Embracing Technology: Why is it so hard?

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**Abstract**

While technology continues to change the way students are learning the role of the educator is expected to change also.  Teachers are being encouraged to adapt and adopt new practices to move forward in preparing 21st century students for a globally, connected society.  Students believe that this world should be extended into our schools (Project Tomorrow, 2010); however, many educators have different perspectives of integrating technology in the classroom.  As schools are increasingly investing in technology and many educators, policy-makers and parents continue to support technology integration in classrooms; teachers are often the ones most apprehensive of incorporating technology in their classrooms.  Why is it so hard for teachers to embrace technology?  Does history play an important role in educational media today?  What about leadership and the right professional development for teachers?  The findings in this paper suggest that technological change involves many dimensions that make it difficult for educators to embrace technology as easily as they should.

**Introduction**

Zhao and Frank (2003), question why technology is not as easily embraced in schools and use the metaphor of our ecosystem to compare the natural habitat to our educational habitat.  They also suggest that teachers, being keystone species, have control over technology uses and implementation, and the outcome of whether technology is integrated and how it is integrated is dependent on this.  As this article was written in 2003, bulky computers, limited space, teachers’ unwillingness to take students to the lab, and lack of access to computers at home should no longer be factors that limit the use of technology in schools.  So if this was the excuse back then, what is the excuse for teacher resistance now?  Zhao & Frank (2003) argue that teachers’ attitudes toward, and expertise with, technology are key factors for the lack of use of technology.  In this paper, I will argue that it is more than just teacher resistance as to why technology is not being embraced as easily as it should be, and that there are many factors which add to the dissonance in teachers embracing technology.

**The Evolution of Technology and Teaching Practice**

There have been a plethora of technologies brought to the forefront of education over time; some technologies have been transformative while others, not so useful.  However, many have contributed to further improvements to Instructional Design models and technologies used in education today.  Today’s society uses technology to access, communicate, create, share and collaborate, much different from the days when it was all about how one presented their information.  There was a time when “aesthetically, teachers using PowerPoint slides may be unwittingly educating a questionable cognitive style, shifting their students’ gaze away from nuanced human gesture and facial expression toward a hypnotic corporate gloss, and thereby altering classroom atmosphere and tone, even as they efficiently deliver the “content” of their talk” (Adams, C., 2008, p. 283).  This time in history when PowerPoint took over classrooms was much similar to the overhead projector days when the teacher slowly uncovered her words simply transferring knowledge. One might ask what is the impact of technology on student learning today?  Howard (2013) states that the potential benefits of technology integration to student learning are still emerging but not yet entirely clear. “This uncertainty has led teachers to feel they may be risking teaching time and student achievement when using new technology in their teaching (cited in Howard, Sarah, K., 2013, p. 357).  With technology changing so rapidly, it is difficult for teachers to always stay current with new technologies and must believe in what the new technologies have to offer and whether or not it will make a difference in the classroom. In my personal experiences, veteran teachers are often the ones who resist change the most as they believe that traditional methods are best.  In fact, only a couple of years ago did I work with a veteran teacher who was still using an overhead projector in her class.  These teachers are not trying to be difficult; they have probably had a lot of success with their tried-and-true lessons and strategies, and new changes may seem unnecessary.  From the 1980’s when debates about whether classroom computers should be used to teach LOGO or BASIC programming to present day where the buzz is around the importance of STEM (Science, Technology, Engineering and Mathematics) education in K-12 classrooms, these educators have been around long enough to know how the education pendulum works.

In Sydney Pressey’s (1961) video about the Automation of Education, he made the comment: “A teaching machine may assist but it can never replace a living teacher..it is still just another tool and the effectiveness of a tool depends on the skill in which it is used.”  With a strong movement towards a utopian vision of education’s future, schools are equipping classrooms with laptops, interactive boards, iPad’s and software geared at all kinds of learners.   Resistance from teachers can then also stem from the fear of technology replacing them.  Li (2007) conducted a qualitative study with a survey method within it, and examined students’ and teachers’ views about the integration of technology in schools focusing on rural and urban secondary mathematics and science teachers and their students.  Li (2007) interviewed 15 math and science teachers who were intentionally chosen based on their teaching experience, averaging six to 15 years, and including a beginning teacher and one who was near retirement.  Individual and focus group interviews were conducted to collect the teacher data, and topics ranged from questions about their professional experience to their experience of integrating technology into teaching and beliefs about the role of technology in education.  Interestingly, several teachers commented on the traditional textbook approach being better suited for weak students than technology-supported learning.  These teachers recognized that their students loved technology, however, it was never considered to use technology to enhance the weak students’ understanding.  These teachers believed that traditional “drill and practice” is what the weak students needed in order to advance in their learning.  “Oversold and underused,” as described in Cuban’s work (cited in Li, Q., 2007, p. 390), speaks to this exact notion where technology is implemented in almost all schools but teachers are not using them.  Twelve teachers in the interview mentioned the fear that technology would take away from “real learning” and that if teaching without technology has worked for many years, why change the practice?  Placing technology in the students’ hands would mean a fundamental change in the teacher’s role and teachers would go from being “a sage on the stage to a guide on the side.”

**Institutional Leadership**

Leadership is a key element for successful educational reform and innovation.  Zhao & Frank state: “Although societal institutions and federal and state policies are remote from individual classrooms, they undoubtedly penetrate teachers’ immediate contexts to affect technology use” (p.816).  When pressures from top-down funnel through a system, the implementation of any reform become difficult unless the educators responsible for supporting it have fully embraced it. For example, in 2007 the Alberta provincial government provided funds to the Calgary Board of Education (CBE), the largest school district in western Canada, to standardize a district-wide implementation of the interactive SMART Board ([www.smart.ca](http://www.smart.ca)). With the implementation of this new technology came the expectation that teaching approaches, and essentially the totality of learning experiences, need to change (Glover and Miller, 2001).  O'Hanlon (2009) states: “With many teachers, the way a technology is introduced into the academic environment can mean the difference between adoption and abandonment. If teachers believe they are being forced into using it, they will resist, especially if you don't show them what value it will bring to their classroom.”   Although there was training offered to teachers for integrating the Smart Board in their classroom, some teachers needed more time and the capability to learn more on their own in order to feel comfortable in using the technology.  For those who did not get that time or support, unfortunately it became another technology left to collect dust.

Finley and Hartman (2004) conducted a qualitative case study around potential barriers to the integration of technology in teacher-preparatory courses.  This study stemmed from “Preparing Tomorrow’s Teachers To Use Technology” (PT3), a United States Department of Education grant awarded to over 400 universities.  Western Michigan University (WMU) accepted this grant in 1999, and their focus was to enable all WMU pre-service graduates “to proficiently use technology in order to engage students in 21st century, collaborative, learner-centered environments” (p. 320). An implementation strategy was identified in the first year of the grant, and was primarily about institutional change.   It was important for Finley & Hartman (2004) to get the grant evaluators to understand how the integration of technology in teaching is central to the institutional change the grant is intended to effect.  They collected data on faculty perceptions from many sources, one being interviews.  Important themes emerged from their interviews, including participants’ perceptions of departmental culture.  One of the participants noted that “some of the technology being used does not seem to be what students are most likely to need in the field, suggesting that faculty use what is ‘cool,’ not necessarily what is most functional.   Gallant (2000) concurs with Finley & Hartman (2004), in that the qualities of the technological and operational support infrastructure of an institution is an issue and that to communicate “a vision of how and why changes are being planned or implemented, as well as ensure that changes are driven by learning and teaching issues rather than by ‘the imperatives of economic rationalism or the ‘silicon veneer’ of technological determinism’” (p. 73) is critical. In other words, it is easy for administration to purchase the “latest and greatest” for their schools and may not fully consider the affordances of such technologies.  This lack of planning and oversight is what leads to technological determinism.  Technology standards also continue to guide grant goals, which is both positive and negative for schools.  The positive is that schools receive “x” dollars for all this new technology but the negative are the questions that face pedagogy and belief around how students are learning and how teachers are teaching.

**Professional Development**

Current professional development for teachers often does not effectively support teachers in transforming their instruction (Crawford, 2011).  School professional development days are usually held monthly and involve a full day of in-service on a specific topic or issue and teachers are left at the end of the day to think about, explore and/or implement new ideas. According to Gallant (2000), these “one-shot” training sessions are not the most effective.  She says, “Professional development, especially that which is squeezed into already busy schedules, will work best if it is designed as an ongoing incremental, and cumulative process, a continual cycle of ‘renewal and growth’” (p. 324).  Li’s (2007) study revealed that the more comfortable teachers felt in the subjects they were teaching, the more apt they were in integrating technology, and that “teachers’ willingness to integrate technology was connected with their comfort level in teaching, in technology, in the students, and in the content” (p. 390).  There has been a large scope of educational technology research done with regards to teachers’ knowledge and use of technology, and it is well known that “teachers showing higher levels of confidence and competence using technology are more likely to integrate it in their teaching” (cited in Howard, S., 2013, pp.360).  These teachers are often ones to take risks, innovate, and change their teaching practice than other teachers.  Baylor and Ritchie (2002) defined this term as an openness to change.  They argue, “openness to change is one of the most critical predictors of technology integration” (cited in Howard, S., 2013, p.361).  Howard (2013) did a qualitative analysis of one Australian secondary mathematics teacher’s beliefs about, and experiences with, technology integration.  Her study included three one-hour semi structured interviews conducted over one year (2008), and the use of technology mentioned in the interviews was triangulated with classroom observations.  The results of this study concluded that the participant’s decision to not use technology in her classroom was based on anxiety, fear and dread of technology use.  Finley and Hartman (2004) state that in order for people to adopt any innovation, they need to feel comfortable attaining and using the required skills and knowledge.  They concluded, “lack of training then, has been found to be a key source of “cyber-anxiety” (p. 323).  To address the perceived risks related to technology integration, Howard (2013) recommended to provide risk communication in professional development by training and equipping teachers with coping strategies, such as managing technology failure and off-task students.  In order for this to happen teachers need time and support, and this is one of the biggest concerns stressing teachers today.  In the most recent and longest British Columbia teachers strike, nearly half a million students and more than 40,000 teachers were out of school for nearly three months. Class size, salary, pension and benefits were some of the issues affecting teachers and were addressed through this strike (www.cbc.ca).  Government underfunding has a severe implication on teachers and in classrooms.  Without the right funding, teachers do not get the time needed to share and collaborate with other colleagues.  Infrastructure is affected, as schools cannot afford to pay for more bandwidth even though they have Wi-Fi.  Low funding also means less IT personnel to help support issues that arise in schools.  Zhao & Frank  (2003) mention how teacher and technology co-evolve, and with all the issues schools are facing, not only using and implementing technology, but with troubleshooting when technology fails, it is understandable why many schools have “extinct” equipment stored away.

With all these issues at hand, changing philosophy and integrating technology is an even more added stress on the educator and therefore, is less likely to adopt new technologies in their classroom without proper support and funding.    Zhao & Frank (2003), state that, “the more contact two species have with one another the more they adapt to each other” (p.826).  This concurs with the 70:20:10 model developed by Morgan McCall, Robert W. Eichinger and Michael M. Lombardo at the Center for Creative Leadership. The 70:20:10 model describes how learning occurs: 70% of lessons learned are from real life and on-the-job experiences, tasks and problem solving, 20% from people (mainly leadership) such as feedback and from observing and working with role models, and 10% from formal training such as courses and reading ([www.princeton.edu](http://www.princeton.edu)). Many formal learning interventions continue to be information-rich and interaction-poor, meaning the power of experiential and social learning is ignored. Giving teachers the time to explore and interact with technology will support them in deciding whether or not a technology is appropriate to use or not, and become more comfortable in using such technologies in their classroom.  The digital ecosystem is big and being aware of what to use and when to use it is essential.

Howard (2013) recommends that in order minimize risk perception; alignment of technology integration with school and faculty aims and goals needs to be considered.  Her analysis identified that faculty and subject area norms still have the power to influence teachers who are risk-averse in teaching.  Findings from Howard’s participant in the study showed that even though the participant had a strong risk-aversion and anxiety using technology, she would still fulfill the requirement of integrating spreadsheets in her teaching.  This concurs with Zhao & Frank’s (2003) metaphor of schools as ecosystems and the power of social pressure in schools.

**Conclusion**

In this paper, I discussed a few factors that contribute to teachers’ apprehension and uncertainty to integrating technology in their classrooms.  Technology will continue to change and evolve and the uncertainty from teachers embracing new technology is only going to increase.  Howard (2013) concludes that “the key to helping teachers fruitfully engage with technology and change is to understand what is actually being risked, and what they perceive is at risk. Only with this understanding can teachers be helped to make clear decisions about technology and teaching, rather than resisting change with the heat of emotion” (Howard, S., 2013, p. 370).  This uncertainty can definitely lead teachers to consider what is at risk when using new technology. New tools are emerging faster than the time we spend getting comfortable with what is current, and it does become difficult for teachers to believe in what technology has to offer or whether or not it will make a difference. Pressures from top to bottom continue to play a key role in rapid change in order to stay current and have the “latest and greatest” tools. If the idea is to empower teachers to develop best practices for using and integrating technology, it needs to come from the ground up rather than being imposed from top-down. Support from leadership and time to share and connect with colleagues is necessary in order for teachers to consider integrating technology in their teaching methodologies.  Using the 70:20:10 model is an ideal framework for leadership to keep in mind to better support teachers in embracing technology use. Providing teachers with opportunities to apply new learning and skills and reflect and learn from the technologies they have implemented in their classrooms will help in bridging the digital divide. The benefits of action learning, such as giving teachers opportunities for both formal and informal mentoring and learning from administrators, colleagues and students will only help improve teachers’ capability to perform and apply what they are learning. Also, for teachers who are comfortable in their own teaching methods may not find it easy to break away from what is “tried and true.” Often enough, it is easy to express that the only way for an educational system to effectively equip students for 21st century learning, are for its educators to fully embrace technology. However, as discussed in this paper, successfully integrating technology into the classroom relies on much more than teachers’ willingness to embrace technology. It requires full alignment across the system, including policy-makers, administration, parents, students and teachers.

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