Integration of Technology into Education and its Effects on Student Learning

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Abstract:

Technology is ubiquitous, touching almost every part of our lives, our communities, and our homes. Yet most schools lag far behind when it comes to integrating technology in classroom learning. So it is quite important to conduct a review on different types of technology integration in schools. With this intention, the present study is conducted to review the literature related to different technologies integrated in students' learning process, reasons behind technology integration, outcomes of students' learning based on technology integration. Various studies support that technology helps to change the roles and relationships between students and teachers: students take responsibility for their learning outcomes, while teachers become guides and facilitators.

Technology lends itself as a multidimensional tool to support the learning process. There is growing evidence that integrating technology has a positive impact on student learning and academic achievement. Research on technology use and integration suggests that teachers and schools are most likely to use technology to personalize learning when (1)it supports existing student-center practices and helps to address problems or challenges; (2) it is part of a structured, organization-wide initiative to implement learner-centered learning; and (3) teachers have access to extensive professional development and ongoing support..

Keywords: Technology integration, ubiquitous, learning process, multidimensional, student, centered learning

Introduction:

A growing consensus among education reformers is that better preparing students for the 21st century, including further education and employment, requires fundamental and systematic changes in the way middle and high school education is organized.

Technology is everywhere, touching almost every part of our lives, our communities, our families. Yet most schools lag far behind when it comes to integrating technology into classroom instruction. The true potential of technology for teaching and learning is just beginning to be explored by many. Used properly, technology can help students develop the skills they need to compete in a complex, high-tech, knowledge-based economy.

A key rationale for integrating technology into education is that learning should be made effective by focusing on students and their mastery of specific competencies, supported by technology, rather than old school structures and arbitrary age-based benchmarks. The use of technology and digital media has fundamentally changed all aspects of our lives, and many education reformers agree that it can and must

be an important part of current efforts to personalize education (e.g. Christensen, 2008; Collins & Halverson, 2009; U.S. Department of Education, 2010; Welling & Levine, 2009; Woolf, Shute, Van Lehn, Burleson, King, Suthers, Bredeweg, Luckin, Baker & Tonkin, 2010). Using technology can help to enhance and extend the acquisition of knowledge and skills, and learning with and about technology is essential for students to acquire the competencies needed to function well in a 21st century society and workforce. Technology is intrinsically motivating for many students and, because it is highly adaptable, it is particularly well suited to supporting students' holistic development in academics, personal development and many other aspects of their lives. In the past, school reform efforts driven by technology have often failed (e.g. Cuban, 2001; Zhao & Frank, 2003).In an effort to know about the effectiveness of technology integration in student learning, this extensive review of research has been carried out. The literature on technology integration was used as a framework for understanding different types and uses of technology to personalize learning.

Concept of Technology Integration:

Seamless integration occurs when students not only use technology on a daily basis, but also have access to a variety of tools that are appropriate to the task at hand and provide them with the opportunity to develop a deeper understanding of the content. A willingness to embrace change is also essential for successful technology integration. Technology is constantly and rapidly evolving. It is a continuous process and requires continuous learning. The definition of technology tools covers a wide range of digital devices such as computers, tablets, touchscreens, interactive whiteboards, mobile devices, cameras, DVD and music players, audio recorders, electronic toys, games, e-book readers, as well as older analogue devices still in use such as tape recorders, video recorders, VHS tapes, record and cassette players, light tables, projectors and microscopes, and so on. Technology that fits comfortably into the curriculum or teaching plans of the classroom is an indication of integrated technology. In this case, technology is not an additional layer in the classroom, but is embedded in the teacher's lesson plan and pedagogy. Thus, in this in this approach, the teacher designs learning activities and the students use technology to construct their own learning. For example, students use technology to search for information, construct and organize their learning and represent it through computer applications. In this way, the teacher acts as a facilitator and the student as a constructor of their own learning. Such an approach considers technology as a tool rather than an end in itself, defines the teacher's role as a facilitator and designer of the learning environment, and emphasizes students' use of technology and authentic assessments and activities using technology in the classroom (Grabe and Grabe cited in Charania, 2011).

"When students are able to select and use technology tools to acquire, analyses, synthesize and present information, effective technology integration is achieved. Technology should become an integral part of the operation of the classroom – as accessible as all other instructional resources. (National Education Technology Standards for Pupils, International Society for Technology in Education)

When effectively integrated into the curriculum, technological tools can powerfully extend learning. These tools can provide students and teachers with access to up-to-date primary resources, ways to collect and record data, ways of collaborating with students, teachers and experts worldwide, opportunities to express understanding through multimedia, relevant learning and authentic evaluation, and training in how to publish and present their new knowledge. When technology integration works best, children and educators don't think about using technology tools - its second nature. Students are often more actively engaged in academic learning when technology tools are a seamless part of the learning process.

Types of Technology Integration: There are many ways that technology can become an integral part of the learning process. Just a few of these ways are listed below, but new technology tools and ideas are emerging daily.

1. **Online Learning and Blended Classrooms** While K-12 online learning is gaining traction around the world, many teachers are also exploring blended learning as a combination of online and face-to-face education. Dixon (2009) reported that online video sharing sites such as YouTube.com allow students to create and share reflective video journals that focus on both their formal and informal learning experiences. Thisstudy was designed to determine the factors that enhance the effectiveness of reflective videotaping for enhancing metacognition in adolescent students. Twelve high school students participated in a six-session after-school reflective video journaling programmer. Various data collection methods were used. The research revealed several factors that enhanced student metacognition, including highly structured prompts, privacy during production, and a focus on content over production value. Factors that detract from student reflection include student autonomy, the voluntary nature of this study, and prompts that are not tied to a content area.

2. **Project-based activities using technology:** Many of the most rigorous projects are infused with technology from start to finish with a one-to-one laptop programmer.Project-based learning (PBL) is defined by the Buck Institute for Education (BIE) as: "a systematic instructional method that engages students in the acquisition of knowledge and skills through an extended process of inquiry structured around complex, authentic questions and carefully designed outcomes and tasks".

   According to the Northwest Regional Educational Laboratory, the benefits of PBL include:

   • Prepare students for work through learning skills in cooperation, project planning, decision making and time management.

   • Higher levels of attendance, participation and homework are often reported by teachers to increase motivation.

   • Learners have more opportunities to share knowledge.

   • Improved social and communication skills.

   • Pupils are able to make connections between disciplines.

   • Increased problem solving skills.

   • Increased learner self-esteem.

3. **Game-based learning and assessment:**

There has been much discussion about the benefits of incorporating simulations and game-based learning activities into classroom teaching. Dominguez et al (2013) designed and built a gamification plug-in for a well-known e-learning platform and experimented with its use in a university course, collecting quantitative and qualitative data along the way. The results suggest that a number of commonly held beliefs about the benefits of using games in education can be challenged. Students who completed the gamified experience scored higher on practical assignments and overall, but the results also suggest that these students performed poorly on written assignments and participated less in class activities, despite their initial motivation.

4. **Learning with mobile and handheld devices:**

Once widely dismissed as distractions, devices such as mobile phones, mp3 players and tablet computers are now being used as learning tools in forward-thinking schools. These changes are happening at such an accelerated rate that they are reshaping society in ways similar to those that occurred when print expanded access to books and print literacy. The shift towards new media skills and the need for digital skills,

encompassing both technology and media skills, will continue to shape the world young children develop and learn; Alper n.d.).

5. Teaching tools such as interactive whiteboards and student response systems

In many schools, the days of the green chalkboard are over. Nowadays, whiteboards are more effective in communicating teacher messages to students. A review of educational case studies and research literature has been compiled by SMART Technologies Inc. to help educators weigh the benefits of using interactive whiteboards in the classroom. It contains findings from the longest running educational research study of interactive whiteboards - Smarter Kids™ Research. The findings show that interactive whiteboards have been embedded in learning environments for more than a decade, with a growing body of research on their impact from the United States, United Kingdom and Australia. Several themes and patterns have emerged from the available research, including the positive impact of interactive whiteboards on student engagement and motivation, the ability to accommodate a variety of learning styles (including special needs students), and the ability to enhance student comprehension and review processes. Evidence also suggests that designing lessons around interactive white boarding can help teachers to optimize their preparation and integrate ICT more effectively, increasing their overall productivity.

6. Web-based projects, exploration and research

One of the first and most basic ways teachers encouraged children to use technology was through online research, virtual field trips and web quests.

Miller et al (2004) conducted a study and central hypothesis to examine whether brief exposure to a web adventure format that includes virtual lab experiments and computer games within an engaging storyline can impact student learning. MedMyst is an episodic adventure series that focuses on infectious diseases and the microbes that cause them. In the online adventure, the player (student) enters a futuristic world where he or she becomes a "reconstructed", a member of an elite team tasked with preventing the spread of infectious diseases. The series consists of three "missions". Each mission lasts approximately 30 to 40 minutes and is designed to meet a limited number of learning objectives. Middle school students, classroom teachers, scientists and clinicians helped to develop the game. A field test was conducted to assess the knowledge gains from playing MedMyst, involving more than 700 students from nine schools. Gains from pre-test to post-test indicated that middle school students retained important information by interacting with the online material for as little as 30 minutes per adventure; however, gains for high school students were less convincing, perhaps indicating that a different learning tool or content is required for this age group.

7. Using social media to engage students

Although social media tools are still blocked in many schools, students around the world spend a great deal of time on social networks outside of school.

TERNES (2013) concluded in his study that the two most popular social media sites, Facebook and Twitter, offer several tools for interacting with students on a college campus. Professionals can use the tools that seem most appropriate for the situation they find themselves in. Using Facebook groups and pages can extend the reach of campus activities beyond the time spent together and can increase student engagement and the learning that occurs as a result of these activities. Twitter provides the opportunity to interact with other users and specific content through the use of hashtags, mentions, replies and retweets. These features allow students and professionals to interact in real time. This capability creates a community that can extend conversations beyond the face-to-face level, enabling users to interact with each other and engage with content in new and meaningful ways. The use of social media will continue to

grow among students; the sites, features, applications, etc. will change and adapt over time, but the concept of interacting with each other online is here to stay. Higher education institutions and professionals. Or district web, including grades (94%), attendance data (90%), and student evaluations (75%). Ninety-seven percent of teachers reported having remote access to school email, and 81 percent had remote access to student.

Reasons for the need to integrate technology into pupils' learning:

There are several reasons suggested in the literature as to why technology should be an integral part of students' studies. **First**, research shows that certain uses of technology can improve student outcomes, although the relationship between technology and learning is complex. While classroom technology availability does not guarantee effects on student outcomes (e.g., Agodini, Dynarski, Heaviside, Novak, Carey, Campuzano, Means, Murphy, Penuel, Javitz, Emery, & Sussex, 2007; Wenglinsky, 1998), when used appropriately, it can improve student performance on achievement tests (e.g., Kulik, 2003; Wenglinsky, 2006).

The use of technology for drill and practice has been generally found to be less effective than the application of technology for more constructivist purposes such as writing, research, collaboration, analysis and publication (Warschauer & Matuchniak, 2010). For example, based on an analysis of NAEP data, Wenglinsky (2005) found that for eighth-grade reading, using computers for writing activities had a positive effect on test scores, but using computers for grammar/punctuation, reading drills, or tutorials had a negative effect on test scores. The educational use of technology can also enhance competencies that go well beyond the knowledge and skills typically measured by these achievement tests (e.g., Bransford, Brown, Cocking, 1999; Collins & Halverson, 2009). These competencies include improved understanding of complex concepts; connections between ideas, processes, and learning strategies; and the development of problem-solving, visualization, data management, communication, and collaboration skills, which are among the skills that employers say are lacking even in many college graduates (The Conference Board, Corporate Voices for Working Families, the Partnership for 21st Century Skills, and the Society for Human Resource Management, 2006).

Second, Technology now has a significant presence in public schools. According to a recent U.S. Department of Education survey (Gray, Thomas, & Lewis, 2010), 97 percent of teachers had one or more computers in their classroom every day in the winter and spring of 2009. Internet access was available to 93 per cent of computers on a daily basis (although school firewalls may limit the amount of internet access in the classroom). Other technology devices available in the classroom or school included liquid crystal display (LCD) or digital light processing projectors (48 and 36 per cent, respectively), interactive whiteboards (23 and 28 per cent), and digital cameras (14 and 64 per cent). Many teachers also report having access to student data through their school records. Teachers have a powerful set of tools to support teaching and learning. A growing body of research shows that integrating technology into the curriculum improves student learning processes and outcomes. Teachers who see computers as problem-solving tools change the way they teach. They move from a behavioral approach to a more constructivist one. Project-based learning is better supported by technology and interactive multimedia. Students are engaged in their learning with these powerful tools and can become creators and critics rather than just consumers.

Student outcomes based on technology integration:

Despite the ready availability of technology in schools and the compelling reasons to use it to enhance

teaching and learning, research shows that it is not widely integrated into classrooms. According to a recent survey of more than 1,000 high school teachers, IT staff and students conducted by CDW Government LLC (2010), only 8 percent of teachers surveyed fully integrate technology into the classroom. The survey also found that teachers primarily use technology to teach (e.g., for presentations), while students lack opportunities to use technology hands-on. Sixty per cent of teachers said they use technology in the classroom, but only 26 per cent of students said they are encouraged to use technology themselves.

Technology and media should not be a substitute for creative play, exploration of the real world, being physically active, experiencing the outdoors, talking and social interaction. Technology and media should be used to support learning, not isolated activities, and to broaden young children' access to new content (Guernsey 2010a, 2011b)

Conclusion:

Technology integration in education goes beyond teaching basic computer skills and software programs in a separate computer course. Effective integration of technology must take place across the curriculum in ways that research has shown to enhance and improve learning. In particular, it must support four key components of learning: active engagement, group participation, frequent interaction and feedback, and connection to real-world experts. Technology contributes to changing the roles and relationships between students and educators, with students taking responsibility for their learning results and educators becoming guides and moderators. Technology lends itself as a multidimensional tool to support this process. For economically disadvantaged students, school may be the only place where they have the opportunity to use a computer and integrate technology into their learning. There is a growing body of evidence that the integration of technology can have a positive impact on student achievement and academic performance. However, it is unlikely that technology alone will transform traditional learning environments into student-centered learning environments, although technology can support student-center learning. Research on technology use and integration suggests that teachers and schools are most likely to use technology to personalize learning when (1) it supports existing student-centered practices and helps to solve problems or address challenges; (2) it is part of a systemic, organization-wide initiative to implement student-centered learning; and (3) teachers have access to sufficient professional development and ongoing support.

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