

Implications of One-to-One Computing Initiatives on Education: A Policy Brief

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Executive Summary

Education policies and approaches in the United States are always evolving and changing with new research and trends. With the growing emphasis on preparing students to be productive 21st century citizens in addition to traditional academic preparation, a greater emphasis is placed on incorporating technology into classrooms. One way that many states, districts, and schools have integrated technology into their instruction is by implementing a one-to-one computing initiative in which each student receives some sort of computing device. Research on the outcomes of these initiatives have shown mixed results, though there do appear to be benefits that would make such a program worthwhile for a variety of different groups: students, teachers, and administrators. While one-to-one initiatives can provide many advantages, there are many factors that should be carefully considered before implementation to ensure that the program is effective and successful.

Educators today are faced with the daunting task of not only educating students in the traditional

curriculum, such as language arts, mathematics, science, and social studies, but also preparing students to pass numerous standardized tests, teaching students the skills to be productive members of society, and making sure that students are ready to be successful in their chosen careers or simply ready for the next grade level. As the world becomes more digitally-based and technologically-driven each and every day, one of the major areas in which teachers have to educate their students is how to effectively and responsibly use technology.

In today's technology-dependent world, students are digital natives, growing up surrounded by different technologies that they use in a variety of ways. To be a capable 21st century citizen, students need to be able to think critically, communicate clearly and effectively, and problem solve. Many of these skills are enhanced by the use of technology. To teach students how to use these 21st century skills and to capitalize on many students' existing interest in technology, many school districts and states are implementing one-to-one computing initiatives.

One-to-one computing is "an environment in which students use computing devices, such as wireless laptops or tablet pc computers in order to learn anytime and anywhere" (CMP Media, LLC, 2005, p. 3). Programs can vary not only in the devices provided to students, such as laptops versus tablets, but also in terms of student access. Some programs allow students to take their devices with them for 24-7 access to learn, while other programs allow students to have their devices only at

school for the day or for certain classes, blocks, or subjects (Carr, 2012).

According to a report by the Education Development Center (EDC), “one-to-one computing environments are different from what one traditionally finds in most school settings because they offer students and teachers continuous access to a wide-range of software, electronic documents, the Internet, and other digital resources for teaching and learning” (Bonifaz & Zucker, 2004, p. 3). Focus is placed not on the technology itself, but on how the instruction incorporates the technology to motivate students to have a “new sense of enthusiasm and ownership in their learning” (CMP Media, LLC, 2005, p. 3). Other goals of one-to-one computing include “improving academic achievement, increasing equity of access, increasing economic competitiveness of a region, and/or transforming the quality of instruction” (Sauers & McLeod, 2012, p. 5).

Approaches and Results

Many different approaches have been taken when implementing one-to-one computing initiatives. The current trend is to provide each student in a given class, grade level, school, or even school district with a personal device that he or she can take home. Laptops are frequently used, though many districts are moving to tablets. One-to-one computing programs are typically initially implemented in high school and then expanded to middle school. Although less common, some programs include upper elementary school students such

as fourth and fifth graders.

There is a general lack of empirical research regarding one-to-one computing programs, especially longitudinal studies. However, the research available on the effects of one-to-one computing initiatives show mixed, but promising, results. There have been some initiatives that were implemented in schools that have not made much, if any, improvement in student achievement, and therefore cancelled their programs (Sauers & McLeod, 2012). The majority of research studies show that one-to-one computing initiatives are beneficial to students in a variety of ways.

Academically, research shows that students in one-to-one programs score higher on standardized tests in writing, literacy, math, and science, as well as earn higher GPAs (Holcomb, 2009; Keengwe, Schnellert, & Mills, 2011; Sauers & McLeod, 2012). Other educational benefits of one-to-one computing initiatives include more time spent working collaboratively, more project-based instruction, access to more information, and improved research skills (Keengwe, Schnellert, & Mills, 2011). One-to-one computing initiatives benefit students in other ways as well. Holcomb (2009) suggested that students who are part of one-to-one computing programs are “more engaged, reflective, and active in their learning” (p. 49). Schools with one-to-one computing initiatives also have decreased absentee rates, increased attendance, reduced behavior referrals and school-wide discipline problems, and increased community support (Holcomb, 2009).

Although the positive impacts of

one-to-one computing initiatives are promising, research has highlighted many potential barriers to implementation and negative influences to consider as well, including difficulties with effectively integrating technology into the classroom (Keengwe, Schnellert, & Mills, 2011). Other concerns include “poor administrative support; negative staff attitudes and lack of knowledge towards computers; problems with time, access, space, supervision, and operation; poor software; curriculum integration difficulties; and lack of technical support” (Keengwe, Schnellert, & Mills, 2011, pp. 138-139). Another possible barrier to implementation is a lack of professional development and training available to teachers (Keengwe, Schnellert, & Mills, 2011). One of the main possible negative impacts of one-to-one computing initiatives is the potential for the technology to become a distraction for students, especially if students use their devices for non-educational purposes (Lei & Zhao, 2008). Another concern is that students will become over-dependent on information technology and may resort to plagiarism more quickly (Lei & Zhao, 2008).

Implications and Recommendations

One-to-one computing initiatives provide access to technology for students that no other policy or initiative has offered before. This type of program puts all students, regardless of their socioeconomic status, on the same level with access to the same technology while at school. The potential benefits of such an

initiative—if implemented correctly and carefully—are much greater than the potential concerns.

When implementing a one-to-one initiative, it is important to consider all of the potential negative influences and concerns that are exposed in the research about such programs. Schools should set procedures and rules for both teachers and students to ensure that all parties are using technology effectively and responsibly. Guidelines for proper student usage are particularly important to prevent students from being distracted and using devices for non-educational purposes. Policies for taking care of devices, repairing or replacing damaged devices, and obtaining proper technical support should be developed and communicated to all parties. Proper training for teachers is needed so that teachers are prepared to implement the initiative successfully within their classrooms. Integrating one-to-one computing devices into existing curricula can be a daunting task for teachers, and without the appropriate support, the technology may not be implemented effectively.

Although one-to-one computing is still a fairly new initiative in education, it is an approach that is evolving as quickly as the technology it implements. As the plans for one-to-one initiatives grow and progress, it will become increasingly important for those implementing the initiatives to continuously consider the goals and intended outcomes of the program. According to Holcomb (2009), “how and why laptops are used in education are critical factors for success. Simply providing each student with a laptop

will not elicit gains or improvements in learning” (p. 54).

Conclusion

With the world becoming increasingly digitized every day, it is logical that educators look for ways to incorporate technology into education to prepare students to be 21st century citizens and to create more meaningful and engaging learning experiences. One-to-one computing initiatives are one way to integrate technology in the classroom. Even though there is a lack of empirical research regarding one-to-one computing initiatives and there are some concerns that should be carefully considered and evaluated, the majority of the existing research provides support for the benefits of such programs.

References

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