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Advancing Technology Integration and Curriculum through the Role of a Technology Coach in Elementary Schools

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Abstract

This literature review looks at the best practice to implement the role of a technology coach to enhance technology integration and advance the technology curriculum in an elementary school. The review looks at the history of technology in curriculum, and the change in implementation for modern schools. Technology is so intertwined with a student's learning environment that it is changing the way technology needs to be taught in elementary schools. When technology is effectively implemented through an instructional coach, teachers are supported, students are engaged, 21st century skills are acquired, and curriculum is transformed. The most effective way for schools to change instruction and enhance learning environments is by implementing a technology coach to guide teachers and students through a changing educational landscape.

Advancing Technology Integration and Curriculum through

the Role of a Technology Coach in Elementary Schools

In an educational landscape that is rapidly changing as a result of technology access in schools, it is important to evaluate the best practice for keeping teacher up to date as well as maximizing the learning potential of students. Many teachers that have entered the teaching profession as digital immigrants are being forced to utilize technologies in their classroom with very little training. Student learning is becoming more individualized and self-driven. School districts and administrators are evaluating the most effective way to incorporate technology into existing curriculums. "For computer technology to be successful in schools, teachers need to be trained and well prepared to competently integrate it into their curricular" (Batane, 2004, p. 388).

There is an established need in education for students to be equipped with skills that will prepare them for a changing future. Larson and Miller (2011) stated, "as technology becomes even more prevalent in today's society, students need increased expertise in digital technologies" (p. 122). According to research there is very little debate that students need to incorporate technology into what they are learning. Students are needed that are equipped for success in a world that is rapidly changing. Education is shifting from teachers that simply relay knowledge to teachers that facilitate student-driven learning.

There is an identified need and desire for this change, but there is less research identifying the correct way to begin and continue this shift in our schools. Teachers must be equipped to lead this educational shift, and must continue to be able to adapt to emerging technologies. There are needs for teachers to be able to use data, utilize technology, research, learn new technologies, and find ways to implement non-traditional education technology (Donlevy, 2006). There are ever increasing demands placed on teachers and the need for them to

stay informed on immerging technologies. The role of a technology coach is becoming an essential position at schools to facilitate technology integration.

The important question is what is best practice to implement the role of a technology coach to enhance technology integration and advance the technology curriculum in an elementary school? Reviewing literature on the topic will give administrators, coaches, and teachers a better understanding of this question. It is essential to evaluate the needs of the teachers, students, and coaches. Changes in curriculum and roles often accompany intentional integration of technology. There are many ways to use and implement technology, but research needs to be evaluated to determine the most effective way.

Review of the Literature

When creating a technology coach position at a school a role must be defined. "The technology coach essentially establishes and nurtures a professional learning community of teachers. These learning communities enable their members to share ideas and resources among each other and to create a shared knowledge base of best practices and provide a sense of collective accountability" (Sugar & Van Tryon, 2014, p. 55). There are different possible avenues to foster technology integration in schools. An emerging trend is a virtual technology coach, which would present teachers with a collaborative learning community outside of their current district. Research found that "the importance of these particular Collaboration, Discussion, Learning, and Sharing resources imply that the teacher participants prefer a technology coach facilitated learning community to support their respective technology integration needs" (Sugar & Van Tryon, 2014, p. 55). This study shows that teachers prefer to learn in community but to be driven by a technology coach.

In the current educational climate, there is a need for students to develop an understanding of the usefulness of technology in education. "Technology literacy is the ability of an individual to responsibly, appropriately, creatively, and effectively use appropriate technology tools to communicate; access, collect, manage, integrate, and evaluate information; build and share knowledge; and improve and enhance learning in all subject areas and experiences" (Keengwe, Georgina & Wachira, 2014, p. 2). An educator in today's learning environment needs to be able to provide experiences to their students to learn with technology. Students and teachers need to have more than foundational skills, but with the rapidness of changing technology, they need the ability to acquire skills and adapt to new technologies (Keengwe et al., 2014). A technology coach needs to facilitate development of skills that will both promote technological skills among a staff and facilitate staff members' eagerness to adapt to new technologies.

Many educators are the result of a traditional education and are classified as digital immigrants. Research has shown that there needs to be a shift in pedagogical thinking among educators "digital immigrant teachers assume that learners are the same as they have always been, and that the same methods that worked for the teachers when they were students will work for their students now, but that assumption is no longer valid" (Wilsey & Keengwe, 2012, p. 16). Teachers need to take it upon themselves to guide their learning and education by expanding their ability to teach with technology. Teachers often instinctively do what they have always done as a teacher and mold the technology to fit that pedagogy (Wilsey & Keengwe, 2012). It is part of a technology coach role to help guide teachers through the transition into a modern pedagogy.

Technology coach must lead teachers in facilitating technology integration in their district/school. Technology integration needs to be evaluated on both a local and national level.

The U.S. Department of Education has released a plan for increasing the technology training for teachers. A point emphasized by the U.S. Department of Education is to "improve teacher training. The plan suggests that teacher preparation programs do more to help teachers master the new technologies" (Donlevy, 2005, p. 108). There is more information available to teachers than there ever has been before, so teachers should have everything they need at their fingertips. Teachers also need to utilize the data that is present in order to individually reach each student (Donlevy, 2005). There is emphasis placed on the importance of training teachers and allowing them to realize that technology understanding is necessary in a shifting educational environment.

Gerald Knezek and Rhonda Christensen (2016) developed a will, skill, and tool model of technology integration. This model is vital to the successful integration of technology into a school/district and implementation would be facilitated through the role of a technology coach. This three part approach defines a need for the willingness of a teacher, the skill of a teacher, and the availability of technology. According to research conducted by Knezek and Christiensen (2016), "Teachers' attitudes towards computers, their self-efficacy, and a general openness to change, are among the factors that are indicative of effective use in K-12 instructional practices" (p. 323). Three areas of focus are important when implementing technology effectively. Teachers must have access to technology, when that is established, teachers must develop a desire to learn and teach with the technology. The final step is being able to become proficient with the technology use (Knezek & Christiensen, 2016). An essential piece of the development of a technology integration plan is to define individual teacher and staff willingness, individual and staff ability, and technology availability at the district/school level.

It is important that technology is implemented successfully which can be effectively implemented through a technology coaching position. According to research "If schools want

teachers to use technology to enhance learners' learning, then it is important to address these issues. New ideas come and go and are rarely sustainable. To avoid 'initiative fatigue', schools must focus not only on introducing new technology, but also on implementing and promotion the use thereof" (Maboe, Banoobhai, & Makgatho, 2018, p. 1). Technology needs to be introduced in a way that is going to enhance pedagogical content knowledge and allow classroom instruction to become more efficient. Maboe et al. (2018) claimed that:

> "In order to achieve sustainable and successful outcomes, a shared vision has to be a belief that technology is beneficial, as defined by different communities of users or practice and education models, and to be embraced with an open mind by all involved. Teachers should be guided to develop their capability to engage actively and collaboratively with learner. Effective integration and essential conditions should positively impact learning and it should be galvanized to support leaners fully." (p. 4)

Schools should be serving to prepare students for their future, the rapid change in technology is something that students are going to have to be constantly adapting throughout their life to accommodate changing technology. Nikleia Eteokleous-Grigoriou (2009) addresses this change and determines that "as the society is becoming increasingly sophisticated, the basic, necessary skills keep changing too, thus more and more requirements are place on students in order to become qualified citizens" (p. 710). There is also an importance placed on a change agent or coach in preparing stakeholders for the implementation of technology. "The major challenge is to help stakeholders to transcend and evolve their mindsets regarding technology integration and advice on how to approach educational reform, create and take ownership, promote commitment and take over responsibilities and roles" (Eteokleous-Grigoriou, 2009, p. 712). It is important to challenge the conventional confines of a traditional classroom and

transform the way that learning is conducted. "The use of technology goes beyond the classroom environment. Teacher and students collaborate, communicate and interact through synchronous and/or asynchronous methods of communication. Specifically, they communicate through e-mail, bulletin boards, chat rooms, blogs, using course management systems" (Eteokleous-Grigoriou, 2009, p. 714). The ability to do this lifts the barriers of the traditional class period and allows students to learn according to their schedule.

Benefits and Limitations

Research has confirmed that there are many benefits to a mentor/coach relationship with teachers. Teachers need to be actively involved in training and this process must be ongoing. It is important that teachers are able to approach training enabled to make mistakes, to learn more about themselves and to collaborate with peers (Onchwari & Keengwe, 2010). Research proves that student learning is positively impacted when teachers participate in a mentor/mentee relationship. The overall effect of the attitude of mentored teachers showed a willingness to change and adopt the best practices for their students (Onchwari & Keengwe, 2010).

Teachers must have access to consistent professional development often in order to effectively develop new skills and implement new ideas in their classroom (Onchwari & Keengwe, 2010). "Mentoring encourages teachers to be receptive to new ideas and explore their teaching styles through the guidance provided rather than imposing somebody else's teaching style" (Onchwari & Keengwe, 2010, p. 312) Teachers need to be willing to enhance their abilities and knowledge in the classroom to benefit students. When a mentor or coach is allowing a teacher to develop new skills in a trusting intimate environment it is proven to be beneficial to teachers. Schools that have a desire to enhance new skills in their teachers would benefit from equipping teachers to learn new skills through a mentor or coaching relationship. Teachers that

are not in a relationship with someone they trust will be less likely to implement and acquire the new skills necessary for the modern classroom.

Professional Development

Technology integration is very difficult to navigate and has many variables to consider, however professional development is a key part of implementing technology into the curriculum. "There is a need for teachers with low levels of technology integration to experience hand-on training, administrative support, on site technology support in the classroom when needed, and be exposed to other experts and teachers who model the use of the technology" (Unger & Tracey, 2013, p. 3). Research supports the idea that professional development needs to be collaborative for the teachers. Technology professional development should also include someone presenting technology, pedagogy, content and management. In addition to pedagogical change, there is a need for teachers to undergo and attitudinal change as well (Unger & Tracey, 2013). The mentor relationship facilitated by a technology coach can help facilitate a change in attitude among educators. Unger's research identified seven factors that led to beneficial technology professional development. Relevance, Learning, Access, Reactions, Interaction, Clear and easy and Instructor (Unger & Tracey, 2013). When these conditions are met in professional development, teacher attitude and willingness to implement best classroom practices is impacted positively.

Schedule

Many elementary schools operate on a fixed schedule, and determining the schedule is an important aspect of technology implementation. Stubeck (2015) noted that "we know from this research that information skills taught in isolation from curriculum content are not as relevant to

students as skills taught in the context of what they already know" (p. 29). Technology that is specifically addressed in a special period one time per week is not sufficient or relevant to student success in the classroom. Students need to tie special skills to units that are already being taught in the classroom to foster meaningful learning. The transition of the role of computer teacher to technology coach facilitates more meaningful learning taking place in the classroom.

When maximizing the shift in scheduling from fixed to fluid it requires collaboration between teachers as well as a focus on student progress. Stubeck (2015) and colleagues spent months in advance planning a collaborative unit that was taught in both the classroom and library, and reinforced by the assisting teacher. A technology curriculum that is currently delivered as an isolated special will not lead to effective student learning, or students meeting technology learning objectives. When students were able to translate the necessity of research in the library, tying to their classroom learning there was a tangible translation between the two. Planning and collaboration between colleagues assured that students were able to understand the correlation and impact that a special had on their learning (Stubeck, 2015).

Technology allows the ability to overcome the limitations of schedule and to be consistently and fully incorporated into the learning environment to enhance the student outcome. "Taking advantage of technology, we seamlessly linked library and classroom learning in a spiraling collaboration model, alternating instruction between the school library and the classroom" (Stubeck, 2015, p. 33). Technology resources that were utilized closed the gap between a once a week isolated subject and a completely relevant subject that applied to and enhanced classroom learning. Stubeck (2015) noted that the use of online components enabled interaction as well as collaboration digitally. This is a scheduling framework that can be used to enhance school wide learning and cross-curricular units through the use of technology.

Computer Lab or Personal Devices

Student access to technology is constantly evolving and expanding based on programs presented in elementary schools, with many schools shifting to 1:1 technology implementation. This leads to a discussion on the importance of a one day a week pull out to focus on computer skill training is necessary. When 1:1 implementation occurs there needs to be a shift in teacher/student's view of education. Standard practices of instruction and assessment need to be altered for 1:1 to benefit students and teachers. Islam and Gronlund (2016) point out the important realization that it is not the technology itself that leads to positive effects; it is a shift in the way that students learn. For 1:1 to be successful teachers must be coached through a change in the way things are taught and a chance in the way that things are assessed (Islam & Gronlund, 2016).

The computer lab has begun to transition from the traditional role of a physical place to the idea of an intentional development of computer skills that takes place naturally through the consistent use of technology in the classroom. Lock and Carlson (2000) noted that "the computer lab, with its multitude of specialized and interesting software, appears to be a valuable tool in enabling general education teachers to begin to meet the needs of their exceptional students" (p. 4). Lock and Carlson (2000) also noted that teachers that were more comfortable using technology were more likely to utilize the computer lab as a tool to enhance the curriculum. They also determined that for time in the computer lab to be successful there must be a collaboration between the computer lab teacher and the classroom teacher. With the removal of more computer labs, it shifts the role of the computer lab teacher to one that enables classroom teachers to take over that part of instruction. (Lock & Carlson, 2000)

Student utilization of laptops and technology has positive impacts on student learning if it is used right. Keengwe's (2012) research noted that student's use of time must be carefully monitored when they are using their own personal technology device. The positive use of time resulted in students "improved academic achievement, higher rates of attendance, better student engagement in the 21st century learning process, parental satisfaction with educational systems, improved teacher ability to prepare students for the 21st century, and a greater ability to meet the changing needs of students, teachers, and parents" (Keengwe, 2012, p. 145). When improper use of student devices occurs, it takes away from instructional time and student learning. It is important that teachers and students understand and have policies in place to make sure that student time is maximized (Keengwe, 2012).

It is important that every student has access to their own personal device, even if a district is not fully 1:1. Islam and Gronlund (2016) found that 1:1 technology increased engagement and motivation, improved quality of work and achievements, fostered self-directing and independent learning, improved research skills, enhanced computing skills and increased cognitive skills. Students immersed in a 1:1 program also benefited from ease of assessment and more quality teaching. Many 21st century skills become byproducts of a 1:1 program. When students have constant technology available to them, they are able to engage in collaboration, student-driven learning, and more project-based learning (Islam & Gronlund, 2016).

Technology Analysis

When schools are evaluating technology curriculum and student-learning internet plays a huge role in research and learning and restrictions sometimes place a barrier on students' learning. There are many negatives to the internet that students definitely need to be shielded from, however this also causes students to be shielded from many useful tools that can

intentionally or unintentionally be blocked. The government has policies in place to prevent

students from potential harm on the internet. Students are still limited to only the things that they

had access to before technology, except in a different form. Students need to be protected, but it

is also important to make sure that they are responsible digital citizens while they learn at school.

(Kilfoye, 2013)

Many schools have a wide variety of technology that is available to them: laptops,

smartboards, desktops, tablets, iPods, etc., and these tools have simply replaced their "non-

technology" counterpart, like notebooks, chalkboards. Kilfoye (2013) discusses the inability of

the newspaper industry to adapt with new technologies because "They continue to think of

themselves as newspapers instead of information providers, which may be a more practical

approach" (p. 55). The availability of technology in our elementary schools is being stifled by

educators, and administrators, that are unable to adapt traditional learning styles to meet the

needs of students. As technology continues to advance students and teachers need to possess

skills that equip them to utilize technological advancements. There are justified technology

limitations that are in place for protection, but administrators and teachers need to understand the

necessity of students being able to access all of the tools at their disposal.

With the availability of technologies and the changing landscape of how technology is

being utilized in the classroom, it is leading to an important shift in the education and training of

teachers. Liu and Low explore how teacher-training needs to have a common goal to prepare

teachers that are willing to think, reflect, and explore. They claim that no matter how a teacher is

instructed that the goal is "trying to develop thoughtful, reflecting, and inquiring teachers with

the competencies required to meet the challenges of twenty-first century classrooms (Liu & Low,

2015, p. 191). Through education, teachers have a basis for their craft, but need to be provided

opportunities to expand the skills needed for the modern classroom. Twenty-first century classrooms need teachers that are not afraid to explore, and are willing to collaborate to benefit student learning.

It is widely agreed upon in education that technology is necessary in a modern school, what is still not clear is the best way to seamlessly integrate this technology into the curriculum. Research conducted by Clark (2006) found that technology needs to be reliable, immersed in the classroom, have adequate funding, adequate planning and have administrative support. Teachers identified the fact that technology implementation would not be effective if it was not done properly. Teachers wanted minimal interruption caused by technology being introduced into the classroom. Clark (2006) found that there needed to be an emphasis on teacher ability and support, the study added, "Teachers cannot succeed in a vacuum. They need to be mentored and become a mentor" (p. 490). Appropriate planning and support by administration need to be present for successful technology integration to take place.

Teacher Needs

There is currently a strong shift in education away from a traditional classroom and into an individualized project-based collaborative environment centered on technology. For this shift to occur and for education to be enhanced through technology teachers must be trained and supported. Walsh (2013) states "the core of insider complaints is not that the (education) profession is marching in the wrong direction, as some believe, but that too many of its soldiers are out of step, inadequately provisioned, and carrying the wrong weapons" (p. 2). Teachers are not teaching wrong, but are also being given inadequate time, resources, and support to keep advancing in their individual profession and continue advancing education as a collective.

Teacher's need to be allowed to perform their job at the highest level possible, and having technology support can assist in that process.

It is essential for technology utilization to be successful teachers must have a level of consistency for classroom inclusion. Walsh (2013) makes a rather bold claim that freedom for teachers to make content related decisions only works if every teacher has the ability to hold themselves accountable, and determine what is acceptable content. When each teachers is allowed to determine what content is acceptable and appropriate it leads to inconsistency throughout education. Technology integration falls into the same category, having a coach to monitor its implementation leads to consistency across every grade level. When teachers have the ability to determine their own acceptable amount of technology integration it will lead to teachers only implementing to their comfort level. This will cause a larger and larger gap as technology continues to rapidly advance.

Teachers are entering a time where they are facing more and more demands with less and less support. Darling-Hammond (2006) notes that many outside observers assume that anyone with knowledge has the ability to teach. People outside of the teaching profession feel that with a few tricks that are learned anyone can be a successful teacher. Teachers need a vast array of skills to perform their jobs, "not only is the kind of practice needed to teach students with a wide range of learning needs an extremely complex, knowledge-intense undertaking-requiring extraordinary personal and professional skills-but also U.S. schools rarely support this kind of practice" (Darling-Hammond, 2006, p. 31). It is important that teachers have the technology support they need so that they can manage the many other demands that a modern teacher faces.

School districts need to make sure that programs that are introduced enhance the abilities of the teachers and have the support of the teachers. Teachers must have clearly articulated

expectations that are supported and fostered. It is important that implementation is well thought out and that teachers will not have instructional difficulties as a result of new implementation. It is important that things are backed by research and that teachers understand the importance of the impact on learning. There also has to be an ability for districts to tightly integrate every aspect of learning to make sure that teachers are all able to support each other (Darling-Hammond, 2006). Teachers' ability grows when they have the ability to collaborate with colleagues and integrate curriculum together.

Teachers need to be confident in their ability to use technology in their classroom before they will be willing to incorporate it into their curriculum. "Many other studies have also shown that measured gains in teachers' self-assessed knowledge over time are more reflective of their increased confidence regarding a particular professional development than their actual increased knowledge in practice" (Agyei & Keengwe, 2014, p. 156). Traditional professional development takes place in isolated instances with little or no direction and follow up. The role of a coach facilitates the development of confidence which is essential to successful use of technology for teachers. Once confidence begins to present itself for teachers, they will be more willing to expand their implementation of technology into more parts of their classroom.

Technology effect on Student Learning Outcomes

Research has been conducted to analyze the effect of online classes on student learning outcomes. Romanov and Neygi (2008) found that according to research females tested significantly higher in an online discussion based environment compared to a traditional lecture classroom, males showed little difference. Blending learning environments for elementary aged students begins to take positive traditional components and combine them with digital learning components to maximize student learning. The study found that there was an important link

between learning outcomes and engagement in the learning activity. Students that participated in online discussions at a higher level showed more positive learning outcomes than their less-engaged peers (Romanov & Neygi, 2008). Elementary students face a similar challenge of needing to be engaged to get the most out of any learning environment.

Technology equips teachers with a wide variety of teaching approaches to ensure student understanding. When teachers enhance their ability and comfortability with technology it enhances student learning. Agyei and Keengwe (2014) found that when teachers were given tools and taught how to effectively use them, it improved their pedagogical strategies and it also allowed the learning to center around each individual student. The teachers' ability to use and implement technology more effectively allowed the students to enhance the lessons and improve the student learning that took place for that particular lesson (Agyei & Keengwe, 2014). There was a direct correlation between the learning outcomes of the students and the intentional technology implementation of the teachers.

Students learn best when education is individualized and each specific learners needs are being met in the classroom, and was very rarely achieved in traditional classroom settings because of the complexity and resource limitations of the instructor. It is essential that students are in a learning environment that supports user interest and engagement so that student learning is not negatively impacted by technology complexity. It is important that students are able to use the technology effectively in order to maximize learning outcomes. Difficulties can arise when teachers are not aware of problems that students may be having with the software they are using to learn (Sarkar, Mohapatra, & Sundarakrishnan, 2017). Technology barriers need to be eliminated for digital learning to be most effective.

21st Century Skills

The purpose of education today is to begin preparing students for jobs that aren't even created yet, students need to be equipped with 21st century skills that are going to enable them to adapt to those jobs. The idea of 21st century skill is not a new one, and it has been present in education for a long time. The ability for students to sort through information and create new things from it is becoming more and more important. Students currently have an enormous amount of knowledge that is available to them and it is important that they are able to use that information and adapt to the world's changing landscape (Larson & Miller, 2011). "Today's teachers must build on the vision of early educators by fostering students' communication and collaboration skills, integrating technology and problem-solving skills, and encouraging innovative and creative thinking" (Larson & Miller, 2011, p. 122).

Educational methods that help students develop 21st century skills shift the role of the student into a position that is going to help the student develop skills and not only absorb information. Aslan (2015) identifies key skills as "creativity, independence, self-confidence, self-efficacy, teamwork, communication, complex thinking, empathy, knowledge on searching and managing, research methodology, presentation and discussion skills, digital skills, punctuality, reliability, and patience" (p. 1443). Skills that students acquire not only serve them academically, but translate into daily life as well. When students are given opportunities to collaborate, communicate, and present ideas they start to develop these skills, which will allow them to be more comfortable using them in the future (Aslan, 2015). Students' acquisition of twenty first century skills are less about learning a technology and more about applying information student's gain from technology.

Collaborating and communicating have become an invaluable skill in education and the workplace. Students need to be able to direct their own learning, and collaborate and

communicate in a digital world. Many interactive tools are available that allow students to

communicate with peers and colleagues all over the world. The important skill that students need

to develop is the ability to effectively communicate on these platforms. While students are using

these platforms as collaborative opportunities they also need to be able to distinguish between

useful and non-useful information (Larson & Miller, 2011).

Students are in a unique position where they are often more experienced in technology

use than their teachers. It is important that "In the 21st century classroom, effective teachers and

students orchestrate learning environments in which individual expertise in technology is shared

with the broader community of learners (Larson & Miller, 2011, p. 123). Students are using the

technology and it is not as important for teachers to teach the technology. Teachers need to shift

their focus from being the source of information to teaching students how to apply and analyze

the information that they have available through technology (Larson & Miller, 2011). A 21st

century classroom will flourish when students' technology use moves past consuming and begins

to develop depth of knowledge.

Schools need to continue to introduce emerging technologies to students, even if they

have not traditionally been used as a catalyst in education. Pence and McIntosh (2011) realized

that phones are often something that is banned in most educational settings, because students can

use them as an avenue to cheat or for things that are outside of academia. It is important that

students also understand that there are appropriate and inappropriate times for technology use. If

schools are not taking the lead in teaching students how to manage technology that they are

equipped with, where is that understanding going to be developed. Access to technology is no

longer an issue that schools face, but rather getting students to use the technology as a tool to

enhance instruction, rather than a distraction from learning.

ISTE Standards

The International Society for Technology in Education (ISTE) has developed standards for multiple levels of technology integration from administrators to students. Many technology leadership positions are new and are constantly evolving, which causes many stakeholders to not fully understand the role of technology integration. It is important that facilitators of technology have a framework to build on in their districts. The ISTE standards provide that framework and allow for more consistent implementation across districts. Implementation of technology needs to be supported from the top down in order to effectively integrate technology into classrooms (Williamson & Redish, 2007).

ISTE has enabled integration to be consistent at all levels, by tying together standards for technology coaches, as well as students it creates a uniformed approach to implementing technology. The training available through ISTE allows teachers to streamline the learning process and values teachers' demanding schedules. In ISTE training the "emphasis is on the student experience, but will also examine the purpose behind the activity" (Hayman, 2010, p. 17). Students and teachers are the main players in successful technology integration and that is made easier by following the ISTE guidelines. A district that is willing to adopt this from the top down is enabling their schools to be a place where seamless, uniform implementation will take place.

Once standards are understood by teachers, it is important to effectively implement technology along a realistic timeline into the classroom. "Effective teaching implies that instructors strive to encourage students to use active techniques to create more knowledge and then to reflect on what they are doing" (Keengwe & Georgina, 2013, p. 54) Teachers must then realize the importance of adjusting their current lessons so that technology can become the

facilitator of what they are already doing. Teachers need to gradually adjust lesson plans to implement technology into what they are already doing. When teachers understand the importance of the technological tool enhancing what they are doing it will begin to be a logical transition to using more technology.

When initiating a technology integration plan into a school district it is important to build success with the stakeholders initially. Once the initial fear of implementation is created in the classroom, teachers need to have the ability to rapidly adapt to changes in technology. Education becomes more individualized for the students, and teachers need to make sure that content is driving learning and not specific pieces of technology. Since there is less importance on teachers passing on knowledge to students, it is important that they have the ability to allow students to access the wealth of knowledge at their fingertips. Students have the ability to move more rapidly through curriculum and have the potential to move at different rates than their peer groups (Abeles, 2007).

Analysis

The desires of education in the 21st century is to create learners that are equipped to thrive in a rapidly changing world with technologies that may not even be created. The difficulty with effectively implementing these changes into a traditional classroom has been the model in which implementation has occurred. Traditionally districts have attempted to give teachers resources and training in a very standard professional development model. The traditional model of professional development left teachers with very little accountability and very little support. The traditional model of professional development also indirectly resulted in students not gaining the skills they needed to be effective learners in a modern world. The role of a technology coach

supports teachers in a way that builds confidence and enables success, as well as enhances curriculum and promotes 21st century learning.

There is a clearly defined need for technology integration in our current educational climate, the role of a technology coach is imperative to assist teachers in effectively adapting curriculum and integration to enhance the learning of students. In a 21st century classroom teachers must be able to present students with opportunities to enhance learning through technology (Keengwe et al., 2014). Educators are often met with challenges including a lack of training, an outdated view of pedagogical thinking, and a reluctance to adapt to rapidly changing technologies. Technology needs to be carefully implemented in a way that enhances pedagogical content knowledge (Maboe et al. 2018). When examining the research, a role of a technology coach is necessary to enable teachers to learn new technology, increases willingness to adapt, and allows teachers to successfully implement technology in their classroom.

There are certain barriers and opportunities that vary from district to district. Teachers face challenges such as schedule, technology access, and technology diversity. These barriers require onsite support for teachers to experience success. Coaching has the ability to successfully unite what is being taught and which technologies are being utilized in the classroom. Since there is such a wide variety of technology to implement, the role of a coach allows teachers to focus on how to best use the technology they are given, rather than having to sift through mountains of technology that is available for classroom use. Studies have shown that teachers have an increased success with technology if they are confident in their abilities, and often traditional professional development doesn't build confidence in a way that a coach relationship does (Agyei & Keengwe, 2014).

Teachers' abilities to implement technology effectively has a direct impact on student learning outcomes. Teachers are able to improve pedagogical strategies, foster more positive learning outcomes, develop 21st century skills, and effectively implement national technology standards (Romanov & Neygi, 2008; Larson & Miller, 2011; Williamson & Redish, 2007). All of these learning outcomes depend on the ability of educators to effectively implement technology into an already established curriculum. When educators that haven't been brought up in a 21st century learning environment are attempting to implement technology there is often a lot of hesitation resulting from a lack of confidence. Coaching enables teachers to receive support, provide resources for implementation, and build confidence among educators. Research shows that a technology coaching relationship is a much more effective model for implementation than traditional professional development has been in the past.

Based on the research in this study, a technology coach is essential for effective technology implementation and a positive impact on student learning outcomes. Every school in the world has a desire to have students effectively using technology to enhance what is being taught in their schools. When the schools in the US attempt to implement this without support for teachers, it results in classrooms that are using the exact same strategies that have been present for many years in the traditional classroom. When teachers are supported and coaches are able to facilitate change in the classrooms it leads to transformed learning and students equipped with 21st century skills that are equipped to have success in an ever-changing technology landscape.

Application

The implementation of technology is most effective when teachers are supported and implementation is enhanced by someone in a dedicated coaching role. The role of a technology coach replaces traditional needs for a once a month dedicated professional

development time, and allows teachers to be consistently immersed in new ideas and supported when assistance is needed. Technology is changing the way that learning is happening in our school districts and is changing at an incredibly rapid pace. Teachers that are supported by a technology coach can seamlessly transition between one technology to another resulting in a positive impact on student learning as well as enhancing curriculum that is currently taught. Students, teachers, administrators, and parents all benefit from effective technology integration that is driven by a consistently available coach.

As a technology/computer teacher in the traditional sense, I see my students once a week for a dedicated computer time, I do not have the opportunity to effectively present new technologies to students that enter my classroom. Students are continuing to have more and more advanced technology skills and inquiries. Many teachers don't keep up with technology at a fast enough pace to remain relevant to student interests and to impact student learning. It is important that my role starts to transition from a traditional classroom computer teacher into someone that assists teachers by effectively making technology something they are comfortable with and that is seamlessly blending with what they are already doing in their classroom. Getting all the teachers and students using technology routinely across all grade levels will lead to enhanced learning and prepare students with the 21st century skills that employers will be demanding.

The role of a technology coach will transform school districts. Most schools are still stuck in a model that has replaced traditional methods using pen and paper with traditional methods that use computers. When a coach is present in a district it gives the teachers support, and cuts down on the amount of searching they have to do for technology integration. Having a person to oversee technology use in the classroom results in consistent implementation across grade levels as well as consistent implementation from grade level to grade level. When teachers

are getting this consistency and support it removes the fear of technology and the overwhelming task of narrowing down which technologies to use when. There needs to be a dedication from the district to make this transition effective. There are schedule implications that need to be considered, the coach needs to have time to meet with teachers as well as the teachers having time in their schedule to meet with their coach. There needs to be compensation for a technology coach, which is added onto already tight budget situations in most schools. Districts would be wise to consider current computer/technology courses that are offered in addition to core curriculum, and analyze whether that is the most effective use of that teachers' time. Districts have the opportunity to transform the way they use current staff to effectively introduce technology integration and the role of a technology coach to their staff.

Change in education is often a slow process, and many times the most effective change can be incremental. I teach in a school that has been pursuing the idea of morphing my role as a computer teacher into a facilitator of integration through the role of a coach. I was given the opportunity to promote technology integration with our 7th and 8th grade staff on top of teaching a full course load. This was better than what was previously in place, but left no room for teacher support. Slowly my school plans to transition our current computer class set up into a role where I will get to go into the classroom and facilitate the use of technology with things that they are currently doing in their curriculum. As a school we identified that our 5th grade students/teachers were doing very well at implementing technology and we were lacking at the 6th grade level. When a coach has the opportunity to go into the classroom and help, it allows less comfortable teachers to gain comfort and more comfortable teachers to continue being pushed. My school has dedicated two meetings a month for me to sit down with grade levels and introduce new ideas or

offer suggestions/support in regards to technology. Opening up this space in my schedule required considerable flexibility from administration.

The slow transition from traditional computers to a model that pushes technology education into the classroom is important as well. In education it is important to make sure that teachers are understanding of new ideas and that they are well researched and thought out before they are implemented. When teachers understand the why it makes it much easier for them to get on board and buy in. Starting two grade levels at a time will also allow my school to make sure that all of the logistics are in place before everyone is involved, there is a period where information can be gathered and practices can be improved before making a mass roll out to the entire school. The most important thing is the reality of the coaches workload as well, it is important that a technology coach has availability to assist classroom teachers for effective implementation.

Research is clear about the positive impact on student learning that comes from effective technology integration through the use of a coach. I am currently teaching in a school that is on board with a technology coach position, but logistically it brings up the question of how much interaction needs to take place between a coach and a teacher for the most effective outcome. Would a school be better off adding 2 or 3 coaches? Or would that lead to inconsistency and frustration? I currently know what standards my computer students are reaching and proficient in when they leave my classroom, I am excited to determine if my 5th grade students will acquire the same abilities as my previous computer classes or if we will be able to accomplish more because of the direct tie-in to their current curriculum. It is also important to learn whether teachers will have a more favorable outlook on technology integration and professional development when it is done through a coaching role.

When classroom teachers are aware of the positive impact that technology integration and a technology coach will have on their classroom, they will be more excited to try new things in the realm of technology and student learning will be positively impacted. It is important for teachers to realize the benefit of a technology coach, the technology coach will have the benefit of being able to offer more adequate training to teachers so they are completely comfortable and supported in their technology integration efforts. When teachers feel confident it will open up a whole new world of learning opportunities to students, and will also give them the ability to organically acquire the 21st century skills that are becoming a necessity in most current and future jobs. Since time is very valuable and is often limited, it is going to be important for our school and any district to make sure that these are mandatory times that are not allowed to be missed. Starting with a select number of grade levels will allow the implementation of a technology coach to be effective and done correctly. Effective implementation will eliminate the need for one day professional development time that is dedicated to implementing one blanket thing for every grade level, but rather will be more meaningful time of dialogue, problem solving, and evaluating best technologies between a coach and grade level to make sure that the most effective tool for student learning is being implemented. Students will also be more engaged while utilizing different and often unfamiliar technologies rather than doing the same thing each year. The research that is present strongly encourages the advancement of curriculum with technology, the encouragement through a coach/coachee relationship, and the positive impact on student learning. The research shows that the benefits of this teacher implementation far outweigh any additional costs or time that may be associated with it.

Conclusion

The landscape in education is currently undergoing a radical shift in pedagogy and the use of technology to facilitate learning. Districts are evaluating the most effective way to enhance student learning through the effective use of technology. The role of a technology coach position is essential in advancing technology integration and enhancing the curriculum in an elementary school. Traditional pedagogy is not an effective way to teach the skills needed for student success in a rapidly advancing world. To effectively shift the mindset of educators and allow for successful implementation of technology there needs to be the creation of a technology coach to initiate and facilitate that change at the elementary level.

A technology coach has the ability to establish and nurture the integration of technology into a district. Many educators are not confident in their use of technology and feel their students have a better understanding of the technology. When educators lack confidence and feel less adequate than their students, it leads to a lack of effective integration. A position within a district that is dedicated to helping and facilitating effective implementation regardless of the ability of the classroom teacher is going to have a positive effect on student learning and effectiveness of the curriculum. Teachers have a monumental amount of demands already placed on them and will be overall more receptive to a coach who has the ability to save them time by evaluating effective technologies and giving them the best practice for effectively implementing them. When an effective coaching role is implemented it will lead to consistently effective technology implementation and positively impact students' ability to learn 21st century skills.

The immigration of many current teachers into the world of technology has led to an in ability to effectively equip students for a world that is overwhelmingly immersed in rapidly evolving technologies. Districts need to give teachers and students every resource possible to

allow students to benefit from technology in the classroom. Districts need teachers that are

willing to transform their classroom from traditional practices to modern practices which

facilitate student learning. Districts need to migrate from outdated and ineffective forms of

professional development that don't effectively equip teachers or build confidence in teachers'

abilities. The role of a technology coach will help districts effectively fix the things that have

hindered technology implementation in the past and will ultimately benefit student learning and

enhance the curriculum in our elementary schools.

References

Abeles, T. P. (2007). Education unbound. *On the Horizon, 15*(4), 199-203.

Aslan, S. (2015). Is learning by teaching effective in gaining 21st century skills? The views of

pre-service science teachers. *Educational Sciences: Theory and Practice, 15*(6), 1441

1457.

Agyei, D. D., & Keengwe, J. (2014). Using technology pedagogical content knowledge

development to enhance learning outcomes. *Education and Information*

Technologies, 19(1), 155-171.

Batane, T. (2004). Inservice teacher training and technology: A case of Botswana. *Journal of*

Technology and Teacher Education, 12(3), 387-410.

Clark, K. (2006). Practices for the use of technology in high schools: A delphi study. *Journal of*

Technology and Teacher Education, 14(3), 481-499.

Darling-Hammond, L. (2006). Constructing 21st-century teacher education. *Journal of Teacher*

Education, 57(3), 300-314.

Donlevy, J. (2005). Teachers, Technology and Training: Envisioning the Future: The U.S.

Department of Education's National Technology Plan. *International Journal of*

Instructional Media, 32(2), 107-109.

Eteokleous-Grigoriou, N. (2009). Instilling a new learning, work and communication culture

through systemically integrated technology in education. *Systems Research and*

Behavioral Science, 26(6), 707-716.

Hayman, A. (2010). Introducing ISTE learning: what do you want to learn today? *Learning &*

Leading with Technology, 38(4), 16+.

Islam, M. S., & Grönlund, Å. (2016). An international literature review of 1:1 computing in

schools. *Journal of Educational Change, 17*(2), 191-122.

Keengwe, J., & Georgina, D. (2013). Supporting digital natives to learn effectively with

technology tools. *International Journal of Information and Communication Technology*

Education, 9(1), 51-59.

Keengwe, J., Georgina, D., & Wachira, P. (2010). Faculty training strategies to enhance

pedagogy-technology integration. *International Journal of Information and*

Communication Technology Education, 6(3), 1+.

Keengwe, J., Schnellert, G., & Mills, C. (2012). Laptop initiative: Impact on instructional

technology integration and student learning. *Education and Information*

Technologies, 17(2), 137-146.

Kilfoye, C. (2013). A voice from the past calls for classroom technology. *Phi Delta*

Kappan, *94*(7), 53–56.

Knezek, G., & Christensen, R. (2016). Extending the will, skill, tool model of technology

integration: Adding pedagogy as a new model construct. *Journal of Computing in Higher*

Education: Research & Integration of Instructional Technology, 28(3), 307-325.

Larson, L. C., & Miller, T. N. (2011). 21st century skills: Prepare students for the future.

Kappa Delta Pi Record, 47(3), 121-123.

Liu, W., & Low, E. (2015). Editorial: Teacher education for the 21st century. *Educational*

Research for Policy and Practice, 14(3), 189-191.

Lock, R. H., & Carlson, D. M. (2000). Planning for effective, enjoyable computer lab

use. *Teaching Exceptional Children, 32*(4), 4.

Maboe, E., Banoobhai, M., & Makgatho, M. (2018). Implementing tablets to teach reading in

grade 5. *Reading & Writing: Journal of the Reading Association of South Africa, 9*(1), 1-

10.

Machin, S., McNally, S., & Silva, O. (2007). New technology in schools: Is there a payoff? *The*

Economic Journal, 117(522), 1145-1167.

Onchwari, G., & Keengwe, J. (2010). Teacher mentoring and early literacy learning: A case

study of a mentor-coach initiative. *Early Childhood Education Journal, 37*(4), 311-317.

Oncu, S., Delialioglu, O., & Brown, C. A. (2008). Critical components for technology

integration: How do instructors make decisions? *The Journal of Computers in*

Mathematics and Science Teaching, 27(1), 19-46.

Pence, H., & McIntosh, S. (2011). Refocusing the vision: The future of instructional

technology. *Journal of Educational Technology Systems, 39*(2), 173-179.

Romanov, K., & Nevgi, A. (2008). Student activity and learning outcomes in a virtual learning

    environment. *Learning Environments Research, 11*(2), 153-162.

Sarkar, S., Mohapatra, S., & Sundarakrishnan, J. (2017). Assessing impact of technology based

    digital equalizer programme on improving student learning outcomes. *Education and*

    Information Technologies, 22(1), 195-213.

Stubeck, C. J. (2015). Enabling inquiry learning in fixed-schedule libraries: An evidence-based

    approach. *Knowledge Quest, 43*(3), 28-34.

Sugar, W., & Van Tryon, P. (2014). Development of a virtual technology coach to support

    technology integration for k-12 educators. *Techtrends: Linking Research and Practice to*

    Improve Learning a Publication of the Association for Educational Communications &

    Technology, 58(3), 54-62.

Unger, K. L., & Tracey, M. W. (2013). Examining the factors of a technology professional

    development intervention. *Journal of Computing in Higher Education, 25*(3), 123-146.

Walsh, K. (2013). 21st-century teacher education. *Education Next, 13*(3) 18-24.

Wilsey, B. B., & Keengwe, J. (2012). Technology integration curriculum framework for

    effective program evaluation. *International Journal of Information and Communication*

    Technology Education, *8*(1), 15+.