EDUC 639 Barriers to Pedagogy Change Literature Review

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Abstract

"Culture is a set of definitions of reality, including language, values and rules that set the limits for behavior, which are held in common by people who share a distinctive way of life. This shapes the way people behave, view the world, communicate, and think" (Recabarren, M, Et Al, P. 2920, 2008). People's experiences, upbringing, chosen careers, environment, and perspectives shape their cultural view of the world. This cultural perspective is also affected by how people handle situations, the support they receive, the strategies they develop to deal with problems, and their own self view (McCarthy, R., Berger, J., 2008). Throughout this literature review the subject of culture and subculture is explored within the parameters of a school environment and educational technology. This includes cultural differences in age, profession, and type of educational environment. The focus of this literature review examines cultural differences between information technologists, educators, special educators, and generational gaps, and asks if they can be bridged in the forum of professional development. Ecclesiastes 4:12 explains that one man cannot easily withstand an attack, two men can, and a threefold cord is not easily broken. This concept when applied to cultural differences infers that people may have weaknesses on their own, but when people with different cultural perspectives combine their strengths, and work together; the result is a much better product. This review proposes that the best way to facilitate the combination of efforts among the subcultures of education is within the forum of professional development.

Key words: cultural barriers, instructional technology, professional development, educational technology, technology gaps

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As emerging educational technologists and educators, we are often confronted with the multi-faceted issue of how best to integrate technology and curriculum. To make an authentic attempt to find a solution to this widely-shared issue, one must first examine some of the stakeholders and the gaps that need to be bridged in the process. Educational technology should, by design, be the answer to the original question of what keeps the stakeholders from coming together with an agreed-upon solution? The "us versus them" culture and the "haves and the have not's" of the social and economic divide are obvious sects that merit investigation, but what about the "use versus the use not's"? What prevents instructional and informational technologists from successfully collaborating with the teaching side of the house? How can the areas of special education and general education come together over shared goals and sound pedagogy principles to work together on technology integration and curricular change? Is professional development a part of the problem, or a part of the solution…or both? Identifying these areas of focus and the literature surrounding them can help illuminate gaps in empirical evidence that may contribute in paving the way towards a solution that can allow educational technology and pedagogy change to work in tandem to support, engage, and empower faculty and the students they serve. We examined literature surrounding cultural barriers, information/instructional technology and instruction, general education and special education, and professional development, in hopes to frame a discussion of educational technology and its challenges.

The Culture of Educational Technology: I/T and Instruction

Immediacy. Choice. Learning. Engagement. Collaboration. Identity. Reading Bonk's (2009) book, *The World Is Open*, these dynamic words came sharply into focus for the team.

Bonk (2009) takes readers on a journey beginning with the development of education over time, moving on to discuss the importance of access and the concept of perpetual learning. He examines acquiring that knowledge as part of a global community, and illuminates the abundance of free resources for learning. Wrapping it up with collaboration, identity, and building community in a mobile world, the author paces through the topics that highlight distance learning today.

The purpose of the book is to examine the ubiquitous nature of technology with special regard to mobile devices, and how the reality of on-demand learning also allows a student to participate and contribute to the world of learning 'on the fly'. Bonk (2009) discusses the ability that the web gives for many to share and learn from the experience of the few. The book breaks down ten key technology trends that directly and indirectly impact our learning, represented by WE-ALL-LEARN. Bonk (2009) presents an optimistic future for education, framed in the global community.

Bonk (2009) was able to reinforce several theories often referenced in literature and research, even those contained in this review. Article upon article question the evidence of the low impact that technology, in all of its glory, actually has on education the majority of the time. This is widely accepted as a result of inadequate training and support on the part of those who are tasked with implementing and reporting on expected outcomes. Bonk also discusses the obvious correlation between the pervasive technology tools we employ as students and the need for student-centered curriculum. One must question if it truly matters which variable is driving the other, since it simply reflects the world in which we live.

There were many parts in the book that struck the team as authentic and impactful, but one in particular spoke to a shared personal educational technology philosophy. He introduced a

chapter in the book by reminding us that there is nothing new under the sun. He reminds us that educational philosophers from long ago would not be surprised by the magnitude of the educational pedagogy shift that we are currently facing; in fact, they knew it was coming. The rights of the student, the need to balance work, family, school, and time and budget constraints, all point to distance learning and virtual education. We live in a world with constant informational flow, and whether that is a positive factor at all times is up for discussion. However, in a world of shrinking budgets and pervasive technology, we must all embrace the student-centered model in order to reach them where they are, retain them, and see them successfully through to a life with more options.

In response to questions regarding the validity and equality of virtual and traditional education, McFarlane (2011) investigates the effects of organizational structure on pedagogy. He reviewed previous literature, and aimed to establish an agreement that education's function doesn't necessarily increase or lessen based on the modality or method. He proposed that organizational structure and educational philosophy are just as important in a virtual education as in a traditional education medium. Acknowledging that education is foundational to our societal development, McFarlane (2011) discussed common misconceptions about virtual education, such as the curriculum is easier than traditional classroom curriculum, and that there is no social interaction in a virtual school.

McFarlane (2011) defines essential distance learning and educational terminology as a means of ensuring a common understanding of the foundational topic. Additionally, he discusses the differences between web, video, and web courses with consideration of the synchronous versus asynchronous delivery methods. After discussing different organizational structure theories and how they impact the decision-making and design process of education,

McFarlane's (2011) writing culminated in the over-arching theory that if the goal of virtual and traditional schooling is the same, it is reasonable to assume that the pedagogy and curricular design is also in alignment.

There were a few statements that caught our attention in reading this article, the first being the assumption that every student in distance learning or virtual education is experiencing the equivalent of being in the front row of a physical classroom. It is widely accepted that students experience different levels of comfort and confidence in an online classroom. Some students, who may be shy in a face-to-face setting, may flourish under the anonymity of a virtual environment. Other students may be so intimidated that they fear interacting with technology more than in a face-to-face environment. In addition, the author seemed to be missing a big piece of the puzzle by not acknowledging the cultural and economic barriers that prevent some students from participating in virtual education.

McFarlane (2011) also indicated that virtual education eliminates the potential for discrimination. This broad statement fails to take into account the amount of cyber-bullying and poor netiquette that can grow rampant if not checked in an online environment. Considering the fact that this article was published in 2011, it was shocking that so little attention was paid to the advances that virtual education has made since those misconceptions were formed. McFarlane even indicated that curriculum of virtual education is often more narrow and limited than traditional school offerings, which defies all widely-agreed-upon current fact.

The lack of integration of current technologies and collaborations tools, i.e. wikis, blogs, MOOCs (Massive Online Open Courses), social networking, and virtual synchronous meeting spaces, was very surprising, and the team felt that including that ability of students to communicate more easily would have gone farther in proving his points. The ubiquitous nature

of social networking and technological devices in society today do, indeed, allow for more collaboration and communication than ever before. One can conclude that while not every teacher or student is prepared for virtual learning, the options and opportunities are plentiful.

Seale and Cooper (2010) address a large gap in instructional technology by studying the relationship between accessibility and pedagogy. The authors start by defining accessibility, framed in a definition of disability with regard to education. They focus on the access issue being a 'trait' resulting from the mismatched relationship between the learner and the delivery medium. The point is made that the learning environment must be adaptable based on the needs of all learners in order to be truly accessible. However, the authors go on to highlight the importance of teachers making adjustments to the curriculum in addition to the technology itself being adjustable. While the number of educational technological tools is plentiful, the number of teachers who are able to embrace the tools with appropriate expertise is lacking. This lack of buy-in creates a low threshold for the tools to actually have an impact on the learning process.

By examining and building on existing literature, the authors illuminate how the tools must evolve beyond reporting technical weaknesses or errors, but must also be able to address conceptual needs, such as bridging the digital divide and accounting for various learning styles in content. Different 'tool kits' to address this area are discussed, and the exploration of various cognitive learning theories culminates in the belief that pedagogical accessibility and adaptability are as crucial, if not more so, than technical accessibility.

While the authors performed an extensive involvement of literature, there was no experimental data to consider. Much of their subject matter culminates in creating a theory. Although the researchers include product evaluations to align with their hypotheses, they focused on a select number of 'tool kits' for pedagogical tools that address accessibility. The

involvement of actual educators experimenting with a tool kit in order to address some of the areas they highlighted through their research review would have been extremely powerful in validating their theories. The authors' attention to detail by communicating specific definitions for each step of the theory building was important for enhancing understanding. The authors wrote a carefully detailed article, making sure to communicate specific definitions at each step of the theory-building to keep the reader on the same page, which I appreciated. When reading such a high-level academic piece of literature, it is reassuring to be grounded by common terminology and familiar content. The team came away from reading the article feeling that the authors were not as detailed about the generic pedagogical tools, and feel that more depth in that area would have added more to our understanding of the topic. The discussion of the models used in conceptual tool evaluation seemed too brief to really highlight that area; it would have been even more beneficial had the authors narrowed their discussion to just a few concepts in the topic area.

Collins and Halverson (2009) brought attention to the wide swath of daily life which has been transformed by technology. Work, leisure and home life have been fundamentally transformed by the inclusion of technology and the free acceptance of technology tools. The field of education is the last holdout in the digital revolution that has touched people from toddlers to geriatrics. Failure to make a change in how we educate could have real, lasting consequences for our students.

Since much of what a student learns is outside of the classroom, educators should be prepared to challenge students using the tools with which they are already familiar and comfortable. This embracing of non-tethered technology will push education beyond the four walls of the traditional brick-and-mortar classroom, and challenge students to observe the world

around them in a more holistic manner. To bring the change that is needed, educators must tackle various challenges, which include:

- the struggle between uniform learning and customization
- viewing the teacher as the expert as opposed to opening the door to a multitude of various expert sources of understanding
- competition between standardized assessment and specialization
- the difference between learners holding the necessary knowledge in their head as opposed to having access to resources
- learning by acquisition as opposed to learning by doing among other points.

Collins and Halverson (2009) see the seeds of a new paradigm growing in the future. In this new model, the construct of a central learning platform will be less ubiquitous. The future learning model will include multiple, varied options for the learner. Online learning, adult education and learning centers are just a few examples of a new approach to deeper understanding for the learner.

One central issue with the underlying current of this article is the authors' assumption that we can truly escape the binds of a central educational structure. The brick-and-mortar foundation of our current educational paradigm is deeply engrained into the consciousness of the American learning community, both on the side of the learner and the instructor. Although presented as an exemplar, the homeschooling model falls short of showing the path forward for k-12 education, as it is not widely embraced by the education community. Real, effective change takes time to prepare, establish and endure. A team member, a former lobbyist for Florida Right to Life, remembers dreaming out loud with legislators and friends about what the pro-life movement's goals would be a decade ahead. That exercise was helpful in focusing all involved

towards accomplishing the incremental goals that would move them toward larger change. Incremental change tends to draw more disparate extremes toward the same goal. There was often surprise at who came together to work on the controversial legislation. All of this in mind, Collins and Halverson (2009) still offer a well-stated discussion on the need of educators to think outside of the box for the benefit of our students. Technology is here to stay.

The article Cultural Divide and the Internet from the publication *Computers in Human Behavior* investigated the relation between cultures, sub-cultures, and the Internet. According to the article "culture is a set of definitions of reality, including language, values, and rules that set the limits for behavior which are held in common by people who share a distinctive way of life" (Recabarren, M., Nassbaum, M., Leiva, C., p. 2920). The article used a social distinction among private and state-subsidized schools within Chile. The primary impetus leading to the concern raised by the article over the cultural differences lies in the difference in online scholarship and loan application quality within the country of Chile. The concern is that there might be culturally based variances that resulted in different abilities or knowledge bases to contribute to the ability to properly fill out an internet based form, which could in turn become a discriminator for university entrance, thus continuing the economic divide among the subcultures.

The study referred to in the article used the following variables to measure aspects of culture: "power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation" (Recabarren, M., Nassbaum, M., Leiva, C., p. 2920). The study also identified four types of knowledge that would be applied to the use of the Internet: syntactic, context, semantic, and strategic. The experiment consisted of first year students attending the Universidad Catolica de Chile. A test was given to students on a computer involving questions on both cultural variables, and Internet knowledge. The study found the demographic of students from private

schools placed value and confidence in friendship and family relationships; however, they did not frequently place value in inter-gender relationships. The study found the inverse with students from state subsidized schools. There was also a difference found in masculinity and long-term orientation, which affected Internet knowledge. Overall, statistical variation was found between the two groups. The overall conclusion of the study was that web developers should consider cultural difference prior to developing websites to better serve each demographic.

This article covered a study that revealed that there are technological differences between different subcultures within a society. The study had been conducted in Chile where the demographic variable had a greater potential to have a difference in the respect of Internet use and understanding. It is valuable to know that there are cultural differences that have varying results when the Internet is used as an educational tool. This information may however be much different if applied to the United States. The living conditions and schooling system in Chile is likely to be much different than the United States, however the principle of the study and its results could still apply to various types of technology integration. It should be remembered that some subcultures would have different perceptions and financial restraints. It may be less likely to have as significant a limitation in Internet exposure in the United States; however, there will be newer technologies in the U.S. that will require special attentions when applied to various demographics.

The book *Considerations on Technology and Teachers: The Best of JRTE* is a collection of articles from the Journal of Research in Technology Education published by ISTE. The first chapter focuses on studies of laptop initiatives amongst colleges in the nineties. The concept of these initiatives were primarily to bridge the perceived technological divide of the time, and better prepare students for the possible technologies they might encounter in the work force,

create more competitive campuses, and provide equal learning tools. This concept had many names such as “ubiquitous computing”, “universal access’, or “digital unity”. According to Marc Weiser, the article referenced three phases of on-campus computer program. These were mainframes, followed by networks, and finally, seamless integration. In many ways, the laptop initiatives were a central portion of this process, and could be likened to the integration of the phone into our society with a higher rate of innovation. The article focused on two universities; Wake Forest and Grove City.

The Wake Forest initiative began in 1996 and incorporated a contract with IBM wiring Wake Forest for computers. The students were surveyed before they were issued laptops; they were then surveyed again each of their subsequent years of school. According to these surveys the “computer enriched environment generated a measurable change in student attitudes about computers” (Schrum, L., 2010, P. 398). Some other outcomes of the program included improved communication & improved appreciation and technical skills among the university faculty. The unfortunate side effect of this program was an increased technological divide between the generation that received the laptops, and those who didn’t.

The laptop program at Grove City University was implemented in 1994. Unlike the Wake Forest program, this program was studied in retrospect with students who had already graduated and entered the workforce. The study included students from four different graduating classes. Three of these classes (1998, 1999, and 2000) were provided laptops beginning their freshman year; the students in the class of 1997 were required to bring their own computers to school. A unique aspect of this study was survey questions based on Kolb’s Learning Style Inventory; it also integrated the three original goals of Grove City University. The study was analyzed based on 600 surveys methodically sent to students from each graduating class. This survey was

conducted in 2001 providing feedback from students one to four years removed from graduation. The 212 returned surveys were analyzed for demographic differences to ensure an even sampling. The class of 1997 was considered the control group because they were not issued laptops. The study found that students who had been fully integrated in the laptop program generally had a more positive view of technology than those who had not been integrated. The integrated students were also more satisfied with their college's technology support program; however, there was some disparity between the classes as to the extent of the quality of the laptop program with the class of 2000 being the most satisfied. A similar trend was apparent among the alumni in their opinions on their technological preparation. The study also surveyed the use of common computer applications such as games, word processing, presentation software, Internet, and email. Most of these applications were slightly inclined toward the male population with the exception of word processing, and email. The research found this to be related to the students' learning style, and chosen course of study. A male population, thus partially explaining the divide, dominated the types of disciplines that required more computer applications. The article ended with an updated comment on the modern version of these types of programs applying these types of approaches more recently to tablet PC's and electronic pads.

This chapter does have some outdated elements, but it is brought back to relevancy by the final portion of the text reassessing the material against current trends. Technology will most likely continue to be an evolution, and thus the types of technologies that institutions choose to implement and integrate will continue to change. The types of effects of distributive technological programs will likely return similar results. It can thus be expected that a program implementing tablet technology is likely to have similar results. The conclusion, thus, serves to demonstrate a manifestation of the prophetic assessment referred to by the article in Marc

Weiser's theory of what campus technology programs would look like inevitably returning a seamless, almost invisible presence of technology. Probably the weakest portion of the article is in the details of the Wake Forest study verses that of the Grove City University study. The best way to communicate better results would probably be to investigate further studies into this subject. A more current study incorporating the use of tablets, and tablet PC's would also bring more value to the subject so that the reader could see the results that transcend time and technological change.

General Education and Special Education

Many technological barriers can present themselves in both general education and special education. One form of education that is becoming increasingly popular is distance education. Distance education in itself can present barriers simply because of the mere "distance." Typically online courses are sought after because of the convenience and flexibility that they allow. However with any learning environment, as well as distance education, there are barriers that can hinder the learning process or the overall pedagogy. Technology is perceived by many to be a great resource that can bring a positive impact to any learning environment; this not only includes distance learning but the K-12 educational setting as well. Technology integration is being pushed in the K-12 educational setting but there are still barriers present.

Hew (2007) conducted a study that analyzed 123 barriers that were found to effect the current relations to technology integration with the curriculum in K-12 schools. These barriers were broken down into six main categories: resources, knowledge and skills, institution, attitudes and beliefs, assessment and subject culture (Hew 2007). Some of these K-12 barriers were present in research that were in connection to distance education; as mentioned by Zirkle when he categorizes the barriers into three subgroups and when the National Research Center on Rural

Education Support categorizes there barriers into the five subgroups listed above. "Although each type of barrier was described separately and broken into various subgroups, in reality the barriers are all related to one another (Hew, 2007). Zirkle (2001) states that there are three distinct barriers that present themselves in online learning environments: situational, institutional and dispositional. Situational barriers are described as the type of barriers that come from the effects of personal life outside of the educational realm. Often times if a student is having hardships in their personal lives, it too will show through to their ability to perform in their courses. This is true for any classroom environment, distance or traditional.

Institutional barriers can result from things such as lack of faculty training, time commitment and technical expertise (Irvin, 2010). Professional development sessions can assist in making sure that instructors and institutional staff are abreast of current technology and the best practices and programs are put into place. Ihde (2010, pg 74) states that "successful implementation of new policies, programs, processes, practices and even new personnel do not just happen." Interventions, professional development sessions, should be established in order to work through any institutional barriers that are present due to personnel challenges or training issues. "Faculty must be adequately trained to deliver instruction at a distance and continual professional development must be offered in order to keep up with technological change" (Zirkle 2010). This is not only true for general education instructors but also for instructors that perhaps have students with disabilities in their course. When designing courses, instructors need to take barriers into consideration so that they can better meet the needs of all of their students, general education or special education.

Zirkle (2010) refers to dispositional barriers as a learner's attitude towards their continued education as a distance learner. At times the attitude of a learner can be negative

towards distance education because they lack confidence in their abilities to perform in an online environment. Irvin (2010) mentions that student barriers can present themselves mainly due to little computer skill knowledge.

According to a study conducted by the National Research Center on Rural Education Support, there are five most common barriers to the use of distance education that rural school administrators identified. These barriers include "no need for distance education, funding, scheduling, not being a district priority, and personnel training" (Irvin, 2010, p. 80). These barriers to distance learning are evident barriers not only present themselves in rural areas as far as distance education but in all general education and special education. Continual research needs to be done on a large scope in order for instructors and institutions to understand the implications that these barriers can have on their courses and their students (Irvin 2010).

Distance education can present additional barriers with special education students. These barriers can hinder the distance education accessibility for students with disabilities. At some institutions assistive technologies have been put in place to help bridge the technological barrier that could occur with disabled students. Gornitsky (2010, pg 47) mentions that "assistive technologies are available but may not accomplish their goal unless the underlying design of the course or platform of delivery can provide the necessary information for the assistive technology to function successfully. " On the institutional level, there are expectations for all federally funded programs to have principles of equal education by making everything for the program accessible. However it goes beyond just being accessible, in order to fully meet the needs of the students with disabilities the assistive technology must be appropriate for the course and appropriate for the needs of the disabled student.

Some assistive technologies that could be used to enhance the distance education accessibility for students with disabilities would be WCAG 2.0 program interfaces that allow for online accessibility of websites, screen readers that can read text on a webpage for visually impaired students, text transcripts that have audio embedded on the website for hearing-impaired students or a mouth stick/head wand for the students that are physically impaired (Gornitsky 2010).

There will always be barriers in every realm of education, general and special education. Distance education is one form of learning that is constantly affected by these barriers. Distance learners are given the flexibility with their time and the freedom to work at their own pace in accordance with their course guidelines. However the barriers that are present can often hinder the educational process for the institution, instructors, IT staff and especially the students (Gornitsky 2010). Continuous advances in technology have allowed for some changes in the field of distance education to take place. However all barriers must be addressed in accordance with general education and special education guidelines, and students must have equal access to distance education in order for programs to reach their highest potential of effectiveness.

Professional Development: The Problem or the Solution?

Wright (2010) cites the notion that for many and for a long time, educational technology has been treated as an "add-on" to the general curriculum. However, by implementing the TPACK (Technology, Pedagogy, And Content Knowledge) model, educators may see a significantly better result. Wright (2010) formed teams of educators who were deemed Master Technology Teachers (MTTs) that were able to a) establish practices within the faculty that offers a wealth of collaborative opportunities; b) bring attention and awareness to new and emerging technologies that might be of use in the classroom; c) extend professional development

opportunities to staff; and d) focus on best practices in the use of technology in the classroom. In short, the MTT was challenged to seek out new and innovative ways of applying technology along the lines of current and emerging pedagogy.

Implementation was slow at first as teachers had to learn how to use the technology. As the comfort level of the teachers grew, the program was able to focus on new technology. It was not until the fifth year into the program of developing teacher comfort and adeptness that the program could be viewed as sustainable. Currently, the MTTs are well on their way toward helping teachers implement strategies that employ web 2.0 tools across the curriculum. The primary fiscal concerns present at the beginning began to dissipate by year ten, when tech savvy teachers were demanding less in the way of technical assistance and traditional materials like pencils and paper. Paperless classrooms had sprung up across the curriculum. Both students and teachers were working together to develop projects that challenged the students and used technology.

This study brings attention to the critical concept of collaboration between the IT team and classroom teachers. Up close, progress was painfully slow at the onset of the program as teachers were presented new tools and technology and instructed how to use them. As the program matured, teachers grew in their confidence and ultimately began operating autonomously within the Web 2.0 realm. This process works. It takes time and a long-term investment by the entire institution. All stakeholders must buy into the concept -- from principal to teacher to student to parents.

As with other qualitative longitudinal studies, this kind of program needs time and resources to take root and flourish. In time, real evidence can be shown in the academic development of the students finishing the programs at the school. It is clear that teachers benefit

from such an investment, but students are the ultimate beneficiaries of collaboration between IT members and classroom teachers. Picciano (2011) notes the importance of evidenced-based practices in goal and outcome setting to avoid distraction and confusion. Additionally, the planning process for professional development should be viewed as an ongoing process.

The study by Christie and Jurado (2009) embarked upon the desire to explore how much online instructors utilize the tools available to them via their institution's Learning Management System (LMS). The sample for the study was the lecturers at the School of Engineering at the University College of Boras, in which the authors used combined literature review and systematic observations to gather quantitative data. They coordinated a scheme of observations by soliciting information on the six most important tools in the LMS (WebCT). After validating the answers by looking in the course pages to determine how many of the six tools were used by each instructor, the authors surveyed the participants using Likert-scale questions.

Analysis revealed that the participants did not have the time or incentive to become experts in how to use an LMS. There were some tools that were utilized a maximum of 60% of the time, (i.e. content tools,) while other tools received negligible use, (i.e. whiteboard and student tips). The variation among the results could be attributed to any number of course variables. The authors concluded that not all LMS tools needed to be used in online or blended courses. The variables that affected the percentage of use in the results were great influencers in the measurement of usage. It was also agreed that the institution must continue to offer training and use development to instructors and students in order to get the full use out of an LMS and its tools. Motivation to use the LMS also plays a great role in tool utilization and success. Their study supported a prevalent philosophy of education in that technology should not be implemented unless there is sound pedagogy and faculty support.

The authors did well to acknowledge that all stakeholders involved need to be on board with major pedagogical change, especially when technology is involved. The amount of planning, training and resources can be overwhelming, and may be met with resistance or avoided altogether if the buy-in is not there. The sample of engineering instructors at the University College of Boras is too small and unduplicated to be considered credible in the world of statistics-gathering, but the process and procedure for gathering the data and classifying the variable seems based in common sense, which is always sound practice.

The recognition that content plays a large part in what tools are used is also an important factor. While the study encompassed all engineering instructors, the course content was varied across the sample, so perhaps more research is needed in comparing an even more relevant and comparable sample. It may be a more clear analysis to take instructors teaching in the same discipline and the same course content-type. Making this slight change in analysis would achieve validity and illustrate more about what tools are appropriate for the content and how often those tools are used.

Shamir-Inbal, Dayan and Kali (2009) approached this study in order to design a three-year professional development model using a socio-constructivist approach, providing educators with much needed support for development and implementation of online activities. The Teacher Professional Development (TPD) model was implemented over three schools with 45 teachers, utilizing quantitative and qualitative analysis. They measured the production and quality of online materials to be significantly higher after the teachers completed the TPD. School internet traffic also increased significantly, and remained at that level at one-year post-project completion.

Positive results were seen with teachers learning to rely on each other while building internal resources to increase the likelihood of sustainability. The school reform framework and the technology adoption life-cycle framework were utilized to interpret the findings and measure success and sustainability of the project results.

It is widely discussed among educators that regulations and requirements often come to fruition with no money, time, or other resources available to meet the deadlines. The 'No Child Left Behind' Act may be the largest of these mandates, but as the importance of recruiting and retaining students rises, technology implementation plays a large part in attracting and keeping those students. One of the best points the authors made in the article centered around the briefly mentioned fact that schools will often implement superficial changes in order to meet the technical requirements being asked of them, due largely to time and budget constraints. The pressure to be innovative while doing more with less increases the probability of "band-aid" implementations.

The authors make a very strong case for carefully planned and thoroughly supported professional development with regard to educational technology and online resources, and speak to the divide between the I/T and teaching departments. Without strong communication and cooperation, the actual needs of the teachers and students may not be where they should be on the priority list for establishing technology goals. It is crucial that technology only be implemented when it serves the target demographic appropriately, be that teachers or students. Implementing cutting edge technology, when no one is interested or willing to commit the time to mastering the technology, is just one more frustration that decreases morale and increases the amount of waste in spending.

Collaboration among educational professionals is a skill that must be cultivated (Musanti & Pence, 2010). In their longitudinal qualitative study of certified English as Second Language (ESL) instructors, Musanti and Pence (2010) discover that inasmuch as collaboration requires flexibility and open-mindedness, the study of collaboration requires the same dexterity. The authors cite this study as standing on the foundational idea that knowledge is gained by human social interaction and that collaboration is a synthesis of connectedness, joint purpose and conflicting thoughts and values. This synthesis is what drew the project administrators away from a rigid adherence to the original goals of tracking teacher response to prescribed activities and toward a better understanding of what it means to collaborate and all which that entails. The concept of professional development (PD), as commonly viewed, has a strong and negative stigma. The idea that PD is a means of "fixing" teachers transfers into the realm of collaboration, as well. Collaboration as a means of PD is a powerful tool, but like any tool, it must be skillfully handled and maintained to remain in good working order. Teachers must learn to collaborate. Organizers of the study discovered that each individual brings pre-existing knowledge and emotion to the process of collaboration. The long process requires an individual, long-term commitment to the goals and vision of the larger group. One individual in the collaborative group with intransigent emotional attachment to one way of instruction can cause deeper issues for the rest of the group. Along the way, Musanti and Pence (2010) discovered that resistance to peer evaluation and deflection are two obstacles to be overcome in the process of collaboration. Although the effort is not an easy process, the benefits reach far beyond the classroom.

The findings of this study have real, practical implications for daily practice. First, the value of collaboration as a means of building better practice in the classroom is beyond the traditional idea of PD. In an authentic collaborative environment teachers openly share

information about what works in context while they are genuinely open to the possibility of changing the way they do things. This openness must be present within the collaborative process. Without it, the process grinds to a halt for both the individual and the group. Secondly, collaboration must be learned. Each individual brings to the collaborative effort certain notions that can cause problems for the effort. These include the idea that the teacher is a self-made construct, and that the teacher is a repository of all knowledge. Both ideas naturally build barriers between the teacher and collaborators. This study brings to light some of the root causes of collaborative failure. In the school setting, collaboration is a powerful tool for improving practice and bringing students to deeper understanding. To protect the organization building a collaborative model for PD, new staff must be carefully vetted to ensure adherence to the concept of collaboration. In their flexibility, Musanti and Pence (2010) put into practice the ideas that their study highlights. Openness to new ideas and a new way of seeing the process can bring about great results.

Parnell (2011) notes the power that collaboration brings to the process of educating students. In his descriptive research study of a group of teachers at the Helen Gordon Child Development Center at Portland State University, Parnell (2011) notes that collaboration must include all members of the learning community. The purpose of this study was to determine what meaning could be found in collegial discussion and collaboration between parents, students and teachers. To be effective, this collaboration must be intentional, and teachers must avoid operating within a "membrane of isolation." The process of collaboration is not always easy, but intellectual disagreement can be viewed as a positive process because deliberation can lead to individual growth. The study also pointed out the real value of documentation. The impact of most of the learning events discussed in the report was not realized until they were reviewed the

following year. They could not be seen until the full impact was realized long after the event concluded. Returning to a documented event in a collaborative environment allows for emotional separation form the event and a clearer perspective on the impact of the event on the learning environment. Parnell (2011) notes three narratives that drive the conclusions of the study: a) "Hardship, Ideas, and Inspiration," b) "Change and Uncovering a Moment" and, c) "Reliving the Experience One Year Later: A Collaborative Session Reveals the Extraordinary in the Everyday." These three bring out cogent points about the value of collaboration. The idea of opening the door to new opportunities holds power. Happiness can be a real result. These results were not evident in this undertaking until one year following the initial study when subjects were gathered to reflect upon the experiences. By learning to listen and collaborate, teachers were able to see extraordinary results of what might be viewed as ordinary events.

This study brings to the forefront the concept that documentation is often necessary for a clear perspective on our collaborative successes. Although Parnell does not state it, documentation can lead us away from weak practices in the classroom as well. This is the biggest problem with the report on this study. Non-examples or failures deserve reflection and consideration. Without understanding the real 'how's' and 'whys' to both the positive and negative outcomes, it is difficult to build a true picture of what may or may not happen. Inasmuch as there are activities that are viewed as mundane in the moment, but later proven to be of real value to students and teachers alike, there are incidents of learning events that seem to have real impact in the moment, but in retrospect prove to be of little impact. The question, then, revolves around how to best gauge the real impact of these learning events. If future reflection is to be the gauge, how do we accurately judge the latter events without applying the emotion noted at the time the event was documented? Developing tools to gauge the impact of learning events

is a big part of the equation that seems to be missing from this study. Without them, much of the value of past learning events could be viewed through the lens of affective outcomes rather than the cognitive benefits. All in all, Parnell (2011) helps to focus our attention on the deep impact of collaboration both today and into the future. Collaboration requires an open perspective. It requires us to look at our own practices from different points of view. It also calls us to look back on those experiences and determine what worked and what needs to be improved.

Grossman and Arnold (2011) look into the root causes of the problem surrounding teacher retention in their study of tech savvy undergraduate students and instructors at Emory & Henry College. They asked two basic questions: 1) Does the process of partnering students with experienced teachers result in the teacher adapting more technology, and; 2) when students are compelled by a course to collaborate with experienced veterans, does that result in students adopting the practice later on? As it turns out, the results may help resolve a good deal of the problem of slipping new teacher retention. Grossman and Arnold (2011) note several studies that support the notion that people from baby boomers to 'millennials' use social media for a wide range of purposes. Professional collaboration can be enhanced with the adaptation of social media. Younger users use social media for engagement. Technology is a natural part of their daily lives, while older teachers are beginning to catch on the ease of use and power of the medium for collegial discussion and professional development. Teacher isolation is the most discussed reason for failure of teacher retention. Simply put, new teachers (within the first three-to-five years) feel isolated from their peers so they "don't feel that they make a difference" in the classroom, or they feel that their voice has not been heard by colleagues. Collaboration by means of social media can, according to this study, alleviate a great deal of these negative feelings and provide an avenue for feedback and input from the teacher next door to educators around the

world. These tools are part of everyday life and are readily available and waiting to make a difference in the green teacher and seasoned veteran.

Iron sharpens iron. It is true. Grossman and Arnold (2011) bring attention to the big, green knuckle-dragging gorilla in the room – the failure of teachers to connect. Retention is a very real and pressing problem. As an exercise, try to find a high school French teacher who is an evangelical. Good teachers are a rare commodity; good veterans are gems as well. We must do a better job of getting both of these groups to collaborate, kibitz, share, blog and voice concerns. The readily available social media offers a great opportunity for administrators and teachers to advance toward the purpose of solid collegial discussion that will benefit educational professionals far beyond campus. This study will and must be revisited over the years to track the full impact on both the green teachers and veterans. Like any other good practice, collaboration takes time to perfect. It is a good "habit of mind." Certainly, the students in this study agreed that the worthwhile experience will help them use technology in their educational strategies, while the veterans were grateful for the opportunity to share and study others' experiences. It will be interesting to see the long-term results.

The new teachers entering the field of education and the teachers who have taught for several years are facing a challenge that has been growing for the last twenty years. The article, "Improving Teachers' Teaching with Communication Technology' by Li-Ling Chen (2012), addresses the need for a school's advanced communication with teachers as technology becomes a pivotal point of discussion in schools across the nation. Chen references the challenges of using technology and the detrimental effect the challenges may have on new teachers. Chen also acknowledges the confidence of teachers who have taught for a number of years inadvertently failing to reach out to the new teachers with helpful knowledge and support. The

final result can be devastating to new teachers who need the support rather than feelings of isolation. As learners for life, teachers are required to retrain, refine, and review teaching skills and knowledge crucial to a classroom. The contact with other teachers, both new and seasoned, is essential. Chen suggests professional development meetings and weekly faculty collaborations are simply not enough to connect teachers with teachers. Instead, Chen supports a social media use of online communities that have proven to be more successful. Additionally, internet communities can share reviews of current literature, ideas based on best practices, and encouragement with fellow teachers. True ongoing discussions via the internet should be the norm, according to Chen. Even global discussions with teachers worldwide and outside the local school district are ingredients for success in improving teachers' communication about technology in the classroom.

Li-Ling Chen's article recognized a growing problem of teachers losing contact with teachers, even when they teach in the same department or school system. The emphasis on promoting collaboration in a meaningful way, even on the internet, is a refreshing change from the workshop training meetings usually required for one or two teachers in the department. Using the social networks to reach across to teachers globally, reviewing current literature on teaching strategies that can impact a class, and staying connected to others (new and seasoned) in the field seems to be a simple concept with significant possibilities of success. The article emphasizes the feeling of being isolated during the planning stage of a curriculum. Although not encouraged, the subject matter (for example only one teacher teaching one particular class) lends itself to isolation. In today's challenging world of education, teachers must connect and support each other. The various departments, such as special education with regular education is not only

a requirement, it is simply good practice. The benefits of doing so are mighty; the results of ignoring the problem will weaken a school system and ultimately hurt our students.

As the classic Bob Dylan song reminds us, "Times They are A-Changin'"… especially in the world of technology. The article, "Learning to Teach online: What Works for Pre-Service Teachers" by Duncan and Barnett, is a timely piece of literature representing the future of education. The authors acknowledge the rapid changes in technology and reference the vast amount of technology related educational material available to schools. Their concern, however, addresses the lack of classes in the K-12 educational training programs for teaching the new teachers the most effective method of teaching online. With the 'millennials' firmly embedded in the world's school systems, there is no question that technology plays a featured role in our classrooms. Are our school systems setting new teachers up for failure by not training them in teaching with technology? The authors feel strongly that indeed, that is the case. High schools, in matching the demand for Dual Credit classes and flexible schedules that offer high school credits online, are forcing educational programs to change the standards of EDUCATION 101 methods classes. Limited space in high schools and the use of credit recovery programs are contributing to the need for online high school diplomas. Credits for elementary and middle school classes are also reaching for online availability to meet the needs of a variety of educational options. E-learning, no longer considered experimental, is drawing the attention of the U.S. Department of Education along with the agencies who monitor educational standards such as Partnership of the 21st Century Skills. Using the constructivism theory, Duncan and Barnett believe students want and require the ability to design the educational program that fits the need of the individual. The research and the social trends seem to fit the idea. In doing so, however, the educational training systems must train teachers to move away from the traditional

educational settings of years gone by and reach out to students through the technology classroom.

Many seasoned teachers never thought we would hear ourselves say this, but technology in the classroom has pushed the Baby Boomer teachers, not yet old enough to retire, into a new way of thinking. The authors have "hit the proverbial nail on the head" and as educators of a new generation of teachers, we must change at least some of our training methods for the new teachers entering the field. As instructors face students who have used technology throughout the previous grades, there will be a definite change in student thinking. Students expect and respond best to material presented at least part of each class period with the use of technology. The continuing emphasis on technology in education will not concern the new breed of teachers, who will succeed in adapting to the needs. The concern may fall on the teachers who may be disconnected with technology because of the lack of offerings the public schools may have available. Not all schools have the funds to become as technologically advanced as desired. Many schools must make do with the funds available in a compromised economy. With that being said, teaching methods of old may still be offered, but updated to technology when possible.

The article "Using multimedia to teach in-service teachers: Impacts on learning, application, and retention" by Pryor and Bitter, provides an excellent reminder for schools and teachers to continue on the technology tract toward improved educational standards. Research simply proves what teachers are witnessing in the classroom: students respond to technology and learn in a better more meaningful way. Providing technology-based lessons is only half of a school system's responsibility. Teachers must be trained in researching the most effective methods, allowed to collaborate with other teachers, and provided the in service to perfect the

skills needed for utilizing technology on a daily basis. Because teachers possess the same variety of learning styles as found in a classroom, the authors encourage reflection time in learning new trends, including one-day workshops and encompassing well-planned programs reflecting interactive and collaborative efforts for the programs. The authors also support the idea of continuing training through online video lessons using multimedia presentations and evaluations. The study confirmed the complete and detailed training seemed to be the key to a long-term adoption of a new technology standard.

When training is provided by a school's own colleagues, success is ongoing because the trainers are still available. The article supports a similar idea and reminds teachers to make use of all multimedia training sessions because of the proven benefits and retention properties. Seeing a video of a concept and working with the details in an interactive session can provide an opportunity to do and not just listen. Perhaps the fading interest in the traditional curriculum in-service could be revitalized with a little help from the multimedia presentations used to present technology strategies.

The world of education is changing rapidly due to the technological advancements available for the classroom teacher. Along with the change of hardware, software, and available websites comes a plethora of ideas designed to help teachers provide the most updated information to students of all ages. The article, "Influence of User Characteristics on Teachers' Intention to Use Technology: Some Research Evidence" by Timothy Teo (2011) addresses several aspects of the subject and relates the important role schools have in the process. The premise sounds innovative and promising. The implementation often lacks the attention to a crucial detail; teachers must have the desire to utilize technology to provide the best educational information to a tech savvy Millennial generation. Although technology in the private sector is

widely available to teachers, using technology in an educational setting and designing lessons that involve students' use of technology is still woefully inadequate. Correction of the problem is a multi-faceted task. The situation calls for schools initially recognizing the need for continuity in the use of technology. Teachers have proven to generally be able to work independently in planning lessons in the classroom. Schools must bring teachers together as the use of technology increases in education. The tendency to isolate ones self when completing lesson plans negatively impacts the willingness teachers may have to incorporate technology on a daily basis. Working collaboratively seems to be the key to helping teachers begin a new perception of the use of technology in the everyday classroom.

Fundamentally, the disconnect between teachers' personal use of technology at home and the implementation of technology as a learning tool for students is a key factor in much of the literature concerning classrooms. Teo sets a foundation for the problems schools may experience in encouraging teachers to have a daily willingness to plan and include regular technology assignments. A great deal of comparison to technology uses in other settings, such as the business world, is helpful in reminding administrators of the differences and needs in building a teacher's confidence in an ability toward technology. The tendency to work independently is the culprit. Although the problem and solution in the form of support and training was emphasized, educators must always be searching for best practices on pre-service training in the technological advancements available to schools.

Conclusion

A synthesis of the literature shows that while there are great advances being made in educational technology and more funds and research being devoted to using it, there are definite gaps in the research that must be bridged. How can professional developed be re-engineered to

address the heart of the issue for those instructors who do not use technology? What lessons can we take from successful professional development and apply them across the board from general education to special education to distance education? To honor the intent of educational technology by applying it in a relevant and impactful manner is the only way to truly move forward and elevate education, teachers and students to a whole new level of learning. As we learn and research more in the areas of professional development for educational technology, we hope to produce plans and practice to enable that elevation to occur.

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