Effective Implementation of Blended Learning

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Effective Implementation of Blended Learning

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A Literature Review Presented

in Partial Fulfillment of the Requirements

For the Degree of Master of Education
Abstract

This literature review depicts the current reality of blended learning in schools and the systems that will need to transform in order to fully implement technology into the daily school experience. Since technology is an integral part of society, schools are tasked with how to create and implement curriculums that include aspects of online learning. Moving from traditional education to a new blended learning approach brings about challenges for both teachers and administrators. Teachers must learn to understand new technologies and how to utilize them to teach with 21st Century skills in mind. Administrators need to lead districts through new developments in technology and provide the professional development needed to support their staff. By analyzing current research, this literature review presents information that can help in moving toward a blended learning approach to education.

Keywords: Blended Learning, Frameworks, Leadership, Professional Development, Instructor Beliefs, Student Motivation, Technology Tools
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Effective Implementation of Blended Learning

Introduction

During the Covid 19 pandemic of 2019 - 2020 and the school shutdowns that occurred because of it, the importance of technology in educational settings became clear. Schools around the world closed and many attempted to use virtual learning to continue to provide some kind of education for students (Engzell et al., 2021). This use of technological innovation, without the face-to-face instruction, required educators to quickly develop a new mode of instruction (Fuller, 2021). Some schools were able to reopen in the 2020-2021 school year, but many remained closed or partially closed. This brought into the limelight educational terminologies of virtual learning and hybrid learning. As the United States began to immunize and get back to the ‘new normal’ prior to the 2021-2022 school year, schools had to reassess what technology they used and how they used it. The term ‘blended learning’ was not birthed during the pandemic, but it became clear that this structure allowed for more fluid education between school and home. A rapid transformation like we saw in the last two years means that many systems were not in place to effectively implement such a new model of educational instruction.

Students of today cannot remember or imagine life without the use of technology and expect to have access to it in every part of their lives (Alaniz & Wilson, 2015). Because of this, a school setting without technology as an integral method of giving and receiving information, is less realistic than the world they live in. Even before the pandemic, schools and educational experts have been researching and tracking ways that technology can be used to benefit traditional education (Laurie, 2021). Knowing that jobs and relationships in the future will revolve around technology and flexible thinking, emphasis is beginning to ebb toward more creative thinking, collaboration, and use of technological tools when problem solving (Alaniz &
Wilson, 2015). This brings forth a lot of exciting opportunities in education, but also a lot of uncertainties.

The problem is many teachers and administrators are not prepared to lead classrooms through the technological world that they are finding themselves in. There is little clarity in the definition of blended learning and what it should look like in a classroom. Preservice training and professional development is not currently in place to guide teachers in the creation of blended learning courses or the implementation of them. Leadership roles will also need to be transformed in a move toward a modern approach to education.

The purpose of this literature review is to examine the use of blended learning as a mode of transforming traditional classrooms to meet the demands of a more technological future. In reviewing the literature at both the adult and adolescent levels, a current reality of technology integration and blended learning is shown. This literature review will look into professional development opportunities that will be needed, since many teachers are not as fluent with technology as their students are. Lastly, this literature review will include different types of systems that need to be in place within a school to ensure a quality educational experience within the realm of blended learning.
Review of the Literature

Blended Learning Models

To begin with, a clear definition of what blended learning is and is not must be clear. Simply stated, blended learning is a pedagogical approach where traditional face-to-face instruction is blended with online learning (Eaton, 2020). Students receive instruction in the traditional way within a brick and mortar building, but also use technology in specific ways inside and outside of that brick and mortar building to continue their education (Eaton, 2020). The technology becomes a part of their core work when used as instruction, collaboration among peers, and assessment. Blended learning is not simply adding technology to a traditional face-to-face classroom via tools like Google Docs, or videoconferencing (Eaton, 2020). Blended learning is flexible in that it can look different based on the needs of a school, classroom or individual student. Each model has an aspect of teacher led instruction, as well as technology driven instruction. Each model expects some time to be spent with a teacher face-to-face and some time working individually using technology as the mode of communication. Blended learning has been shown to have a positive impact on student learning regardless of learning styles, making it accessible to all students (Shamsuddin & Kaur, 2020).

The flipped classroom model is a common blended learning platform and one of the first to become popular in public schools (Eaton, 2020). This model attempts to make the best use of face-to-face time by having students do instructional tasks at home via their devices. This could be instructional videos, or deeper problem solving work. The flipped learning model has been evidenced to grow self-regulation, engagement, sense of responsibility for work and teamwork (Jdaitawi, 2020). The face-to-face time with students is meant to be a time when a teacher can dedicate themselves to applicable work with the topic or skill. Flipped classroom models require
a lot of preparation, skill, and careful integration in order to achieve high-level, engaging courses (Danker, 2015).

The station rotation model and the lab rotation model are also very common in traditional settings (Eaton, 2020). In the rotation model, students rotate to different stations. Some stations are with teachers, while others are technology based. Students can also have opportunities to work with partners, or in small, collaborative groups. Similarly, lab rotations have some face-to-face work with a teacher and then some instruction in a lab. Both of these models seem to work well with purchased programs that give teachers data and suggestions for what to do in their small group face to face time with students, while others continue to work on the computer (Kazakoff et al., 2017; Marcaruso et al., 2020; Prescott et al., 2018).

Following the structure of the rotation model is the individual rotation model and the flex model. In the individual model, each student has their own individual schedule and may or may not do all stations. This can be a great way to differentiate based on needs of students (Eaton, 2020). The flex model takes the individual model and tweaks it just a bit. Now, the teacher provides online instruction for students and creates offline supports (Eaton, 2020).

The last two models, the a la carte and the enriched virtual, are moving deeper into the digital instruction and less in the brick and mortar buildings. The a la carte allows for students to take certain classes online totally while doing some in the traditional face-to-face format (Eaton, 2020). The enriched virtual allows the primary vehicle for instruction to be digital, but then students occasionally come to the brick and mortar location. A caution of using the enriched virtual model, even for adults, came from research by Hui Yong (2016) in which students fell into either a deeply engaged category or a crash course category. There must be a balance between self-direction and choice and a prioritized need to complete the course material.
Blended Learning Research with Adult Learners

It seems logical in some ways that adult learners and instructors of adult learners were some of the first to begin with blended learning courses. Adult demands and schedules fit naturally with the flexibility of blended learning.

Adults are different learners than school age children. Adults have the opportunity to ‘shop’ for their classes as well as the freedom to choose not to do them at all. Therefore, educators of adults have the task of keeping participation and motivation up. Emotion also plays a part in educational decisions and success for adult learners. Jdaitawi’s (2021) research clearly showed that adult learners working in a blended learning environment had higher positive emotions than counterparts in a traditional learning environment. The research mentioned group work and use of digital media students could rewatch as reasons for this higher emotional score (Jdaitawi, 2021). Danker’s (2015) research also noted that adults could connect previous learning to new learning when working at their own pace, working with peers in small groups, and working with instructors in a more personal way. These connections form deeper learning and create a positive emotional environment for learning. Kuo’s (2015) research showed high academic success, as well as this emotional success. The correlation between students’ emotional motivation and success is high. Danker (2015) discovered that students in a flipped environment not only performed well and had positive motivation, but also developed communication skills by facilitating discussions, articulating ideas, encouraging one another, and helping one another accomplish tasks. These are the types of leadership skills that employers look for.

Günes (2020) found that a positive relationship between learner autonomy, motivation and academic success does bring about higher academic performance. Adults take educational
courses, generally, to better their careers. Motivation, for them, is found in how their coursework can be applied to the real world (Hui Yong, 2016). In Günes (2020) research, students participated in a blended learning course that did not directly apply to their major and a blended learning course that did apply. In survey data, the students explained a lower success rate in the non-applicable course to the fact that they did not feel it would make a difference in their real world work (Günes, 2020). Adults are motivated when they can differentiate their own learning by rewatching videos, forming their own groups, and receiving feedback more often from instructors (Danker, 2015). These motivational experiences can be found in blended learning. However, declining video engagement week by week in research by Hui Yong (2016) determined that even though adults can be highly motivated by their coursework, they must still have accountability. Kuo’s (2015) participants utilized video lessons, as well, but then had to apply their learning in field experience. As in any learning environment, some accountability is needed. Adult emotions toward education do show that engagement and individualization are important, but adults want clear answers to real life problems and learning that can be applied to their daily lives (Hui Yong, 2016).

The role of instructor changes as adult coursework moves into blended learning models. Danker (2015) wrote about the individualization of adult learning. Differentiating learning for adults is not a practice that has been in place in the past. Kastner (2020) found that instructors feel blended learning formats are more effective than traditional classroom learning. Adinada & Mohib (2020) determined that discussion forum structures in blended learning can enable students to interact and confront ideas while learning to infer, evaluate, and organize information. Traditional lecture settings do not lead to those types of discussions. Blended
learning has the potential to empower students to take charge of their own learning, while
opening up time for instructors to work more individually with them (Danker, 2015).

There are some barriers to adult blended learning courses. Kuo (2015) utilized knowledge
from TPACK, a framework for curriculum development utilizing technological knowledge,
pedagogical knowledge and content knowledge, to design a course for preservice teachers. No
other mention of specific course design was stated in research, leading this researcher to believe
that instructors are creating their own blended learning courses. Kastner (2020) found that lack
of training, time to develop coursework, lack of resources, lack of collaboration, and
underdeveloped plans for implementation were challenges to instructors. Danker (2015)
recommended more research into instructional design for blended learning in higher education.
Hui Yong (2016) cautioned against the reincarnation of traditional course work via digital
devices.

Curriculum design experts Ainsworth and Donovan (2019) warn that an overload can
exist when when administrators and educators are expected to rapidly learn and implement
many new professional practices in a short span of time. Blended learning means learning many
new skills and creating new structures throughout an educational setting. To counter this
overload, schools should be creating professional development and carefully choosing methods
of implementation, all while building a culture of collaboration (Dawson & Heinecke, 2004).

**Blended Learning Research with Adolescent Learners**

In context of this literature review, the term adolescent includes all school aged children
from kindergarten to completion of high school equivalency. In adult education, common themes
found in research were implementation, academic success and engagement. In adolescent
research, these themes emerged, as well as the concepts of high risk students and their needs to reach academic success. Another common theme in many adolescent studies was the use of purchased computer based programs, as compared to blended learning that is considered teacher created. While adult learning was largely focused on how the blended learning was accepted by students and the success of the educational learning environment, adolescent research seems to focus on filling gaps and implementing a solid foundation for learning, no matter the situation the child may be in.

Students that are not making adequate academic growth are considered high risk for outcomes such as dropping out of school, not attending a post-high school educational experience, or failure to support themselves as an adult. Categories of typical high risk students include, but are not limited to: homeless, abused, low socio-economic households, and students with disabilities. During adolescent years, teachers try to fill gaps in learning for all students, but at risk interventions are a primary focus. Research in blended learning has shown a positive result for students that are considered at risk. Fazal, Panzano, and Luk (2019) discussed the fact that blended learning offers a chance for teachers to have more time for face to face instruction if students are falling below set benchmarks. Because teachers can structure independent activities for those that are meeting benchmarks, they can, plan for face to face lessons for those needing differentiation and extra practice (Eaton, 2021). Camahalan and Ruley (2014) found that comparing writing with middle schoolers using both a blended approach and a face to face approach, both groups made gains, but the blended group showed more growth on assessments. Although it is found that students from high socio economic backgrounds, especially white students, still perform better than those from low socio economic backgrounds, especially
African American students, overall student performance increases with the use of blended learning (Puccetti, 2016)

The blended learning approach has shown particularly beneficial for language learners in a study with early readers. Kazakoff, Macaruso, and Hook (2017) found that after two years of work, language learners considered high risk made dramatic growth in reading utilizing a blended learning approach. Using technology to specifically target skills seems to be an added benefit of blended learning in the research done by Fazal and Bryant (2019). Remediating learning, especially in math, by sending students to digital content which they can practice for mastery is a better use of time than traditional methods (Fazal & Bryant, 2019). The use of various sources of information available for students leads to better communication between peers, increased ability, and increased learning for students that fall into high risk categories (Vincentius & Sutadjji, 2017). In a study in Greece in which middle school students utilized a flipped classroom approach, researchers positively noticed that students with learning disabilities were just as engaged with both the at home portion of learning and the face to face portion (Gariou-Papalexiou, et al., 2017).

Time management is an area in which blended learning has proven to be useful. Flipped classroom models, in which students access some instructional material at home, had a great effect on time that could be used in the face to face setting (Gariou - Papalexiou, et al., 2017). Using accessible online videos that can be viewed by participants when they want, and as many times as they want prior to and after class proved to be a better use of time than traditional classroom lecture (Danker, 2015). Dawson and Heinecke (2004) described the stages of growth that teachers go through to reach this advantage of quality time management beginning with using technology for games or rewards, moving to non-essential curriculum uses, ending with
strategically planned lessons that meet the needs of different students. Once that strategic planning of lessons creates a flexible schedule for students in which a blend of face to face time and independent technology driven lessons meet, blended learning classrooms provide practical, realistic opportunities for better time managed classroom (Vincentius & Sutadji, 2017). Automatic personalization within the digital formats of a purchased blended program, have been shown to be beneficial for students with skill gaps to catch up with peers (Prescott et al., 2018). Kazakoff, Macaruso, and Hook (2017) found that the automatic scaffolding and individualized practice allowed students that were grade levels behind to begin to catch up to peers.

A main concern for administrators and teachers when looking at a change in teaching methods on a large scale is the degree of implementation. This is true for changes from traditional learning to blended learning environments, as well. Blended learning is found to be a successful way to increase student learning, but only when integrated in a way that is closely aligned between student performance and the work, digital or traditional, to push a student forward (Marcaruso et al., 2020). Structured, personal learning approaches that are implemented with fidelity can show large improvements for students (Kazakoff et al., 2017). The investment and commitment of staff to fully implement a blended approach is essential for success (Wilkes, et al., 2020). Engaged teachers were described as being more willing to dig into blended learning programs to determine what they offer for their students’ needs (Schechter, 2017). Teachers that were less engaged were more likely to stay at the surface of a program’s offering, and were less likely to access the depth of materials that were offered as support. (Schechter, 2017).

Administrators and staff must remain aware that the success of any implantation does rely on active engagement of staff.
Blended learning has many different models and the term is used to describe many types of technology integration in classrooms. Some schools choose to purchase programs that can be integrated with fidelity, while other schools choose to create blended learning structures utilizing their own staff. A highly beneficial aspect of purchased programs is the way that they can automatically adapt based on student performance and give teachers in the moment direction for what to work with in face to face instructional time with students (Kazakoff et al., 2017). Less integrated forms of blended learning can leave a teacher trying to blend what he/she has traditionally taught with paper and pencil activities into a new environment that adds a technology based aspect. The differentiation pieces of the learning must be analyzed and put together by that teacher and is often less personalized for the student (Marcaruso et al., 2020). Prescott, Bundschuh, Kazakoff, and Macaruso (2018) found that by implementing a blended learning program as the main curriculum in an urban K-5 setting for one school year, a pronounced gain for K-2 students was achieved. In that same study, a discrepancy of lower gains for students in grades 3-5 was explained due to the lack of strong implementation. In a specific study between blended learning environments using a computer mediated instructional program and a blended learning environment that did not utilize a CMI, Puccetti (2016) found that the use of the computer program did, in fact, bring about higher test scores for eighth grade computer science course. Yet another study in an urban district with 593 kindergarten and first grade students determined that use of a purchased blended program gave higher gains than a traditional method only structure (Wilkes, et al., 2020). In that particular study, curricula, instructional time, instructional groupings and other resources all being the same, the added blended component in the treatment group brought higher scores for students (Wilkes, et a., 2020).
Student motivation for adolescent learners is somewhat different than for adult learners. As stated before, adult learners have choices in when, where, or if they attend educational settings. Adolescents, however, will attend an educational setting that is chosen for them. Motivation, therefore, is more often called engagement for younger learners. Blended learning is considered to be more engaging than traditional instruction (Maracuso et al., 2020). Many of the lessons in a blended learning program are structured like games and have small goals for students to meet (Fazal et al., 2020). Digital content is interactive, brightly colored and highly engaging. In Fazal’s research (2020) students reported feeling as though they could master small skills in consecutive lessons and therefore, felt more accomplished. Vocational high school students reported they preferred learning in a blended learning environment over a project based environment, after taking classes in both (Vincentius & Sutadji, 2017). Middle schoolers using an I-Pad for blended work in a writing classroom were more eager than before to share what they were learning, while a group in the same class using face to face instruction expressed a desire to use technology instead (Camahalan & Ruley, 2014).

Teacher motivation is also a major factor when looking at the implementation of any curricular matter, and blended learning is no different. Schechter, Kazakoff, Bundschuh, Prescott, and Macaruso (2017) completed a national study looking at usage data with a major purchased program. They found that teachers that were engaged and voluntarily signed up for a data usage contest were significantly more active in the dashboard portion the program, which allows for the differentiation for extension and remediation activities (Schechter, et al., 2017). Bliss (2003) remarked on one reason teachers are less motivated to create or implement blended learning as the lack of clearly defined goals or expectations regarding the usage, therefore leaving teachers guessing at their roles. Teachers in a school where technology was considered
as peripheral to assessment and curriculum, even though other positive traits of technology integration existed, made little to no change in their teaching suggesting that teachers must develop a motivation to implement technology before taking on the task of blended learning (Dawson & Heinecke, 2004). High performing, high-technology schools were shown to have caring teachers that were driven by a strong sense of confidence in their own competence with content and technology, as well as the support of their collaborative team of colleagues (Sweet, 2004). Purpose, pedagogy, and organization of technology integration must be equally addressed in order to see successful implementation of any systematic change, including blended learning (Sofkova & Cederlund, 2017). Teachers reported that blended learning was well accepted by students and more effective, but also took much longer to plan for (Kastner, 2020). A blended learning approach is a way for teachers to administer a more personalized instruction, but also needs to be administered by teachers that have had the adequate training and time to prepare for the new challenge (Kazakoff et al., 2017).

**Professional Development**

A common thread among studies that have been done concerning blended learning is the need for professional development. Considering that increased technological innovation decreases costs and expands the productivity of teachers and learners, schools are implementing technology quickly (Alaniz and Wilson, 2015). However, many teachers find themselves struggling to keep up with all the changes (Alaniz and Wilson, 2015). Students of today have grown up with technology, while seasoned teachers still remember a time prior to wide usage. Making the shift into a modern approach to education that includes technology requires teachers to invest time to become familiar with technologies, create quality activities within that new learning, then reflect on the implementation and adjust the usage as needed (Kastner, 2020).
Designing a blended learning environment is a relatively new concept that wasn’t taught in teacher preparation courses. The process of engaging students both face to face and digitally, then integrating them together, is a complex task that many teachers do not feel adequate in doing. Gariou-Papalexiou, Papadakis, Manousou, and Georgiadu (2017) found that creating a flipped model in a junior high classroom showed great results for students, but created a higher demand for teachers. Creating the digital content, and making sure it is diverse for all leanings while remaining engaging while also planning for the face to face lessons based on individual needs of students is much more detailed than planning for a traditional lesson (Gariou-Papalexiou, et al., 2017). Teachers must understand the role and purpose of online learning to be able to create blended learning that is deeper than replacing paper worksheets with digital ones (Shamsuddin & Kaur, 2020).

The most mentioned type of professional development in research was informal interactions with colleagues. Kastner (2020) found interactions with peers, management or subject matter experts guided teachers’ work with blended learning. Johnson’s (2009) study determined local trainings as the major form of professional development on the topic. Staff development and general inservice sessions were described by teachers, and those teachers did not feel it was adequate to support their efforts toward blended learning (Johnson, 2009).

When trying to analyze what formal professional development teachers were offered, most formal options typically revolved around implementation of a new tool or system. For instance, when staff attend a training for Smartboards or receive training on how to manage PowerSchool or Integrate Pro systems (Johnson, 2009). Although these tools may play a part in blended learning, they are only tools. A true blended learning course is not added technology, it is rethinking instruction and using technology when needed to engage, instruct, and assess
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(Eaton, 2020). Training on tools alone will not bring about blended learning. Kuo’s (2015) research from a university in Georgia demonstrated that a successful blended learning course was created using a framework called TPACK. For this type of design, deep research into how different sources of knowledge are interconnected with the content to create a seamless learning environment. Danker (2015) suggested further development of the instructional design for flipped classrooms as a way to assist teachers in creating active learning activities for blended learning environments.

The process of moving from face-to-face teaching into a blended learning environment causes teachers to adjust the learning experience for students. Many teachers are unsure of how to do this (Fuller, 2021). Teachers often resist the change, due to this anxiety. Fuller (2021) found that there is an aspect to purposeful design and transformation of teaching that is best supported by professional development in instructional design. In Bliss’ (2013) study, a majority of teachers claimed to have not received adequate professional development or follow-up needed to raise student achievement or school performance.

From a study in California, one major finding was that the California Department of Education should partner with ISTE and a task force of teachers in order to develop quality professional development for teachers to learn to create highly engaging lessons with real world application (Bataller, 2018). One aspect of professional development that is needed to integrate blended learning is training for teachers on how to effectively analyze data from blended learning in order to design targeted learning opportunities for those that need differentiation (Fazal & Bryant, 2019). This type of data usage goes beyond the previous use of data, which was a measure of progress more than a tool for teaching. Bataller (2018) suggested that training begin in credential programs and universities.
A Swedish study over technology in the literacy classroom clearly found that professional development and pedagogical discussions around technology are important, but are not sufficient (Sofkova & Cederlund, 2017). The most compelling structure mentioned for successful blended learning was the need for better, more focused training for teachers. Considering the rapid development of technology, many teachers feel overwhelmed trying to keep up with changes and adapt their curriculum to meet technological design. Beginning with pre-service training, teachers need to have a pedagogy of the importance of 21st century skills (Bataller, 2018). According to Bataller’s research (2018), teacher candidates should get the knowledge needed to integrate technology within their classrooms in an inquiry-based learning environment. This type of teaching is not what has been taught in pre-service education for most teachers. A significant percentage of teachers feel less than confident to take their current curriculums and design technology based activities to both meet the needs of the standards they need to teach and develop students’ 21st Century Skills (Bliss, 2003). Even administrators in training could use more direct education for how to lead districts and schools through the issues related to technology integration (Gibson, 2002). Without frameworks enabling teacher work and participation of school leaders, stakeholders, and policymakers supporting that work, the professional development will not be enough to ensure quality implementation (Sofkova & Cederlund, 2017).

**Frameworks and Structures in Leadership**

There is little doubt that technology use in education can make a large impact on student learning and teaching methods. However, considerable differences exist in the way that technology can be implemented into a school system and these differences can dramatically change that impact (Schniller, 2002). Even though technology has been in the process of being
integrated into school systems for over fifteen years, it is not yet uniform in how it is approached (Bliss, 2003). Frameworks and structures are foundational in successful implementations of technology usage, like that of blended learning environments (Sweet, 2004). The types of frameworks and structures mentioned in research revolved around administrative beliefs and support, access to technology and the infrastructure needed for it to run properly, as well as the careful selection of technologies to implement and how they integrated into current systems.

A logical place to begin when looking at frameworks and structures needed to implement blended learning, is the infrastructure in place and the access to technology for staff and students. Sweet (2004) found that money was the main factor contributing to technology use in schools. Schools with adequate funding had adequate technologies available and those that lacked funding, lacked those technologies (Sweet, 2004). In an obvious conclusion, without technology available, the technology integration could not occur (Johnson, 2009). Bataller (2018) recognized a need for states to create technology plans to assist schools in these funding issues. However, in Sweet’s research (2004), schools that had access to grants to help with funding often stated that they did not attempt to utilize such grants due to the requirements and expectations that were considered burdensome. As plans are made to provide monies for technology, consideration about expectations will need to be taken into account so that schools see more positive benefits. Overall, Bliss (2003) found that since 1998, schools in the United States have made great progress in their student-to-computer ratio and the daily usage of those computers by students, teachers, administrators, and parents when applicable.

Access to devices and internet, both at school and at home, is another factor to take into account when implementing blended learning. Because some blended learning must take place at home, or somewhere other than school, students need to have access to the internet (Eaton,
According to the U.S. Department of Education, well below half of the public schools in the United States have whole school wireless internet and just above half would have wireless in part of the school or the whole school (Laurie, 2021). Bataller’s (2018) research identified lack of technology resources and insufficient internet connectivity as two of the top five barriers for technology integration. However, Johnson’s (2009) research contradicted that with a finding that teachers were happy with the amount of devices and had no concerns with connectivity. The difference could be that Bataller (2018) took a larger sampling of schools throughout the country while Johnson (2009) focused on two schools in Virginia. There is no doubt that location and socio-economics play a part in equitable access and that without equitable access, schools lacking will not be as successful as their counterparts.

Technology support is another factor that will need to be in place in order to fully integrate technology into a school system. In the span of educational history, a technology team is relatively new. Previously, with only televisions and simplistic devices in classrooms, there was no need for specialized service (Johnston, 2005). The use of a specialized technology teams is varied from district to district. For some schools, the main duties are to fix devices and systems that aren’t working. Some teams have developed into leadership positions in which they also take on teaching and training roles (Waheed & Megat, 2018). The need for training and professional development for teachers has been well established in research, and it makes sense that a team of employees in the district help out in this role. Johnston (2005) suggests a transformation for school librarians using a distributed leadership structure. Her research suggests that since administrators and principals are often the driving force behind technology integration, it would be beneficial to include school librarians in that leadership role to bring about the specialized knowledge from their positions (Johnston, 2005). Johnson (2009) found
that in his study teachers that were left to solve technological issues, either non working devices or implementation issues, were much more likely to be unsuccessful in their technology integration. With an entire system running on technology, a team will be needed to keep the infrastructure working and to train staff. This is a position that will require specialized knowledge and skills (Johnston, 2005).

Administrators are instrumental in implementing any type of new system within a school, and technology is no different (Schniller, 2002). Principals and other administrators are given very little professional development in how to lead a district through the transition toward blended learning or other technological integrations (Acree, et al., 2017). The behaviors of administrators, as well as the frameworks they put in place, are found to significantly effect the outcome of technology integration (Waheed & Megat, 2018). In Gibson’s (2002) research, he concluded that the role of administrators will drastically change in the future. A positive behavior seen in research is the use of and the knowledge of technology by the administrators (Schniller, 2002). When administrators have knowledge of technology, use it regularly and can create a vision for the school, more success is seen (Sweet, 2004). Schools that have supportive administrators that encourage technology use were found among high - performing, high-technology schools (Sweet, 2004).

Further research identifies diversified roles of leadership as having positive effects on integration (Schniller, 2002). Administrators that can recognize expertise in themselves and their staff and clarify roles to revolve around those expertise, have been found to be more successful and appreciated by staff (Waheed & Megat, 20218). The transformation needed for administration is a large and overarching theme in most research over technology integration. The role of administrator will require new knowledge, skills, behavior, personal relationships,
and mental models that must be taught in preparations programs designed for leaders (Gibson, 2002).

As stated so many times before in this research, professional development is a necessity for successful blended learning, and therefore, needs to be a major concern for administrators. School leaders must be the force behind the transformation of pedagogy that is needed to encourage significant change toward technological education (Dawson & Heinecke, 2004). One study followed a group of administrators as they took a blended learning course on how to implement blended learning with findings that determined modeling of blended learning in this way gave the a much greater appreciation for what is necessary in the transition (Acree, et al., 2017).

Administrators also need to be the spokesman for the school’s technology use in the community and with parents. Providing consistent, accurate information for parents on how the technology is being used and how it can impact their child’s life is an integral part of gaining support for what teachers are doing (Sweet, 2004). Administration should consider ways in which to educate parents and stakeholders on how technology can transform education (Dawson & Heinecke, 2004).

When all other things are in place, another framework to make blended learning successful is the method of instruction within blended learning. In high - performing, high - technology schools, Sweet (2004) found that a coherent approach to curriculum, assessment and instruction is almost always based on standards. There are two basic methods described when talking about curricular methods of instruction, teacher created and purchased programs. The goal of blended learning is to differentiate instruction so that each child is getting an individualized education (Eaton, 2021). To do this, some schools depend on teachers to take the
current curriculum, their knowledge of technology, along with student data and create lessons to achieve this end. Other schools invest in computer managed software programs that will take what students do on their devices, analyze it, and give teachers ideas of what to work with face to face. Data usage in blended learning via a purchased program with immediate feedback has been found to be more efficient than traditional grading (Fazal et al., 2019). The online tools make differentiation, extension or remediation, easier because of the adaptive nature of online programing (Fazal & Bryant, 2019). Higher scores were achieved using an adaptive program than a teacher made course (Puccetti, 2016). No matter what is chosen for the structure, teachers should be involved in not only the planning of curriculum in their classrooms, but the school-wide vision and integration planning, as well (Johnson, 2009). When technology was found to be peripheral to the curriculum, even with many other positive structures in place, there was little or no change in the use of the technology (Dawson & Heinecke, 2004). In that same report, schools that had a collaborative decision making process fostered more systemic changes (Dawson & Heinecke, 2004). Schools that are high-performing, high-technology have been found to use technology within core curriculum and within content-specific software (Sweet, 2004).

**Future Research**

Throughout all the research reviewed for this literature review, the most common area of concern mentioned was the need for professional development that specifically addresses blended learning. Transforming traditional curriculum to include quality technological integration will require new skills and learnings that most current teachers and administrators do not have experience with.

Research on how to create quality curriculums that utilize technology will be vital. This research could include more data on what types of programs provide the best results for students
as well as how to implement those programs into current systems and frameworks. Implementing technology into a blended learning environment is more than just taking current curriculums and making digital activities to match. New design methods for curriculum need research based data to help guide schools as they begin to adapt to new methods of instruction.
Conclusion

Blended learning is a structure of technology integration that allows for face to face and online instruction (Eaton, 2021). Blended learning has been shown to have a positive impact on student learning regardless of learning styles, making it accessible to all students (Shamsuddin & Kaur, 2020). The use of technology blended into curriculum can transform how classroom teachers use their time. Blended learning allows teachers to divide class time into individual work with technology that is meeting specific, individual needs, while working with small groups of students face to face (Eaton, 2020). This divide of time can provide a better quality of learning for students no matter their needs (Kazakoff et al., 2017; Marcaruso et al., 2020; Prescott et al., 2018; Fazal & Bryant, 2019). Both adult and adolescent learners have shown motivation, engagement, and academic success while working in blended learning courses (Danker, 2015; Vincentius & Sutadji, 2017; Puccetti, 2016; Fazal et al., 2019; Jdaitawi, 2020; Hui Yong, 2016; Günes, 2020; Kazakoff et al., 2017; Marcaruso et al., 2020; Prescott et al., 2018; Kuo, 2015; Fazal & Bryant, 2019). The strong implementation of blended learning, including usage and teacher pedagogy, does show to be a factor in the success of students (Prescott et al., 2018).

Integration of technology brings about new skill sets for school employees. Administrators, teachers, and technology teams have to learn new ways to design curriculum (Kuo, 2015), plan teaching time (Bliss, 2003), and analyze data (Fazal et al., 2019). Current professional development is not keeping up with these new skills (Kastner, 2020; Johnson, 2009). Current trends in technology professional development often include how to use specific tools and less on how to redesign curriculum to add deep technological integration for 21st century learners (Fuller, 2021). Preservice teacher programs must begin to address the need for
blended learning integration (Bataller, 2018). Administrator preparation classes also need to include more global perspectives that allow for more shared leadership based on expertise of staff (Gibson, 2002).

Along with updated professional development needs, a school moving toward blended learning and technology integration will need to address some structures within their environments. Equitable access, technology teams, and adjusted administrator roles are structures that need to be in place. Access to devices and to the internet is the foundational need to implement blended learning and ways to gain this access are issues that will need to be addressed at the state and federal level (Sweet, 2004). With the large growth in technology being used in classrooms around the world, a new need for a team of people that can keep it running, problem solve issues, and fix devices will be important (Johnson, 2009). A large and sweeping change in the role of administration was mentioned in research (Schniller, 2002; Johnston, 2005; Waheed et al., 2018; Gibson, 2002; Dawson & Heinecke, 2004). Administrators of the future will not need to be in control of all they lead, they will instead need to be able to recognize expertise within their staff and clarify roles in ways that allow those expertise to lead (Waheed et al., 2018).
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