Effective Traits of Professional Learning in US Schools that lead to the 21st Century Skills Employers Expect

Judy B. Cornelius

Lamar University

Abstract

Internet connectivity is reducing the perceived size of the world by bringing countries, communities, and businesses together online, requiring employees and subsequently students to possess certain technology skills. This paper seeks to examine how schools in the US can improve, focussing on preparing teachers to integrate technology into the classroom, by considering influential factors and the purpose of education in society. A brief observation of several countries and cultures reveals America's leadership position in administering public education. The analysis identifies what affects the success and failure of professional learning plans have on teachers and schools, and identifies traits of professional learning in education that may yield the desired results. It also examines several cultural factors that can enhance or impede technology integration success. The review of research reveals that successful technology integration requires a shift of focus to the needs of learners (including teachers as learners), by transforming how teachers learn about and use technology in the classroom, and the importance of leadership, culture, and vision on students' ability to develop 21st century skills.

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Technology in the workplace is no longer a luxury, it is a necessity. Students must possess technology skills if they are to succeed in the global workforce. Employers expect students to learn how to use different types of technologies to be efficient in their work, solve problems, and communicate effectively. Schools throughout the world are struggling to find the right mix of teacher professional learning, technology use in the classroom, and proof that integrating technology into curricula will yield the type of skills employers expect of 21st century learners.

Literature Review

Achieving 21st century skills in American schools has been the emphasis of educators for many years. These skills are typically defined as a group of competencies needed for college and career readiness. Among them is the ability to use technology, as well as critical thinking, global awareness, digital skills, like research, communication, and creativity, and a range of dispositions, and beliefs (Soland, 2013).

Attaining necessary competencies is not exclusively an American education issue. The perception that world educators are working on similar issues is evident in research and case studies that seek to investigate similar goals in other countries. Reports about the changing roles of teachers and students are identified throughout recent studies. Felipe Oyarzo Pineida, from the Ministry of Education in Chile specifically discusses the importance of accepting that technology is an important element of the future and is essential for teachers and students to embrace as a

permanent part of education. He expresses the need for teachers to recognize how today's learners are different in this century and must adapt their teaching practices, as a result (Pineida, 2011).

Skill, Education and Employment

Although conversations about 21st century skills are somewhat universal, the context in which they occur is not. Culture influences education across the world. In a recent study of 18 countries, observations identified that some cultures have competing educational needs; vocational versus academic, based on the needs in local communities (Heisig, 2015). In the Philippines, a high number of youth and young adults are undereducated after leaving school to obtain work out of necessity (UNESCO 2009). The nation's technology infrastructure did not support technology in many schools, and an education initiative was established to provide internet service to develop an online education program that will re-educate youth in several cities in an attempt to strengthen the knowledge base of its citizens. (2009).

Several patterns emerge through international research including the need for society to sacrifice education in communities that depend of workers as a resource for productivity, and the need to invest large amounts of time and money where technology is being integrated into the environment. US higher education is being used as a model for other countries (Powell, Bernhard & Graf, 2012). It is important to remain focussed on the purpose of education. The US is a knowledge society and values education as the basis of preparing for work. Modern culture relies on the continuous stream of young people with well developed skills in order to advance society. Unfortunately, teachers in America are not being trained in college about how to integrate technology into teaching (UNESCO, 2012). Schools (K-12) often have an expectation that

teachers will have adequate technology skills upon hire, and employing school systems are not the place where teachers learn these skills. Although many use technology regularly in their personal lives, they lack understanding about how to segway their personal technology use and knowledge into teaching (Ertmer, Ottenbreit-Feltwich, 2010). This dilemma presents a problem that schools are scrambling to solve. Employees (teachers) lack the very skills they are expected to teach to their students (Powell et al., 2010)

Inadequate skills, whether related to technology or academics can affect employability. Adults with lower levels of academic skills who were educated in academic tracks (such as college prep, AP, etc.) versus vocational tracks, (where rudimentary academic skills were less important), were less able to find good employment as a result (Heisig, 2015). Their communities had employment opportunities for those with vocational training and/or higher knowledge skills but adults with no vocational skills, and low knowledge skills, math, science, reading for example, were less employable (2015).

The significance of the study is the observation of a gap that, for those adults began in early childhood. As children with lower academic skill progress in academic tracks, the gap widens resulting in adults who are less capable of obtaining good employment (Heisig, 2015). As American school administrators evaluate how and where technology plays a role in education, global studies help identify potential areas that could result in long-term disadvantages for some adults. US public school systems are largely based on academic tracks due to the country's knowledge-based economy, therefore a gap in learning and skill may have noticeable consequences in years to come.

Culture and Education

Understanding global education issues is important to American educators whose roles include developing professional learning for teachers. Many countries do not have internet access and instead, rely on cell phones as classroom technology (UNESCO, 2012) while other countries are only beginning to include classroom technology in their vision for education. Germany, for example, recently proposed investing 5.5 Billion dollars (US equivalent) for the purchase of technology in schools and necessary professional learning for instructors (Brady, 2016). In the US, states are considering alternatives to traditional brick and mortar classrooms that allow students access to personalized education through online schooling. Alabama recently proposed a law (Alabama Act 2015-89) requiring all school systems to offer online education meeting graduation requirement of grades 9-12 (Maddox, 2015). Online education options offer non-traditional learning opportunities for students as well as new, technology- focused employment options for teachers.

Other cultural considerations affect the development of students' 21st century skills. Private schools, in particular Catholic schools, have unique cultures. Catholic education systems in the US serve the undereducated and poor, and are typically poorly funded (Schuttloffel, 2012). Some Catholic schools have found workarounds to ensure technologies they use in teaching have the greatest impact possible on students' college, and career readiness. These schools partner with their community for funding and professional learning of teachers (Robison & Smarick, 2016).

The Ottawa Catholic school board in Canada (CEA-Ottawa) serves as a benchmark for success in integrating technology into schools. They provide examples to other Catholic schools wanting to improve technology use in the classroom while honoring their faith-based culture. The system attributes their success to leaders who create a culture of trust, allowing teachers to feel comfortable as they gain the necessary technology skills and learn how to integrate them into teaching, along with a tremendous investment of money and time into using technology and pedagogies that are results oriented (CEA, 2016).

Success and Failure in Integrating Technology In a rush to provide devices for students and teachers, school can easily neglect key components of the process that are necessary for successful integration. There are difference between technology Installation and integration. From an international perspective, Pineida (2011) reminds us that teachers and students must perceive technology as both important and essential to developing society, and that quality learning comes from teachers competency - knowledge of the developmental stages of child learning, specifically.

Ore points out one of many benchmarks for successful technology integration is providing teachers with instruction for integrating technology into curricula (Orr, Kamdar, Lewis & Vahey, 2015). Teachers need both strong technical skills in the use of devices (UNESCO, 2012), and strong content knowledge, as well as pedagogical knowledge in both technology and content (Harris & Hofer, 2016)

Because teachers will use technology differently in various areas of education, professional development for teachers should be centered on the learner's' activities at each

developmental level (Harris, 2016). It is necessary that both teachers and students develop key competencies in order to foster the growth of 21st century skills (Pineida, 2011). Heather Hill, of the Harvard Graduate School of Education reviewed research showing that many teachers do not have high regard for professional learning as nearly half reported it was a waste of time, and conflicts in teaching instruction caused greater confusion. In addition, teachers in the public sector who rated their own teaching performance high were less likely to see corresponsive student learning outcomes than teachers in Charter schools who rated their teaching skills lower (Hill, 2015).

CEA-Ottawa avoided several known professional learning pitfalls. Ottawa schools relied on teachers modeling for each other, good technology integration practices and providing personalized support. (CEA, 2016). Ottawa schools self reported that their culture was one free of judgement and criticism, allowing teachers to try new technologies without fear of failing, resulting in attitudes that promoted growth (2016). Professional learning may vary in different environment however research suggests teachers' attitudes play a role in its success.

The influence of Leadership. VItal to successful integration of technology in schools is the vision of school leaders, which is generally understood to influence the school's culture over time. Technology integration plans should consider sustainability of technology, internet access, and the investment in teachers' knowledge of how to use and integrate it into curriculum (UNESCO, 2009). Sustainability is not to be confused with availability of technology. Many schools have amassed technology but as Ertmer and Ottenbreit-Feltwich (2010) point out, despite the availability of both technology and training, teachers are not using technology to its fullest potential in the classroom.

Negative effects can be seen when leaders fail to provide adequate support to teachers while using technology in teaching. During the initial efforts of the eSkwela program program, an online option for re-entering high school, community leaders and teachers had hope for its success. In subsequent years the failure to support technology, shortcomings in the infrastructure, and the lack of ongoing professional learning support, caused some teachers to abandoned the new teaching methods resulting in lower than expected numbers of graduates (UNESCO, 2009).

Professional Learning Methods that Work

Regardless of where in the world technology integration occurs in schools, some key factors for success have been identified. that show both teachers' and students' performance can improve as a result of leadership, good technical support, peer modeling, and professional learning about how to integrate technology into teaching (Gulamhussein, 2013). A two year study of professional learning about technology integration in Catholic schools was determined to yield positive results for the science and math teachers who voluntarily participated **(**Kuchey, Morrison & Geer, 2009). In the study student learning results were mixed (some made gains greater than others but all gains were attributed to technology use in the classroom), and the vast majority of teachers reported positive gains in their understanding and use of technology in teaching (2009).

As stated earlier, the early years of formal education can be critical for learners, especially for students who may struggle to learn at the average pace. Several factors have been observed that consistently appear in classrooms where technology is used with success. They include: possessing some technical knowledge and confidence using technology for teaching,

using standards-based instruction as a guide, and choosing technology related lessons that are appropriate to the developmental level of the students in the class (Cameron, 2015).

Unfortunately, teachers who rely on the technology to influence student outcomes are not likely to see results (UNESCO, 2012). Also, a study of the effectiveness of curriculum supplements in the form of of electronic books and online quizzes was found to have little or no positive effect on student learning (Bell, Simone & Whitfield, 2016). On the other hand, teachers who use standards-based curriculum together with technology are likely to see gains in student learning, especially when the application also includes consideration for students' developmental understanding of both technology (ease of use) and content (application) (Cameron, 2015). Professional learning helps teachers transition from traditional teaching to teaching with technology, sighting the importance of teachers finding support from professional learning networks of other educators, and learning to use technology at their own pace (UNESCO, 2012). A gap in research leaves teachers and administrators to make their own decisions about which application actually improve students learning when technology is integrated.

Private and public school are facing short timelines to develop effective professional development plans in the US. Recent changes in learning expectations due to the acceptance of Common Core state standards in the majority of states excellerates this as a priority. The Center for Public Education has proposed a short list of manageable professional learning guidelines for schools to follow that will they believe will lead to effective professional learning for teachers (Gulamhussein, 2013). The list includes providing adequate time for ongoing professional learning, technical support of technology, modeling the use of effective technology, targeting

grade specific use of tech in the classroom, and establishing authentic experiences in which technology is used by students that are or simulate desired 21st century skills (2013).

Conclusion and Call for Research

Technology plays a large part in the skill set employers are looking for among candidates within knowledge-based societies, like that of the US. School leaders must take steps to prepare for the necessary investments of time and money needed to create the infrastructure, technical support systems, professional learning programs, and cultures that encourage teachers to learn independently and work together to acquire the technical knowledge and understanding needed for successful integration of technology into teaching.

Technology and education do not intuitively fit together in spite of the current generation of teachers who are digital natives, those who have never known a time without technology. As the world continues to come together as a workforce, schools in the US and other countries are examining how to include technology in education in useful, sustainable ways that help students prepare for employment in a global economy. Education institutions are recognizing the importance of preparing teachers to use technology effectively by changing professional learning, pedagogy, and curriculum in support of a shift toward the needs of learners. Teachers and students must be receptive to these changes in order to bridge the gap between personal and professional/academic use of technology as education systems forge ahead to establish the next generation of 21st century leaders.

As teachers gain confidence in their technical skill and understanding of the purpose technology and electronic services (i.e. cloud technology) in developing 21st century skills, the need for more and better research arises. Administrators need to understand effective ways to

leverage relationships to defray the long-term costs of sustaining technology rich schools, or obtain start-up capital and talent for initial technology integration plans. Teachers need guidance about how technology can deepen student knowledge so they can accurately discern useful applications from product marketing campaigns.

Research is needed to educate school leaders and teachers about why and how technology in teaching can enhance students' ability to think critically, become more globally aware, and use technology for creative expression and communication. Finally, research is needed to identify specific competencies employers sight are lacking in the preparation of students for the 21st century workforce so schools systems can become proactive in meeting the needs of individual cultures across the world.

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