

<http://caret.iste.org/index.cfm?fuseaction=studySummary&studyid=275>

Keywords:

Meta-analysis, learning, motivation

Study

A Quantitative Synthesis of Recent Research on the Effects of Teaching and learning With Technology on Student Outcomes. December, 2002.

Author (s)

Hersh C. Waxman & Michael L. Connell, University of Houston.
Jon Gray, Lamar University.

Description/Research Question(s)/Major Findings(s)

In this meta-analysis, 138 effect sizes were calculated using data from 20 studies that combined a sample size of approximately 4,400 students, and 6,944 schools. The number of schools is larger than the number of schools because three studies used the school as a measure of analysis. The studies crossed all grade levels. About 40% were elementary schools, 40% were middle level schools, and 20% were high schools. The studies looked at students' cognitive, affective, and behavioral outcomes of learning. The overall effect size was .30 which is statistically significant.

Cognitive effects were gathered from data including researcher-based tests (30%), standardized tests (20%), a creativity test (20%), teacher made tests (10%) and school made tests (10%). About 85% of the affective outcomes were based on student attitudes towards computer use, and 15% were based on student motivation. All of the behavioral outcomes in this study were based on student attendance.

The mean of the study-weighted effect sizes averaging across all outcomes was .30 with a 95% confidence interval. This result indicates that teaching and learning with technology has a small, positive, significant effect on student learning when compared to traditional instruction. The mean study-weighted effect size for the 13 studies containing cognitive outcomes was even more significant at .39 with a 95% confidence interval. This result also indicates a small, but greater than the mean of all outcomes, positive, significant effect on students' cognitive outcomes when compared to traditional instruction. The mean-study weighted outcome for the 60 comparisons containing student affective outcomes was .208, a small but still significant finding. Conversely, the mean-study weighted effect size for the 30 comparisons containing behavioral outcomes was -.154, indicating a small negative effect on behavioral outcomes.

URL

<http://www.ncrel.org/tech/effects/index.html>

Keywords:

Elementary, middle school, high school, meta-analysis, cognitive gains, attendance, attitude towards computers, student motivation

Study

The Effects of Technology on Reading Performance in the Middle-School Grades: A Meta-Analysis with Recommendations for Policy. November, 2005

Author (s)

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Description/Research Question(s)/Major Findings(s)

This study, commissioned by NCREL's Center for Technology in collaboration with NCREL's Center for Literacy was designed to discover "the impact of digital literacy tools on middle-school students in the following areas: 1) Strategy use, 2) Metacognition, 3) Reading motivation, 4) Reading engagement, and 5) Reading comprehension. Studies were included if they attempted to improve and/or measure progress in any of these areas. Digital literacy tools included "a wide range of media forms including images, video and audio clips, hypertext, hypermedia, Web pages, learning environments, and particular formats of presenting information for student learning."

The criteria for inclusion in this meta-analysis was rigid and involved a three-step process to ensure that only studies of high quality and studies that specifically met at least one of the five goals of the project were incorporated. The field was narrowed from an initial 204 full-text candidate articles, garnered from 79 different sources, to 38 in phase two to a final 20 in phase three. From these 20 studies, there were a total of 89 effect sizes. The weighted mean of these effect sizes was 0.49 which is statistically significant.

The results of the study found the authors able to adequately address only one of the five areas of reading about which information was sought; reading comprehension. Empirical evidence to support findings on "reading comprehension", however, was strong and reported in about 75% of the research studies. According to the authors, "on the basis of the overall mean effect size, 0.49, one can and should conclude that the range of digital technologies used to ameliorate the reading performance of middle-school students is quite effective." The authors summarize by concluding that, "...although there is reason to be optimistic about using technology in middle-school literacy programs, there is also reason to encourage the research community to redouble its emphasis on digital learning environments for students in this age range and to broaden the scope of the interventions and outcomes they study."

URL

<http://www.ncrel.org/tech/reading/index.html>

Keywords:

Middle school, reading comprehension, meta-analysis

Study

The Impact of Education Technology on Student Achievement: What the Most Current Research Has to Say. 1999

Author (s)

John Schacter

Description/Research Question(s)/Major Findings(s)

The purpose of this report is to briefly summarize the findings of the five largest studies of technology's impact on education through 1999. In addition, two smaller scale studies were included "...that show the promise of newer emerging technologies on student learning."

In James Kulik's 1994 meta-analysis he reported findings from over 500 research studies on computer-based instruction. He found that 1) on average, students who use computer-based instruction scored at the 64th percentile on tests of achievement compared to students in the control conditions without computers who scored at the 50th percentile, 2) students learn more in less time when they receive computer-based instruction, and 3) students like their classes more and develop more positive attitudes when their classes include computer-based instruction. He also found that computers did not have positive effects in every area in which they were studied.

Jay Sivin-Kachala (1998) reviewed 219 research studies from 1990-1997. Positive findings included that 1) students in technology rich environments experienced positive effects on achievement in all subject areas, 2) students in technology rich environments showed increased achievement in preschool through higher education for both regular and special needs students, and 3) students' attitudes toward learning and their own self-concept improved consistently when computers were used for instruction. The study also concluded that the effectiveness of technology in the classroom is influenced by student population, software design, the teacher's role and the level of student access to the technology.

In 1994, Apple Computers sponsored a five year study on its Apple Classrooms of Tomorrow (ACOT) program. The study was conducted in five school sites in four states (California, Tennessee, Minnesota, Ohio). Over the five year study, comparisons were made of: 1) ACOT students' basic skills performance to nationally reported norms, 2) ACOT students' progress over time, and 3) ACOT teachers' teaching practices. Findings reported that: 1) ACOT had a positive impact on student attitude toward learning and teachers changed practices leaning more toward group work and less lecture, and 2) ACOT may have resulted in new learning experiences requiring higher order thinking and problem solving skills. On standardized tests there was no difference between the control and treatment groups.

Dale Mann's 1999 study of the state of West Va's Basic Skill/Computer Education (BS/CE) program examined the student achievement of 950 fifth-grade students using the Stanford 9. These fifth grades had been using the state's integrated learning system since

1991-92. Findings follow: 1) The more students participated in BS/CE, the more their test scores improved on the Stanford 9, 2) Consistent student use, combined with positive teachers and student attitude toward the program along with consistent teacher staff development led to greater student achievement gains, 3) Half of the 290 teachers surveyed felt that BS/CE helped students achieve the state's learning objectives and the longer teachers were involved in the program the more positive their attitudes became, 4) Gender did not play a factor in achievement gains, and 5) A cost analysis of the program found it to be more cost effective than, 1) class size reduction from 35 to 20 students, 2) increasing instructional time, and 3) cross age tutoring programs

Harold Wenglinsky's 1998 study, "assessed the effects of simulation and higher order thinking technologies on a national sample of 6,227 fourth graders and 7,146 eighth graders mathematics achievement on the NAEP." He found that, 1) Eighth-grade students using simulation and higher order thinking software showed gains in math of up to 15 weeks above grade level as measured by NAEP, 2) Eighth-grade students whose teachers received professional development on computers showed gains in math scores of up to 13 weeks above grade level, 3) Higher order uses of computers and professional development were positively related to students' academic achievement in mathematics for both fourth and eighth-grade students, 4) Fourth-grade students used technology to play learning games and develop higher order thinking performed only 3 to 5 weeks ahead of students who did not use technology, and 5) Both fourth and eighth-grade students using drill and practice software performed worse on NAEP than students who did not use drill and practice software.

URL

www.milkenexchange.org

Keywords:

Student achievement, student attitude, mathematics achievement, NAEP,

Study

Assessing the Impact of Instructional Technology on Student Achievement. February, 2001.

Author (s)

Lorraine Sherry; Shelley Billig; Daniel Jesse; and Deborah Watson-Acosta

Description/Research Question(s)/Major Findings(s)

The authors describe and report results of the WEB Project, a five year Technology Innovation Challenge Grant. The project's purpose "...was to infuse standards-based education in multi-media, digital art, music, composition, and online discourse into the general arts and humanities curricula of Vermont K-12 schools. Multi-media technology was incorporated within six academic content areas: art, music, technology, history/social studies, English/language arts, and interdisciplinary studies." Unique to the project was that students shared their work/projects, via a web page, with other students, teachers, digital artists, traditional artists, musicians, composers, Web page designers and other experts. Students used the feedback of these folks to revise and improve the quality of their work. Concurrently, language arts students, with the assistance of teachers and mentors from the Vermont Center for the Book, engaged "...in deep, rich dialogue that focused on standards based activities such as responding to text, substantiating arguments with evidence found in the text, informed decision-making etc. These interventions were stable over the last two to three years of the five year grant."

One of the research questions in The WEB Project was, "What is the impact of The WEB Project" on student achievement?" Student projects were scored using "teacher-created selected rubrics that assessed students' learning processes and final products..." Projects were then scored on a 0 (low) to 3 (high) scale by the students teacher and "to increase reliability" were re-scored by a panel of experts. Conclusions showed a strong correlation between motivation and metacognition, between metacognition and inquiry learning, between inquiry learning and the student learning process outcomes, and finally a strong relationship between application of skills and student product outcomes. One of the conclusions was that student enthusiasm for learning with technology may stimulate a student's interest in using a variety of learning strategies (metacognition). In addition, as the correlations between motivation, metacognition, application of skills, and the student product scores are significant, motivation may be the key component in connecting all of the learning paths and increasing student achievement.

URL

<http://fcis.oise.utoronto.ca/~ewoodruff/papers/05847BE8-001257DC-1/sherry1.pdf>

Keywords:

Standards-based instruction, multi-media, digital art, music, composition, history, social studies, English, language arts.