

A Laptop for Every Student:
1:1 Ratios in the Classroom

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Christopher Dede, a Harvard University professor in learning technologies, believes that laptops are a key to student learning. He says, “How much writing could get done in schools if students had to share pencils and paper? The answer is ‘not much.’ ...I think that’s part of what has happened with technology right now” (Hetzner, 2005, ¶ 5). Like me, Dede grew up in a world where the whole class had to go to a separate room to use computers, putting in the hour given to your class for the week on a sort of timeclock (Hetzner, 2005). Regardless of how learning was improved or if a task was completed, your computer time was over when it was over. Educators have studied this method of offering technology to students to improve learning, and many have found it lacking, especially in this modern age (National Conference of State Legislatures, 2006). Several groups across the world, most notably those in Maine and West Virginia, have pushed against the concept of computer labs and have instead implemented 1:1 laptop-to-student ratios (Cook 2002). Basically, one laptop is given to every student in the school with the goal that it be used as a tool to improve learning.

One-to-one ratios are currently a strong trend in education, some schools have jumped completely on the bandwagon and others are more skeptical to join on the ride (Cook 2002). It is important for educators, policy makers, and communities to consider what 1:1 programs ideally look like, the mixed research and opinions gathered from implemented 1:1 programs, and educational paradigm shifts that have occurred as a result of laptop implementation.

Acquiring the laptops often requires the school district to sign a contract with a computer company to either lease or purchase the computers and related technological support. For example, Maine has a \$37.2 million, four year contract with Apple Computer, and Oklahoma City Public Schools has a \$25 million contract with Dell. Both have spent this money on the laptops needed for students in

selected grades, technologies to bring wireless Internet to the school, staff training, and other technology aides depending on the needs of the school or district (Cook, 2002).

As stated previously, Apple Computer and Dell are two major suppliers of laptops in the schools, and therefore have had a strong hand in the implementation of one-to-one ratios in the classroom. Together, they created several key points they believe make laptops more successful and ideal in schools (Cook 2002). First, one laptop should be given to each student to use for the school year; ideally the student should be able to bring it home after school so he or she can continue learning experiences from home. Next, Apple Computer says that round-the-clock computer access would be available to all teachers and students. This occurs by putting up wireless Internet hubs throughout the school (Apple Computer, n.d.). In many communities, this also means providing free or low cost internet access to student homes as well. Last, students should be allowed to implement technology in any area that would benefit them whether it be used in organizing their work, communicating with others, creating multimedia presentations, or conducting research. For example, students at University Lake School in Wisconsin most commonly use laptops for taking notes and writing essays. They also e-mail teachers, follow class assignments, track their grades, do Internet research, download notes from classes they have missed, and engage in multimedia (Hetzner, 2005). Weaver and Nilson suggested that teachers can use the laptops in the classroom by collecting student data, assessing students, having students conduct self-assessments, research, simulated experiences, analyzing digitized performances, student collaborations, learning exercises, and more (Weaver & Nilson, 2005).

Because one-to-one laptop ratios have only been used for a short amount of time, there are few longitudinal studies that show how the laptops have affected student learning in the long-term. However, several short-term studies done by a variety of groups show that overall, laptops have improved many aspects of learning for most schools (Public Policy Institute of New York State

[PPINYS], 2003). Despite some negative repercussions from laptop use in schools, overwhelmingly it appears that the impact has been positive (Muir, 2003). Most of the arguments over laptop implementation are not about whether or not students should have laptops, but about *how* laptops should be used (Preston, 2006).

Studies done by Apple Computer showed that well-implemented laptop programs created a significant increase in student engagement and achievement, improved quality of student projects, increased likelihood that students would continue learning outside of school, improved communication and teamwork skills, increased homework completion, and improved student behavior. It also showed that teachers were more confident about integrating technology into the curriculum (Apple Computer, n.d.). In addition to the many benefits that Apple shows, other studies show a myriad of other benefits as well. One study done by Michigan State University surveyed fifteen school districts across the state that gave laptops to seven-thousand of their fourth through ninth grade students. The survey found that “students with computers are spending more time on their homework and coming to class better prepared. Parents are enthusiastic about the program, and teachers told the researchers they think parents are getting more involved in their children’s schooling because of it” (Wendland, 2004, ¶ 3).

Other studies have also shown benefits brought to students and the community from laptop integration. One benefit is that laptops level the playing field by closing the gap between students who have access to technology and those who do not (Cook, 2002). John Slatin, the director of the Institute for Technology and Learning at the University of Texas at Austin said, “The idea of laptops for every student is a very interesting one if you’re worried that there are gross disparities between upper-middle-class kids who have computers at home and kids who don’t” (Stoll, 1998, ¶ 1). When every child is given a laptop, they are all open to the same opportunities to learn and achieve.

As suggested above, laptops move schools away from the lab environment. These environments prevent students from using technology to its full potential. When students have to go to the computer lab, they are operating on a school schedule around other classes. Teachers have to structure their technology lessons around when the lab is available, and will often forego lessons altogether because of the hassle. For most schools, the computer lab is the only place in the school where an entire class can be online at once. Laptops help equalize this issue of computer accessibility within the school (Cook, 2002).

Laptops allow students and teachers to access and use multimedia. Instead of standards such as worksheets, writing essays, and taking exams, students can also show that learning has taken place by incorporating electronic presentations, movies, web pages, creating brochures, and more (Muir, 2003). This is because laptops are a tool that allow schools to move beyond using physical books or magazines to find information. Students can now access that information anytime, without going to a library, by accessing eBooks and articles via an electronic library. Students can also use interactive software to learn math and foreign languages. Teachers can also provide course content on the web so students have clear and organized class objectives mapped out for them (Preston, 2006). Several schools also prepare for state testing by utilizing software programs online to guide students through sample questions and test-taking tips (PPINYS, 2003).

When all students have the same technology access, it removes barriers that allow teachers to innovate freely (Hetzner, 2005). Many studies showed that teachers showed increased innovation and professionalism when given technology training and access to one-to-one student laptops (Cook, 2002). Also, the laptops encourage teachers to modify lessons and expectations based on the technology to which they have access. Some teachers will record complex processes on iMovie, and post them to the course web page so students can go home and watch them several times or step-by-step until they

understand the concept. Parents will also watch these movies to learn how things are done so they can in turn help their children to understand the concepts being taught (Cook, 2002).

Having access to laptops helps to improve student writing for a variety of reasons. Teachers say that their reluctant writers are more willing to write and revise a word processed copy than handwritten work. They also say that word-processed copies are much easier to read and edit than handwritten copies (Muir, 2003). New programs will spell and grammar check student work before it gets to their teacher, allow teachers to add comments and corrections on the page, and send the work back to students. Most word processors also contain dictionaries, thesauruses, and other writing resources, which are available to students with just a few clicks of the mouse. Some programs also track potential plagiarism by indexing books, journals, magazines, websites, and even other student work. These technologies also help students to improve writing.

Despite the many positive things happening with laptops in schools, there are also several negative effects that schools are considering. As stated before, most of the issues don't surround whether or not laptops are actually useful, but instead surround *how* to best implement the use of laptops in schools.

One major issue is funding. Most schools simply cannot come up with the cash needed to fund a laptop for every student (Hetzner, 2005). Several schools have sought out grants or corporate sponsorship to get funding. Others restructure spending accounts. Still others will charge families for part of the cost. Some schools who can't afford the one-to-one ratio will seek other options such as getting traveling laptop carts or getting a mix of laptop and desktop computers (Hetzner, 2005). The difference in textbook cost and laptop cost is slowly diminishing with time, so it may be eventually possible for all schools to secure funding for laptops (Still, 1998). There are also many issues emerging

on the administrative level about managing these costs while still maintaining equity between schools in a district (Stites, 2005).

Another issue is a lack of training, which turns into teacher negativity. In the Michigan State University study, some teachers told the researchers that they were not adequately trained on how to use the computers themselves before being expected to train students (Cook, 2002). Others said that the projects need better educational software and a clearer sense of vision so that teachers can meet expectations. Cook (2002) suggests that teachers are not the only ones who need to be trained, citing that parents and students need training that helps them to grow from where they stand in their technology skills. When there is a lack of training, teachers have a tendency to get negative about laptop implementation. Several teachers in one-to-one programs have refused to use the laptops altogether. Others feel that the laptops do not actually improve student learning. Some also find that the technology is more of a distraction than a helpful tool. One teacher even said that she believed that it was “the corporate world manipulating the school system” (Stoll 1998).

Some schools have shown discipline issues that did not previously exist. Henrico County Public Schools disciplined over fifty students in December 2001 for downloading pornography at home. Two students were also suspended for trying to hack into the computers of teachers and classmates. The school district quickly realized that they needed more training to prepare students and parents for the sheer responsibility of having laptops (Cook, 2002).

Lastly, many schools do not join the laptop trend because there are simply not enough studies that prove conclusively that laptops improve learning. It appears that the only way to know if the laptops will provide meaningful learning is to jump in with the laptops and hope for the best (Hetzner, 2005). True, there are several studies in recent years that show laptop success, but many school districts want even more before taking such a large financial leap.

Incorporating laptops into schools has made for several paradigm shifts in learning and how curriculum is delivered. Teaching has become less about instruction and more about guidance. Several companies are now working to create online textbooks and eBooks to replace bound books altogether. The Henrico County Public School District planned to eliminate the use of regular textbooks in grades six through twelve by the fall of 2003 (Cook, 2002). The one-to-one ratios force teachers to recognize the significance of technology and multimedia. There are no more excuses to ignore it or explain it away: it is there and teachers are responsible to implement it in meaningful ways (Stager, n.d.). More constructivist models are replacing the behaviorist learning models that were primarily utilized in the classroom. This has been shown by the increase in project-based learning. Project based learning increases student pride in work, gives students a working portfolio of abilities, and shows a multiple-intelligences approach to learning and assessment (Furger, 2002).

Overall, laptop implementation has shown to be a significant step in providing tools to students. Based on this research, I would make several suggestions to aid those who are considering the use of one-to-one ratios in the classroom. First, teachers and school districts should learn from other programs implementing laptops. Do not feel pressure to reinvent the wheel: see what works for other schools and emulate it in yours. Next, the focus is not on teaching students to use technology, it is on using technology as a tool to help learning. This focus is paramount to a successful program so that the technology does not exist for the sake of itself, but for purposes of aiding and guiding students to stronger learning. Third, involve teachers and the community in the process of planning and innovating. Several programs died after having been forced on teachers and students from an administrative level. The most effective models for implementing laptops into schools had strong collaboration and teamwork emphasized between all those involved. Fourth, training the teachers to be confident with the technology and also to aid them in innovating standards-based projects is a key to the success of the

project. I would deem these four suggestions as very important for people to keep mind when considering laptop integration.

Many sources say that one-to-one computer access will become the norm in schools within the next decade or so (PPINYS, 2003). A longitudinal study in West Virginia showed that computer instruction was “more cost-effective in improving student achievement than (1) class size reduction from thirty-five to twenty students, (2) increasing instructional time, and (3) cross-age tutoring programs” (PPINYS, 2003, pg. 4). Therefore, it is important for schools to intelligently research and develop models of effective laptop implementation that meet the needs of their students. This is of paramount importance if laptop integration is to be successful in improving student learning.

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