International Journal of Education and Culture
June 2019, Volume 8, Issues 1-2, pp. 27-34

http://www.untestedideas.com/journals.php?journal=IJEC
http://untestedideas.net/journal.php?journal=ije
ISSN: 2168-9407 (Print); 2168-9415 (Online)

REVIEW ARTICLE

Technology Use in the Elementary Classrooms: Benefits, Pitfalls, and Implications

Yu Wu*
Hunan First Normal University, China

Jingde Tan
Hunan First Normal University, China

The use of technology has become a major phenomenon in the context of K-12 education around the world. This article addresses the use of technology in the elementary classrooms. It first explains the nature of technology use in the classrooms. It then examines the benefits of using technology in the classrooms. Further, it discusses the pitfalls of using technology in the classrooms. Finally, it proposes practical implications for elementary teachers to use technology effectively and wisely so that it facilitates students' learning in the classrooms.

*Correspondence should be sent to: Yu Wu, College of Foreign Languages, Hunan First Normal University, Changsha, Hunan, China. Email: E-mail: *229867527@qq.com*

INTRODUCTION

Today's children are growing in a digital age and they are infatuated with technology; and they develop a relationship with technology from an early age (Kerawalla & Crook, 2002; Keengwe, Onchwari, & Wachira, 2008). Early exposure to technology develops an early familiarity. As children develop, technology becomes a significant part of school life (Keengwe et al., 2008). *Technology has* become a major *phenomenon within the context of* elementary education around the *world (*Keengwe et al., 2008; Kerawalla, & Crook, 2002; Kirkorian, Wartella, & Anderson, 2008*).*

Research statistics show that elementary schools around the world are becoming increasingly well equipped with televisions, cellphones, tablets, and computers (Kerawalla, & Crook, 2002; Kirkorian et al., 2008). However, in most elementary schools technology is employed to supplement traditional classroom teaching but is yet effectively integrated into daily classroom practices (Cuban, 2001; Kirkorian et al., 2008). The positive implementation of technology in the elementary classrooms is dependent on the classroom teachers. When used wisely, technology can support and enhance elementary school students' learning experiences (Keengwe et al., 2008; Kerawalla, & Crook, 2002; Kirkorian et al., 2008). Therefore, it is important for the elementary classroom teachers to know how the technology can be used in the classrooms so that it can assist students' learning.

This article addresses the use of technology in the elementary classrooms. First, it explains the nature of technology use in the classrooms. Second, it examines the benefits of using technology in the classrooms. Third, it discusses the pitfalls of using technology in the classrooms. Finally, it proposes practical implications for elementary teachers to use technology effectively and wisely so that it facilitates students' learning in the classrooms.

THE NATURE OF TECHNOLOGY USE IN THE ELEMENTARY CLASSROOMS

Technology has become very popular in the elementary classrooms in the world *(*Bitter & Pierson, 2002; Keengwe et al., 2008; Kerawalla, & Crook, 2002; Kirkorian et al, 2008*).* In the United States, for example, schools, districts, and the federal government have invested heavily in instructional technology since the early 1990s. Teacher and student access to technology in schools has improved dramatically. Today, all public schools are connected to the Internet, with ninety-seven percent connected via high speed connection. Hundreds of schools and districts are experimenting with or have put in place one-to-one laptop programs that provide each student with his or her own laptop.

There are many types of technology that can be used in the elementary classrooms. The most common types include the Internet, which is arguably the greatest technological invention of all times. Its capabilities have provided resources to teachers that were unimaginable just a generation ago. LCD Projector, a mounted LCD projector allows a teacher the opportunity to share activities, videos, PowerPoint presentations, etc. from their computer with the whole class *(*Bitter & Pierson, 2002; Keengwe et al., 2008*).*

Another form of classroom technology is a document camera, a document camera works in conjunction with your LCD projector. A document camera essentially has taken the place of the old overhead projectors. With a document camera, you no longer need transparencies. You simply put the document you want to show your students under the camera, and it is shot up on the screen through your LCD projector (Kerawalla, & Crook, 2002; Kirkorian et al, 2008).

Smartboards are also becoming increasingly popular. Students love to interact with technology-based educational tools. A smartboard takes the place of a traditional chalkboard or whiteboard. It is essentially a whiteboard with technological capabilities that allow teachers and their students to interact in ways they had previously not been able to. Teachers can create engaging active lessons using the many tools that a smartboard provides. They can transpose diagrams, charts, and templates. They may also have students come up and actively participate in the lesson. A digital camera is also a key technology component in today's elementary classrooms. Digital cameras have video capabilities that could bring another dimension to the classroom. A digital camera could be used in a variety of ways to engage students in the learning process (Keengwe et al., 2008; Kerawalla, & Crook, 2002).

THE BENEFITS OF USING TECHNOLOGY IN THE ELEMENTARY CLASSROOMS

Using technology can have a beneficial effect on children's learning (Gooden, 1996; Kerawalla & Crook, 2002; Morrison & Lowther, 2002; Zhao, 2003). Statistics show that more than fifty percent of the children in the twenty-first century start using mobile devices when they are 5 to 8 years old; further, thirty percent of the apps on parents' mobile devices are downloaded specially for their children's usage; and seventy two percent of iTunes top selling apps are designed for preschoolers and elementary students (Impact of Technology, 2013).

It is evident that technology greatly influences elementary education. Children are exposed early and are very intact with the current technology world. Some educators believe that the use of technological devices in education is a great way to engage students because it attracts them. They believe mobile devices and computers provide students with a fun learning environment (Edwards, Hilburn, & Crawford, 2001; Gooden, 1996).

As we know, different students have different learning styles; and they feel technology helps them learn in the way they're comfortable with. Many games, storytelling apps and online tools are introduced into the elementary classroom to engage students more effectively than with traditional approaches. With these technological devices, students can learn from anywhere. Tablets, Desktop computers, iPads, etc., help educators and parents to provide students with the personalized learning environment and also helps them learn interactively through many games and apps. It has become easy for teachers to engage students with lesson concepts through animations and presentations rather than depending on textbooks and blackboard (Gooden, 1996; Impact of Technology, 2013).

Some teachers believe that technology integration is a necessity of today's students to have twenty-first century skills, which may include personal and social responsibility, planning, critical thinking, reasoning, and creativity, strong communication skills, both for interpersonal and presentation needs, cross-cultural understanding, visualizing and decision making and knowing how and when to use technology and choosing the most appropriate tool for the task. Therefore, the use of technology in the classroom increases student success (Gooden, 1996; Hammett & Meyers, 1998).

THE PITFALLS OF USING TECHNOLOGY IN THE ELEMENTARY CLASSROOMS

It is argued that the use of technology in the classroom can have shortcomings (Stoll, 1999). The school system is centered on using technology to increase standardized test scores, but is lost on the arts and other subjects that allow students to think critically. A child who uses a computer program to dissect a frog instead of doing it in person misses on experience of understanding how to prepare to dissect and of course the care requiring to handle it. Furthermore, a software program may be able to show students what is involved, but students are still missing those hands on experiences which bring a certain reality to it instead of trying to save money and without offending anyone (Stoll, 1999).

Teachers believe that the extensive use of technology can have negative impact young students. Using technology can affect a child's ability to empathize. Further, overuse of technology can also affect a child's own mood. A report from the United Kingdom revealed that kids who use computer games and their home Internet for more than four hours do not have the same sense of wellbeing as those who used that technology for less than an hour. One expert explained that with less physical contact, children might have difficulty developing social skills and emotional reactions (The Four Negative Sides of Technology).

Some teachers believe that because students often use computers primarily for games; many students' associate computers and technology with game playing. Though some teachers can use this to their advantage, if this issue is not addressed, some students may get distracted and off task quickly (Miranda, & Russell, 2011).

It is also believed that the computer technology affects the culture of the classroom. For example, due to the use of technology, the classroom teacher has to take away or add components of the curriculum. This change in the culture of the classroom also changes how the teacher has to teach the classroom and how well students perform in these classes (Schofield, 1995).

In addition, if technology isn't properly implemented in the classroom, it becomes a waste of time and money. For example, teachers using technology in the classrooms are limited by the type of software and other resources provided to them (Cuban, 2001).

Technology integration varies from classroom to classroom. Educators decide how technology is implemented into the curriculum but outside factors may affect integration efficiency. Young children develop a familiarity with technology because they are developing in this digital age, however, educators and parents, may not have a relationship

with technology. The unfamiliarity adults may have with technology develops an imbalance of effective application. Familiarity with computers predicts greater comfort with technology and greater comfort is related to greater integration within the classroom (Wood, 2005).

Comfortability and usage of technology in the classroom is dependent on teacher usage. Educators have to modify their teaching in major ways to include technology within their curriculum. Teachers' knowledge, skill and philosophy are determinants of their instructional methods (Staub & Stern, 2002). Instructional methods are based on teachers' beliefs therefore some teachers are resistant to modifying their teaching pedagogies wheases others adapt and modify their lessons in accordance to their student's interest and the world around them.

Technology should not replace activities and social interaction that are important for childhood development but should be used to support learning and expand children's access to different content. Technology can reinforce information and offer different techniques to learn new content. It is the job of an educator to be aware of the individualized needs of their students and utilize techniques that sustain and develop learning skills. Teachers' beliefs, attitudes and emotions also build the meaning they bring to innovations, such as technology integration (van den Berg, 2002), and these beliefs impact the attitudes and beliefs of students they teach (Ross et al., 2001).

Training for teachers to use technology is limited; the knowledge of technology of teachers was also limited, the type of computers and technologies were not equally distributed to schools making it difficult to standardize a curriculum and the lack of computer software to assist non-computer science subjects (Cannings & Brown, 1986).

Further, schools with low levels of funding were not able to afford the technology and software needed to make an effective use of it and as such forced teachers to use the traditional approach to teaching (Cannings & Brown, 1986).

It is evident that technology shapes the world in which we live in. Educators acknowledge the importance and impact of technology; however, its process of implementation is questioned. The pace of change is so rapid that society is experiencing a disruption almost as significant as when there was a shift from oral language to printed word (Ertmer, 2010). Educators with a traditional teaching practice may be resistant to include technology within their curriculum due to their personal unfamiliarity and fear of the unknown. There are many potential barriers to the successful implementation of technology in the classroom. These barriers range from equipment based issues, such as limited access (Borich, 2000), technical problems and malfunctions, social issues that impact traditional classroom organization and social interactions in the classroom (Schofield, 1995) to individual differences in attitudes and skills among teachers (Becker & Ravitz, 2001). While there is research of potential barriers that may affect technology integration, the long term impact of those barriers requires further investigation.

IMPLICATIONS FOR TEACHERS TO USE TECHNOLOGY IN THE ELEMENTARY CLASSROOMS

Relevant research suggests a variety of strategies in terms of how technology can be used in the elementary classrooms. First, technology can be used for identifying both similarities and differences. At any grade level, teachers can use technology to help children compare and contrast, classify, or link information. While Venn diagrams probably come to mind first, students can identify similarities and differences though other computer tasks. They can draw pictures that illustrate similarities and differences in content-area units such as seasons, insect body parts, and planets. Writing similes and metaphors requires students to make connections between two unlike things. Students can even draw illustrations of analogies within poems or work on Web sites where they separate words by initial sounds.

Second, technology can be used for summarizing and note taking. When students learn essential information from what they read or hear, they improve their recall of the information. Creating a slide show presentation requires students to distill their information into a few bullet points that will convey their messages. Students can also take two column notes in a spreadsheet or word processing application.

Third, technology can be used for reinforcing effort and providing recognition. Students do not always understand that effort pays off. When they set reading goals and then graph the results after a semester, they can take pride in their accomplishments. Studying famous people who made a difference in the world will highlight for students the connection between effort and recognition. At any grade level, students can create portfolios of their work periodically looking back at where they started and what they have accomplished can motivate students to continue working hard.

Fourth, technology can be used for homework and practice. Homework is most effective when students do it without parental involvement. By third grade, students can practice keyboarding independently at home. If students have Internet access, they can use a number of free Web-based keyboarding resources. Teachers can also recommend Web-based drill activities to help students' master basic skills.

Fifth, technology can be used for nonlinguistic representations. Vocabulary and words stick when students use drawings as well as definitions. Even before they can read and write, elementary school students can express their understanding of curricular targets through pictures. Graphing provides another way for students to understand relationships in numbers.

Sixth, technology can also be used for cooperative learning. Students in computer-rich classrooms are more likely to use cooperative learning to complete their work. Teachers can promote cooperative learning through assigning teams to complete small projects, such as writing dialogue in pairs or longer assignments, or researching an aspect of space exploration.

Finally, technology can be used for questions, cues, and advance organizers. When questions, organizers and other tools are used prior to instruction in a curricular unit, the tools help students identify what is important to remember. Teachers can introduce a unit through wordless slide shows. With a pictures-only slide show, students draw conclusions about the unit from the pictures they see. This also gives them visual anchors for the text

they read. Introducing primary source photos and audio clips at the beginning of a unit on state history, for example, can help students generate the questions they want to research (Hamilton, 2007; Saracho, 2014).

CONCLUSION

The importance and impact of technology within the elementary classroom is evident. Technology is a main part of mainstream culture and often excessively used. Integrating technology within an elementary classroom can yield both positive and negative outcomes. Technology can create an opportunity for distractions and it is the educator's job to monitor students. Traditional teaching practice involves students solely listening to teacher instruction and classroom activities. Appropriate technological use, balances traditional teaching practice and uses technology as reinforcement. The appropriate use of technology reflects educators' awareness and understanding of technological advancements.

ACKNOWLEDGMENTS

This article was funded by the following research projects (本文获得以下项目的资助): "湘北方言与关东日语的入声对比研究", 湖南社会科学基金项目 (13YBA390), 基于微信公众号的日语语音能力构建的实证研究", 湖南省教育厅科研课题 (17C0338), 基于数据挖掘技术的中国日语学习者认知机制研究, 国家社会科学基金项目 (19BYY201) 。

REFERENCES

Becker, H. J. & & Ravitz, J. L. (2001). *Computer use by teachers: Are Cuban's predictions correct?* Paper presented at the Annual Meeting of the American Educational Research Association, Seattle, WA, March.

Bitter, G., & Pierson, M. (2002). *Using technology in the classroom* (5th ed.). Boston: Allyn and Bacon.

Borich, G. D. (2000). *Effective teaching methods*. Upper Saddle River, NJ, Prentice Hall.

Cannings, T. R., & Brown, S. W. (1986). *The information age classroom: Using the computer as a tool.* Irvine: Frankilin, Beedle & Associates.

Cuban, L. (2001). *Oversold and underused computers in the classroom*. Cambridge: Harvard University Press.

Edwards, T., Hilburn, S., & Crawford, C. M. (2001). Creating successful learning environments using a web-enhanced one computer classroom. *Webnet 2001*, 7.

Ertmer, P. A., & Ottenbreit-Leftwich, a.T. (2010). Teacher technology change: how knowledge, beliefs, and culture intersect. *Journal of Research onTechnology in Education*, 42, 255-284.

Gooden, A. R. (1996). *Computers in the classroom.* San Francisco: Joseey-Bass Publishers.

Hamilton, B. (2007). It's elementary! *Integrating Technology in the Primary Grades*, 19-27.

Hammett, R. F., & Meyers, J. (1998). Possibilities for technology in the classroom: Tools for transformation rather than oppression. *Review of Education, Pedagogy & Cultural Studies , 20*(1), 99-115.

Keengwe, J., Onchwari, G., & Wachira, P. (2008). Computer technology integration and student learning: Barriers and promise. *Journal of Science Education and Technology, 17*(6), 560-565.

Kerawalla, L., & Crook, C. (2002). Children's computer use at home and at school: Context and continuity. *British Educational Research Journal, 28*(6), 751–71.

Kirkorian, H. L., Wartella, E. A. & Anderson, D. R. (2008). Media and young children's learning. *The Future of Children, 18*(1), 39–61.

Miranda, H., & Russell, M. (2011). Predictors of teacher-directed student use of technology in elementary classrooms. *Journal of Research on Technology in Education, 43*(4), 301-323.

Morrison, G. R., & Lowther, D. L. (2002). *Integrating computer technology into the classroom* (2nd ed.). Upper Saddle River: Merrill Prentice Hall.

Ross, J. A., Hogaboam-Gray, A., & Hannay, L. (2001). Effects of teacher efficacy on computer skills and computer cognition in Canadian students in Grades K-3, *Elementary School Journal, 102*, 141–156

Schofield, J. W. (1995). *Computers and classroom culture.* Cambridge: Cambridge University Press.

Stoll, C. (1999). *High-tech heretic: why computers don't belong in the classroom and other reflections by a computer contrarian.* New York: Random House.

Saracho, O. N. (2014). Developmentally-appropriate Technology and Interactive Media in Early Childhood Education. *Young Children and Families in the Information Age*, 183-205.

Staub, F. C. & Stern, E. (2002).The nature of teachers' pedagogical content beliefs matter for students' achievement gains: quasi-experimental evidence from elementary mathematics, Journal of Educational Psychology, 94, 344–355.

van den Berg, R. (2002). Teachers' meanings regarding educational practice. *Review of Educational Research, 72*, 577–625

Wood, E., Mueller, J., Willoughby, T., Specht, J., & Deyoung, T. (2005). Teachers' Perceptions: barriers and supports to using technology in the classroom. *Education, Communication & Information, 5*(2), 183-206.

Zhao, F. (2003). Enhancing the quality of online higher education through measurement. *Quality Assurance in Education, 11*(4), 214-221.