How Laptops Digitize and Transform Learning

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Abstract: Laptops have been shown to improve 21st century skills such as life and career skills, learning and innovation skills, and group collaboration, but how does this ever-present technology affect the thinking of today's "screenager?" Through an analysis of focus groups and surveys with students in 1:1 initiatives across North Carolina, researchers have discovered multiple changes in learning and 21st century skills when students have access to laptops. The study included eight Early College (EC) high schools and ten traditional high schools, with a total across the eighteen schools of approximately 9,500 students and 600 school staff.

Introduction

In the fall of 2007, the North Carolina State Board of Education awarded a contract to a university-based research institute to evaluate a one-to-one (1:1) pilot learning initiative in a number of North Carolina high schools reaching approximately 2000 students and 200 school staff. The evaluation has expanded to include eight Early College (EC) high schools and ten traditional high schools, with a total across the eighteen schools of approximately 9,500 students and 600 school staff. This paper presents an overview of how to laptops helped educators reach digital learners across all three years of the project, including:

- Discussion of how laptops prepare the future-ready student through the lens of the Framework for 21st Century Learning (Partnership for 21st Century Skills, 2003)
- New teaching practices within the learning environment
- Concerns over standards, assessment, and overuse of technology

The focus of this evaluation study is two-fold: examine the extent to which the eighteen high schools implemented the 1:1 initiative strategies and achieved the 1:1 project objectives; and, inform local and state-decision-makers on future technology policy and funding.

Research (Muir, Manchester, & Moulton, 2005; Penuel, 2006; Rockman, 2000) identifies important features that define a successful 1:1 learning environment in schools. These critical features consist of an adequate management and technical infrastructure (including connectivity, a wireless network, hardware and software resources, and school procedures/policies), professional development (PD), technology support personnel, and the use of the laptop by teachers and students leading to changes in instructional practices and student learning outcomes. This prior research informed our evaluation in terms of the data we collected.

A consortium of public and private enterprises provided the framework and logistics necessary for such a large-scale initiative. These organizations teamed up to provide funding for this initiative involving both Early College High Schools (ECHS) and traditional NC high

schools. Funding was provided by partners as follows: North Carolina Department of Public Instruction provided state funding for infrastructure, professional development, and evaluation; SAS provided funding for teacher laptops; Golden Leaf Foundation provided funding for student laptops; and The Friday Institute for Educational Innovation supported the 1:1 Learning Collaborative, a resource-rich website and professional development program targeting 1:1 projects.

Theoretical Background

The Joint Committee on Standards for Educational Evaluation (1994) defined program evaluation as "the systematic investigation of the worth or merit of a program" (p. 3). There are many different approaches to program evaluation. Determining which approach to use is dependent upon a number of factors such as the evaluation's purpose and use, the evaluator's philosophy and training, and the context of the educational program. Since the focus of this evaluation study is two-fold: 1) examining the extent to which the eighteen high schools implemented the 1:1 initiative strategies and achieved the 1:1 project objectives; and, 2) to inform local and state-decision-makers on future technology policy and funding. In as much, this study examining a complex pilot 1:1 Learning Initiative could be categorized as both objective and management-oriented approaches (Fitzpatrick, Sanders, & Worthen, 2003).

Research Methods

A matched-group research design was selected for this evaluation study. The schools participating in the 1:1 pilot were selected prior to the involvement of the researchers and without consideration of any research design. During 2009-2010 school year, the NC 1:1 Learning Initiative involved eighteen public high schools in North Carolina. The 1:1 schools are situated in regions across North Carolina, which has a richly diverse geographic and cultural landscape. The 1:1 pilot schools are made up of two distinct groups – the eight ECHS's and ten traditional high schools. Each traditional high school has approximately 1000 students and 100 staff. In contrast, the ECHS have less than 200 students and sometimes as few as six full-time educators on staff. A group of comparison schools, similar in type, size, student demographics, and student achievement on the prior year English and Algebra I End-of-Course tests were selected to provide comparative data from schools not implementing 1:1 programs. Many of the comparison schools had a significant amount of technology available for instructional purposes.

This study utilized a mixed methods process to perform evaluation in order to leverage the benefits of both methodologies (Creswell & Clark, 2007). Quantitative methods utilized matched comparison groups to compare outcomes for students, teachers, and other groups, in terms of end of grade tests, 21st century skills, graduation test scores, and dropout rates. Qualitative methodologies primarily included focus groups/interviews with school staff, document analysis, analysis of archival data, and classroom observation. Once the research design was defined and goals for the project were identified, specific evaluation questions were developed to align to each of the project goals. Subsequently data sources were either identified or developed to answer each evaluation question.

Standard, research-based, appropriate online surveys were administered to administrators, teachers, and students. These surveys were designed to address a number of variables at different levels. The online surveys were made available to the school personnel to administer over a two-week time period for both teacher and student surveys. Non-intrusive site observations occurred at each intervention school. These observations included brief visits to classrooms so that the research team could determine the level of technology usage occurring across study sites. Additionally, during the visits the evaluation project team conducted focus groups with staff. Also, school-level evaluation coordinator, often the technology facilitator, at each intervention school collected various artifacts (e.g., training schedules, technology lab schedules, equipment check-out logs, newsletters, etc.) related to implementation of the 1:1 learning initiative. Finally, the evaluation team examined archival data for all participating schools such as teacher rosters, aggregated survey data collected by NCDPI, and student records (EOC, grades, attendance, etc.) to investigate the effects of the model.

Results

During the third year of the 1:1 initiative, students and teachers experienced a new understanding of school culture and what it means to learn in the digital age. Schools appear to have implemented the critical building blocks of an effective 1:1 computing environment and are seeing some major shifts in teachers' and students' attitudes about technology, increases in staff and students' technology knowledge and skills, as well as changes in how technology is used in the classroom for teaching and learning.

With this progress, many lessons have been learned that can inform future work at schools that may implement 1:1 environments in the future. Lessons include understanding how essential 21st century skills such as life and career skills, learning and innovation skills, and information, media, and technology skills are for today's high school graduate; providing optional professional development in which teachers learn subject-specific technology skills; and recognizing the shift that is occurring in how students of the digital age learn.

References

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