The role of school leaders in the integration of technology for school's effectiveness

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Abstract

The purpose of this qualitative research was to identify the role of school leaders in the integration of technology for secondary schools' effectiveness in Georgetown, Guyana. In 2020 when Covid-19 was declared a pandemic, schools globally were forced to change their mode of delivery of the curriculum and rely on virtual technology to meet the needs of their school community. This resulted in a paradigm shift in how education was delivered and how school administrators operated to keep their institutions functional. However, it is unknown how well-equipped school administrators are to integrate technology into their schools. The struggle of school leaders to successfully manage schools through the use of existing technology can have a substantial influence on the overall performance of school operations and student academic performance.

Most specifically the secondary data study sought to identify the required leadership attributes necessary for administrators, the opportunities that should be provided to teachers and the guiding model and/or framework school leaders need to use to effectively perform their role in the efficient integration of technology in their schools. The research aimed to triangulate findings by utilizing nine scholarly journals. Three themes were yielded from the data, which are as follows: interpersonal qualities, transformational behaviours, and professional development. As such school leader's role in the integration of technology for school's effectiveness is that: they must possess interpersonal qualities along with transformational behaviours, provide professional development as needs be for teachers and utilize the SAMR and TPACK model to evaluate the effectiveness of the technology integration.

Declaration of Authenticity

This is to confirm that, to the best of my knowledge, the content of this thesis is my own original work. This dissertation has not been submitted for a degree or for any other reason.

I, Areana Britton, declare that the intellectual substance of this dissertation is the result of my own work and that all sources and support used in its preparation have been acknowledged.

Areana Britton

Contents

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CHAPTER ONE: INTRODUCTION

Introduction

Technology is frequently referred to as a gauge of the development of modern society. Ground-breaking technologies are incessantly shifting the dynamics of the world. The development of the Internet, smart electronics, virtual reality platforms, and gaming software is accelerating at a rate never previously seen as technology advancement surpasses creative ingenuity. Generations gone have not incorporated this rapid revolution more fully into their lives than this generation of digital natives (Svinicki, 2017)**.**

Consider your daily operations and it is easy to acknowledge that technology plays an integral part in every aspect of human existence. According to Malik (2018), The effectiveness and safety of transportation, availability to food and healthcare, sociability, and productivity are just a few of the many aspects of everyday life that are impacted by technology. It determines how people connect, acquire knowledge, and think. It benefits society, influences how people interact with one another on a daily basis, and significantly contributes to the expansion of all industries. Regardless of whether it is at the workplace, school, medical clinic, or home, the influences of technology on society are immense. The state-of-the-art devices and gadgets have enhanced the quality of life and made it more convenient and beneficial. Technology plays an integral role in the advancement of today's society (Park, 2017).

Notwithstanding, the pervasive appearance of technology everywhere in society globally, its impact on schools, teaching, and learning has been much more limited but a welcomed impact. Academics and educational leaders continue to find it difficult to effectively determine how best to exploit the positive advantages of information and communication technology (ICT) in schools and how to plan for the long-term influences of technology on the field of education. (Ozkan Hidiroglu et al., 2021). Mahat et al. (2018) discovered that technology in schools had not reached the level that had been envisioned, or the impact expected by so many, finding instead that some teachers in the school setting continue to teach the way they were taught when they were in school, and technology remains conceptualized as an add-on luxury rather than integral to achieving an effective educational outcome.

The successful integration of educational technology in their schools is mostly dependent on the school administrators. The use of technology in the classroom must be supported by school administrations, including team leads and teachers. Many education organizations seem to have committed the most dreadful blunders that have pushed them backwards rather than forward with technology integration (Raja & Nagasubramani, 2018).

Altering educators' perspectives on the compelling use of technology may be a troublesome assignment to be accomplished; notwithstanding, these administrators and school leaders enjoy the benefit of making their staff feel comfortable with this new change by giving clear expectations, support, and time for the technology to evolve. According to Mahat et al. (2018) technology can reach its potential in schools only when school leaders, change agents, team leads, and teachers understand the impact these factors have on technology integration and use.

Leadership is the distinctive and imperative factor ensuring successful technology integration in school systems (Yamamoto and Yamaguchi, 2019). School administrators have the responsibility for considering their staff's needs, teaching styles, curriculum goals, and students' needs to effectively create a strategy that will be successfully adopted and implemented. School administrators also serve as role models in the use of technology. Leadership according to Sonmez Cakir and Adiguzel (2020) is viewed as being vital to the advancement and performance of an organization. Therefore, any deficiency of leadership in technology integration is recognized as one of the obstacles to technology integration into the instructional process of an institution (Hammad & Bush, 2021).

This chapter provides an introduction of the study, background, context, and theoretical framework of the study, research focus, research questions, purpose of the study, rational, significance and nature of the study, and definition of terms

Background

The way we work, play, create, and engage with one another is constantly evolving as a result of technological advancements. As a result, it is only natural that technological advancements are paving the way for game-changing breakthroughs in education. Instructive technology has long been an important part of school growth, from the ancient abacus to

handheld adding machines, from slide projectors and homeroom video strips to augmented reality and cutting-edge e-learning. The excitement among educators and students can be considered as exhilarating as these and other technologies continue to advance in fascinating new ways. While the advantages of technology cannot be emphasized, the burning question is who will be in charge of overseeing the integration's deployment. The school administration and leadership team are made up of people who have the most direct influence on the organization of instructors in a school (Kipp, 2019). When technology is successfully integrated into a school system, it leads to significant school change. This necessitates the support of instructors who integrate technology into the curriculum, match it with student learning objectives, and use it for hands-on projects. For extensive and proper use of technology in schools, good school leadership is required (Schaaf, 2020).

The school principal is the highest-ranking administrator in a secondary school, and he or she, along with other members of the leadership team, is in charge of the school's general functioning. The principal, on the other hand, bears sole responsibility for the school's operation. Principals have traditionally been expected to be effective building managers, disciplinarians, and public relations experts; however, the concept of the principal as a building manager has given way to a model in which the principal is an aspirational leader, a team builder, a coach, and a visionary change agent (Perkins, 2016). However, education is undergoing significant modifications as a result of technological integration, which has resulted in a reevaluation of school administrators' duties and responsibilities. These duties and responsibilities are based on the distinction between a leader and a manager, in which the leader of a company creates a vision for transformation while the manager strategizes and executes the details. Previously, school administrators were only trained to manage educational institutions; now, they must also encourage and support staff members to embrace technological integration in the overall learning experience (Aldowah et al., 2017). Although many aspects influence technology in schools, one of the most important factors is the mindset and leadership style of school leadership (Yamamoto & Yamaguchi, 2019). Unfortunately, there is a significant gap between what administrators are supposed to do and what they have been taught to do.

Adaptive leadership assists individuals and organizations in adapting and thriving in the face of adversity, as well as preparing them to face the change process (Heifetz et al., 2009). To

adapt to the changes that technology has brought in the 21st century, principals must utilise new tactics and abilities, as well as the leadership to mobilize teams. Technology leadership can also be viewed through the lens of transformational leadership theory. Transformational leadership is an effective type of leadership that appears to encourage digital innovation in the best possible way (Antonopoulou et al., 2021).

Based on Heifetz's (1994) adaptive leadership theory and Kouzes and Posner's (2012) transformational leadership model, the findings of this study will fill a vacuum in the literature on school leadership and technology integration. The outcomes of this study may have an impact on theoretical analyses of both the adaptive and transformational leadership models. Even though the two models have been used in many forms of school leadership, the results of this study may help to extend these ideas into effective school administrator practices when it comes to technological integration.

Statement of the Problem

Traditional pedagogy in school is being replaced by a cutting-edge emphasis on technological pedagogy (Raja & Nagasubramani, 2018). This shift focuses on the incorporation and educational use of technology in the classrooms, a process that is complex and depends on a number of factors, including a school's organizational maturity (Moreira et al., 2018; Chong & Pao, 2021). Leadership in the integration of technology processes is one of the factors that have been highlighted in various research (Stevenson et al., 2016).

In 2020 when Covid-19 was declared a pandemic, schools globally were forced to change their mode of delivery of the curriculum and rely on virtual technology to meet the needs of their school community. This resulted in a paradigm shift in how education was delivered and how school administrators operated to keep their institutions functional. However, it is unknown how well-equipped school administrators are to integrate technology into their schools. The struggle of school leaders to successfully manage schools through the use of existing technology can have a substantial influence on the overall performance of school operations and student academic performance. The role of a school's educational technology leader is unique in comparison to basic organizational management (Hairon,2017). As a result, in this rapidly evolving technological era, school administrators must be ready to lead technological change (YAH & HOPCAN, 2021). The importance of educational leadership as a necessary element to promote

and carry out technology integration in institutions has been demonstrated in several research (MacBeath, 2019). It was hoped that after this research was completed, insight will be provided into the attributes that leaders must possess, as well as the resources required to successfully execute technology integration inside their school.

Furthermore, to aid the process of successful technology integration in schools, it necessitates that school leaders gather information, evidence and statistics from other administrators who have implemented effective leadership methods at their institutions (Meyer & Patuawa, 2020). The challenge is that administrators in the secondary school system lack appropriate empirical knowledge about the processes and strategies for efficient, school-wide technological integration. Several researchers, however, such as Schaaf (2020) and Kipp (2019), have found a link between failed technology integration efforts and school leadership practices. In order to have a thorough grasp of technology integration at the secondary school level, it is critical to establish effective leadership strategies among school leaders and personnel.

Purpose of the Study

The vast majority of studies on the use of educational technology in schools focuses on the relationship between technology integration and student achievement and/or performance outcomes. Despite the importance of this information in assessing the success of technology in terms of learning outcomes, further research on the leadership role as a determinant in technology integration in the classroom is required.

The purpose of this qualitative research was to identify the role of school leaders in the integration of technology for secondary schools' effectiveness in Georgetown, Guyana. Secondary data from online journals were selected to assess this phenomenon. Most specifically the study sought to identify the required leadership attributes necessary for administrators, the opportunities that should be provided to teachers and the guiding model and/or framework school leaders need to use to successfully perform their duties for integrating technology into their classrooms.

Research Question

In order to determine the role of school leaders in the integration of technology for school's effectiveness in Georgetown, Guyana, the following questions are addressed in this research study:

1. What leadership qualities are required for integration of technology for school's effectiveness in Georgetown, Guyana?

2. What opportunities do school leaders need to provide for integration of technology for school's effectiveness in Georgetown, Guyana?

3. What guiding model and/or framework school leaders need to use for the effective integration of technology for school's effectiveness in Georgetown, Guyana?

Significance of the study

Technology integration in the classroom to increase teaching and learning in the 21st-century education system is a difficult undertaking for school principals. Principals' technological leadership is critical as a catalyst for motivating teachers to adopt technology in their classrooms (Thannimalai & Raman, 2018). As the fourth Industrial Revolution pushes the current education system in a new direction, school administrators and teachers must alter their practice to facilitate the same.

This research was significant because it has the potential to aid educational leadership and technology inclusion in practical ways. Administrators are at the vanguard of the techno-pedagogical revolution in schools, and their experiences are needed to bridge the knowledge gap in the scholarly literature and, more importantly, to make better judgments on future technological practices integration (Uğur & Koç, 2019; Kipp, 2019; Mahat et al., 2018). However, according to Uğur and Koç (2019), information is scarce regarding how to implement effective technological facilitation in school settings, as well as information on educated best practices to guide school leaders in this current movement.

Rational

Many studies on instructional technology integration in schools, such as Bowman et al. (2020) and Iglesias-Pradas et al. (2021) focus on the relationship between technology integration and student achievement and/or performance outcomes. Despite the importance of this data in

determining the success of the use of technology, as it relates to learning outcomes, further study on the function of leadership as a factor of technology integration in the classroom is required. According to (Kipp, 2019) school's administrators and leadership teams attitudes and ideas are a direct correlation between the success or failure of effective technology integration in schools. Leaders must identify and implement school reforms that address how to: create a shared vision; focus on technology-appropriate pedagogy; promote mentorship/coaches; and offer infrastructure that supports technology integration.

To that end, the goal of this qualitative desktop research was to determine the role of school leaders in the effective integration of technology for secondary schools' effectiveness in Georgetown, Guyana. This research also aimed to uncover the leadership qualities that administrators will need to properly fulfill their role in the efficient integration of technology in their schools. It also examines the opportunities that school leaders need to provide for integration of technology for school's effectiveness. In today's educational climate, school leaders require knowledge, advice, and facts in order to build effective technology integration leadership practices in their institution. There is a gap in the research regarding best practices in technology leadership and the role that leadership may have on successful technology implementation and integration in secondary schools.

Research Gap

There are gaps in the research addressing the particular behaviors that support technology integration, even though the majority of the research supports leadership as a determinant in student achievement, teacher effectiveness, and change. However, the data is broad and does not concentrate on personal roles or behaviors in relation to technological integration. There is a significant gap in research on leadership roles and behaviors that have a significant impact on technology integration due to the previous focus of research on technology installation, barriers to integration such as resource allocation, student achievement, and delivery modality. In essence, educational technology scholars appear to view management, administrative, and governance issues as either unnecessary or ignored by those who assume the "true" objective of the profession is to implement learning technology-focused advancements in learning and teaching (Arnold & Sangrà, 2018). The functions and conduct of principals of secondary schools and instructional technology leaders require further study.

K Mwei (2020), posited that there are a number of aspects of technology integration and deployment in the classroom that have yet to be completely explored. It becomes clear that looking at isolated factors, variable lists, and typologies will not help us better understand how technology is used in schools when we consider technology adoption as a process of learning for individuals and organizations, and we acknowledge that the multiple factors influencing technology adoption include both individual and organizational variables as well as pedagogical and technology-related variables. More understanding of leadership behaviors in technology integration is required in order to increase student achievement. However, research indicates that not all uses of technology are positive and helpful, even when they are used regularly, therefore the significance of the quality of technology usage is becoming more widely acknowledged (Sedimo & Ngwako, 2016).

Even though the literature has acknowledged the importance of the principal's role in good instructional leadership and coordinating the integration of technology, educational leaders' critical duties, practices, and professional development needs have been overlooked. Data gained in K Mwei's study, in particular, provided insight into schoolteachers' perceptions of technology integration and use, as well as implications for future educational practice.

Summary

To that end, the goal of this qualitative desktop research was to determine the role of school leaders in the effective integration of technology for secondary schools' effectiveness in Georgetown, Guyana. In today's educational climate, school leaders require knowledge, advice, and facts in order to build effective technology integration leadership practices in their institution. There is a gap in the research regarding best practices in technology leadership and the impact that leadership may have on successful technology implementation and integration in secondary schools.

CHAPTER TWO: LITERATURE REVIEW

Introduction

In the chapter that follows, a survey of the academic literature on the theoretical framework and pertinent topics relating to this research investigation is presented. Technology school leaders, leadership in the 21st century, integration of technology, effects of technology, challenges of technology integration, and accountability of technology integration will all be discussed. The transformational leadership theory and the adaptive leadership model will also be addressed.

Technology integration in the classroom has a long history, stretching from the ancient abacus to augmented reality and cutting-edge e-learning systems. Due to the increased deployment of technology in schools, conventional approaches to teaching and learning have undergone significant change (Han et al., 2021). In order for this generation of digital natives to succeed in the future, they will undoubtedly need to be taught 21st-century skills. In order to reach these lofty goals, educators must focus technology on the most important areas of student achievement (Malik, 2018). Technology must be used in a practical, relevant way if its benefits are to be realized, and educational leaders must work to break down any hurdles that exist in this area.

For technological integration in the classroom to be successful, teachers' support is essential (Che-Wei et al., 2021). The initiative's teachers are its driving force. Principals must develop a school philosophy that outlines the institution's vision, purpose, aims, and beliefs in addition to advocating for the philosophy's goals in order for this to occur (Webster, 2017). In essence, administration or school leadership is what makes any integration success possible. Ferguson (2021) asserts that in order to successfully create a culture where high levels of technology are integrated, leaders must convey the value of technology to the school community and encourage people to make a difference in the process. As a result, the purpose of this study is to ascertain how school administrators in Georgetown, Guyana, enhance to the effective use of technology in the classroom.

Theoretical Framework

The foundations of Transformational Leadership Theory and Adaptive Leadership Model, two of the most extensively studied school leadership models, serve as the basis for this study. These models stand out from others because of the focus on how administrators and teachers may enhance teaching and learning while adapting to the numerous changes that affect the educational system on a daily basis. According to the transformational leadership theory, people will follow a leader who inspires them, and a leader with a vision and passion may accomplish great things. The Adaptive Leadership Model, on the other hand, focuses on getting a group of individuals together to overcome challenging obstacles and succeed in the end (Diaz-Saenz, 2011).

Transformational Leadership Theory

James V. Downton created the transformational leadership theory in 1973 having studied the concept of charisma and how it affects religious leadership (Bass & Bass, 2009). Then, in 1978, leadership specialist and historian James MacGregor Burns stated that transformative leadership arises when leaders and followers inspire one another to higher levels of self-assurance, self-fulfillment, morality, and motivation (Burns, 2003). Abraham Maslow's Theory of Human Needs, which acknowledged how human behavior is based on identifying needs and figuring out how to meet them, had an impact on his views (Okanga & Drotskie, 2016). Maslow's hierarchy of needs served as the basis for his theories, which purported that effective leadership elevates people from lower to higher level demands while also enhancing their sense of self-worth and maximizing their potential rather than merely controlling subordinates. According to Burns' (2003) theory, transformational leaders motivate followers to work harder by taking on their values and assisting them in aligning them with the organization's values.

Then, based on Burns' initial views, a professor by the name of Bernard M. Bass influenced the development of what is now known as Bass' Transformational Leadership Theory. According to Bass' revisions, transformational leadership can be defined by the impact it has on followers and leaders. In this type of leadership, leaders work to earn the respect and admiration of their followers (Bass and Avolio, 1994). According to Burns, transformational leadership entails a change that is advantageous to the participants' relationships and resources. The level of commitment changes as a result, and the ability to accomplish shared goals is improved. He

argued that in order to successfully effect change, a leader must go beyond serving as a role model and also challenge the status quo.

More recently, the works of Kouzes and Posner have investigated the transformational leadership model hypothesis (2012). Their research, which they conducted over a period of almost 20 years, revealed that leadership is not a single position but rather a range of actions and attitudes. These procedures serve as a guide for leaders in achieving their objectives or accomplishing seemingly impossible tasks and objectives (Kouzes & Posner, 1995). These activities, according to them, include challenging the status quo, igniting a common vision, empowering people to take action, setting an example, and fostering the heart (Kouzes & Posner, 1995). Leaders use techniques and behavioural patterns to demonstrate how to handle challenges while providing good leadership (Kouzes & Posner 2012). To provide an example of appropriate behavior, leaders must be honest with their followers about their beliefs and values. They must also support the shared ideals of the group. The leaders' words, deeds, and beliefs must all be consistent with those of the organization. When describing their results, Kouzes and Posner (2012) posited that setting an example rather than issuing orders is more beneficial. If people see you putting in hard work while encouraging it, they are more likely to follow you. Leaders must be enthralled by the vision and convey it to others in order to motivate them, see the future, and comprehend their requirements (Kouzes & Posner, 2012). Leaders must have the courage to take a chance, accept the challenge of the initiative, and view it as an opportunity to develop. In order to inspire followers, leaders must be able to inspire others to action, foster cooperation, and build relationships (Anthony, 2020; Kouzes & Posner, 2012). A culture of quality, community, service, and support for others' success should be fostered by leaders (Balcerzyk, 2021; Kouzes & Posner, 2012). They also came to the conclusion that leadership is a crucial talent that anyone can acquire. True skills and talents are not apparent until obstacles, such as transition and changes in schooling, emerge. Leadership is everyone's business (Kouzes & Posner, 2012).

A key lens for understanding principals' duties and behaviors as technology leaders is their leadership styles and behaviors. To lead in the twenty-first century, school administrators must have the ability to transformative leadership qualities (Ezaki, 2015). The optimum type of leadership to support these transformations is transformational leadership. According to Mayes and Gethers (2018), transformational leadership enables a person's mission and vision to be

redefined, their dedication to be renewed, and their processes for achieving goals to be restructured. Additionally, transformational school leaders support teachers' professional development and collaborative problem-solving by fostering a professional and supportive culture in the classroom (Day et al., 2020). Furthermore, Day et al. discussed school leadership practices, contending that transformational leadership is even more suitable than instructional leadership because it evokes a more suitable range of practice; it should replace instructional leadership as the predominant image of the school administration.

To stay ahead of the curve and maintain competitiveness, technology is evolving quickly, necessitating innovation and powerful leadership. Increasing the effective use of technology in classrooms is another way that transformational leadership may help school administrators (Dagli PhD, 2019). According to Prasad's (2019) theory, technological leadership can follow the transformational leadership theory's practical recommendations. Typically, transformational leaders base their choices on a broad perspective, the organization's vision and mission, the objectives of the group, and the growth of their network (Dagli PhD, 2019). According to Prasad (2019), some of the behaviors of transformational leaders that are applicable in educational settings include defining and articulating an organizational vision, fostering acceptance of group goals, having high performance expectations, providing appropriate models, offering intellectual stimulation, and developing a strong organizational culture.

A global pandemic is forcing schools to navigate challenging times, and it's critical to look at another type of leadership that is especially relevant to the current climate of change in schools. The influence of technology integration has been found to be strongly influenced by transformational leadership. This paradigm, known as the Adaptive Leadership Model, assists people and organizations in adapting to change and thriving in the face of difficulty. Adaptive leadership is characterized as "a practical leadership paradigm that helps individuals and organizations adapt and prosper in challenging settings" by Cambridge Leadership Associates, a company that developed from the work of Ron Heifetz and Marty Linsky.

Adaptive leadership Model

Determining what now needs to change and considering how organizations will adapt to and succeed in a new environment are both necessary for adaptive work (Northouse, 2019). A leadership style called adaptive leadership is designed to accommodate complex, long-term

problems or obstacles. Adaptive leadership style, according to Wong and Chan (2018), developed from situational, transformational, and complexity theories to become a modern leadership idea. Heifetz (1994) was a pioneer in incorporating adaptive leadership techniques into the realities of the contemporary workplace. It is premised on the basis that challenging challenges are best handled with input from the entire organization and attempts to address recurrent organizational issues through systemic transformation. As opposed to conventional leadership methods for problem-solving, which rely on a small group of top executives, utilizing adaptive leadership, a company can overcome obstacles by using its collective ingenuity (Bagwell, 2020). It may be applied to businesses of all sizes and across a wide range of industries. Northouse (2019) asserts that the process of adaptive leadership integrates concepts from the systems, biology, service-oriented, and psychotherapy perspectives.

Adaptive leadership enables leaders to inspire individuals to take on challenging tasks and succeed (Bagwell, 2020). According to Northouse (2019), adaptable leaders are skilled at identifying the problems, precisely characterizing them, and coming up with the best solution. Although adaptive leadership's detractors claim that this idea is effective for companies planning transformation, many businesses are actually fighting the leadership style (Marshall et al., 2020). This is so because adaptive leadership questions established norms, attitudes, and beliefs. According to Marshall et al. (2020), this can drive people to push back against the suggestions and adjustments made by the adaptive leadership strategy. However, by adequately preparing for a changing world, adaptive leadership takes into account all the aspects that have an impact on a organization.

Heifetz's (1994) concept of adaptive leadership is based on particular subset of four aspects that are seen to be essential for leaders facing adaptive problems.

- Leadership is a skill that can be developed, not an inherent trait.
- Leadership must consequently be a team endeavor because power is distributed.
- Leadership is about tackling issues for which there are no known solutions.
- In order to advance, organizations frequently must face painful truths.

Fairness, openness, emotional intelligence, ongoing improvement, and problem-solving that benefits both parties are its defining characteristics.

Technology and School leaders

Principals and other school administrators have been instrumental in implementing educational innovations including institutionalizing technology (Wan Isa et al., 2020). The perception of administrators includes both leadership and technological leadership (Uur & Koç, 2019; Dave Aquino Quidasol, 2020; KARS & INANDI, 2018). Some people assumes that administrators are leaders by necessity because they possess a high position, but this is misleading (Mawell, 2019). According to Maxwell (2019), a leader is defined more by their capacity to motivate and inspire others than by their position in a hierarchy. Effective technology integration requires administrators to be knowledgeable about the procedure and capable of acting as change agents (Wan Isa et al., 2020; Uur & Koç,2019). The most crucial factor in deciding how successfully schools integrate technology is leadership (Oberer & Erkollar, 2018). Effective administrators exhibit leadership qualities and strategies, such integrating technology, that help and support the implementation of educational change (Wan Isa et al., 2020).

Principals now have significantly more responsibilities as curricular and instructional leaders as a result of the integration and deployment of technology, which necessitates the identification of successful principal behaviors (Thannimalai & Raman, 2018). Incorporating instructional technology into teaching and learning, in accordance with Malik (2018), clearly necessitates both a successful and beneficial integration of leadership that can adapt to change. To create a climate where technology enhances student learning, capable leaders are required (Erkollar, 2018; Dinc, 2019). Among other things, leaders must provide a vision, serve as an example of positive attitudes and conduct, support the faculty, maintain order and focus, develop their own leadership potential, and offer opportunities for in-service training and career advancement (Jensen et al., 2018; Thannimalai & Raman, 2018).

Leaders must modify their strategies to take into account how the educational system's use of technology is continually developing. Leaders in education that are effective recognize the importance of time investment and effort to bring about long-term change and enhance staff capacity (Njathi et al., 2018). According to Torrato et al. (2021), it is critical to acknowledge that many school administrators can be hesitant to employ technological solutions to enhance

learning or might think their own technological experience is insufficient to make decisions. The purpose of this study is to offer principals practical strategies for improving the adoption and upkeep of technology in the classroom.

Bellibaş et al. (2021) contend that for technology integration to be successful, principals must harness the potential of technology and exhibit strong instructional leadership. Furthermore, a trained principal and staff can use it as a powerful instrument of the twenty-first century with great adaptability to promote the initiatives of the school and the community's effort to raise the caliber of teaching and learning for every learner (Campbell et al., 2018). According to Bellibaş et al. (2021), to integrate technology in schools effectively, leaders must use the following tactics: consider and acknowledge that technology is an essential instructional tool; develop and maintain databases for all stakeholders within the learning community; integrate school-wide management systems and curriculum; integrate and transform technology throughout the curriculum.

Principals must be technology leaders in order to leverage instructional technology to raise student engagement and accomplishment. Five variables are associated to successful instructional technology integration across the curriculum: student involvement, shared vision, equity of access, professional development and in-service, and universal or global networks (Lander, 2020). These components provide context for principals and other educational leaders who are tasked with successfully integrating technology while simultaneously enhancing student accomplishment and success, according to Lander (2020). The framework also includes objectives, assignments, and specific results that correspond to the five aspects.

In addition, the idea that principals need more than a basic awareness of technology to be a successful instructional leader at a school where technology is a crucial component is supported by Raman et al. (2019). Successful implementation of instructional technology requires a certain set of skills. These include developing and expressing a vision, wanting to continue learning throughout one's life, comprehending various instructional strategies, using the change process, and demonstrating interpersonal skills (Raman et al., 2019). Raman et al. (2019) claim that principals with vision, knowledge, and expertise may collaborate with all stakeholders to research, develop, implement, and evaluate comprehensive programs that maximize the

impact of technology and enhance student achievement. Successful school administrators collaborate to persuade stakeholders to back the use of educational technology.

There are numerous resources and tools available for instructional leaders who desire to use best practices, methodologies, and frameworks while integrating technology (Mawell, 2019; Lander, 2020; Raman et al., 2019). Despite the fact that these recommendations have been made in the literature, there is a dearth of empirical research that can be used to evaluate the roles and behaviors necessary to create a technologically advanced learning environment, incorporate technology into the curriculum, and improve student achievement. Further, educational leaders must foster an environment in which everyone successfully integrates technology and ensure that it is used for the advantage of all students (Munby, 2020).

A particular case focused on the leadership responsibilities that have a substantial impact on the integration of technology in secondary schools, qualitative focus-group study done by Kipp (2019). According to Kipp (2019), survey respondents who were principals concurred that improving classroom efficacy through leadership support for technology. The results demonstrate that teachers are more receptive to using technology in the classroom and at school when principals successfully communicate about it. Second, effective technology use by instructors encourages a good and secure environment for student technology use. Furthermore, active participation in technology-related processes and routines encourages better technology integration and implementation. The study also shows that administrators who encourage technology integration generate a positive vision, improve student instruction and learning, boost staff and teacher professional development, and increase opportunities for social action.

Leadership in the twenty-first century

In the twenty-first century, effective educational leaders must be ready and equipped to take on a number of wide responsibilities (MacBeath, 2019). Meyer and Patuawa (2020) assert that school administrators have a number of crucial duties that align with accountability standards and are all somehow related to student progress. As a result, in the twenty-first century, leaders in education have a direct bearing on student accomplishment. Hickman and Akdere (2018) claim that twenty-first-century leaders require a broad variety of abilities and knowledge in order to begin modifying and transforming their schools into twenty-first-century learning communities. Effective instructional directors must lead and direct continuing improvements in

education, policy, and procedure in addition to managing and operating schools. Okeke (2019) argues that administrators have the primary duty for acquiring and assigning resources, including as instructional materials, assessments, and professional development opportunities, in order for teachers to successfully develop twenty-first-century skills. Additionally, Raman et al. (2019) hypothesized that for twenty-first century skills to be effectively employed, instructional leaders must focus on curriculum, teacher quality, and assessment The mission and vision that pupils must be prepared for postsecondary life is crucial for instructional leaders in the twenty-first century (Hickman & Akdere, 2018). Technology has become a crucial component of instructional leadership, necessitating specialized attitudes and abilities in order to be effective.

Many 21st century capabilities are not inherently new or fresh to principals; rather, they are lasting abilities that have been crucial to prosperous professions throughout history (MacBeath, 2019; Okeke, 2019; Raman et al., 2019). The methods used to learn the skills are innovative (Hickman & Akdere, 2018). Technology use and digital literacy skills must be incorporated into instruction to support the development of other skills. Innovation has allowed for the application of traditional skills in the twenty-first century, and principals must set an example of conduct that encourages the use of technology in the classroom so that students can develop essential life and career skills like cooperation, communication, and critical thinking (Kipp, 2019).

Technology use and digital literacy skills must be incorporated into instruction to support the development of other skills. Innovation has allowed for the application of traditional skills in the twenty-first century, and principals must set an example of conduct that encourages the use of technology in the classroom so that students can develop essential life and career skills like cooperation, communication, and critical thinking (Kipp, 2019).

As leaders in education for the twenty-first century, principals must create a technologically advanced culture that links education to society (Hickman & Akdere, 2018; Okeke, 2019; Raman et al., 2019). The capacity to properly use technology is one of the key skills that today's pupils need (Creighton, 2018). Successful and efficient leaders create and carry out integrated opportunities for all learners using instructional technology. The curriculum, which covers 21st-century learning abilities, must involve creative teaching methods using a variety of media, according to the leaders (Malik, 2018). Effective principals and leaders employ

assessments that look at a variety of talents and abilities. People's lives, employment, and educational opportunities have been and will continue to be altered by technology, globalization, communication, economics, and politics. Twenty-first-century school leaders face a variety of problems in an era of increased standards and accountability and must act as change agents to link instruction and learning with a global society (Wan Isa et al., 2020; Munby, 2020).

Integration of Technology

For educators, the existence of new projects and advancements presents both opportunities and difficulties (Chen et al., 2019). The adoption of technology, which represents a new paradigm in education, has given rise to a number of difficulties, advantages, success stories, and unmet needs (Raja & Nagasubramani 2018). This section covers successful technology integration, the advantages of technology integration, the difficulties to technology integration, and the areas of need.

Successful technology integration

Successful application of technology integration necessitates systematic and distributed leadership in order to promote the use of technology in the classroom (Billingsley et al., 2018). In order to encourage and support teacher ownership, full realization of technology applications, instilling best practices, and the transformation of instruction through the creation of a 21st-century environment for students, administrators and school technology leaders must be educated and trained (Chen et al., 2019). Due to the integration of technology, administrators must use change management and provide educators with enough time for professional development so that educators can fully comprehend the new instructional approaches (Kim et al., 2019; Wrahatnolo, T. 2018). There are several benefits to using cutting-edge technology in core and intervention classrooms, including online student cooperation and the use of formative and summative assessments (Kim et al., 2019). Because this technological revolution is still in its infancy, it is crucial for leadership to offer encouragement, security, comfort, and support for staff who are integrating technology.

Technological Integration benefits

The usage of new technologies in the classroom benefits both teachers and students because they have been specifically designed for this purpose. It can be used by teachers as a teaching tool, for planning lessons, or to deliver academic lessons (Schmitz et al., 2022; Chen et

al., 2019). Schmitz et al.'s (2022) further argument asserted that if technology is readily available and teachers are trained to use it, pupils' learning will be improved. Technology can increase access to information and course materials, as well as staff and student communication (Backfisch et al., 2021).

The numerous technical tools are essentially resources that can be used to improve student learning (Khlaif, 2018; Vassilakopoulou & Hustad, 2021). Khlaif (2018) postulates, technology provides both face-to-face and online instruction in order to facilitate learning and adopt differentiation strategies for specific student needs. Integration of technology allows for a more interdisciplinary curriculum, which can support customized and blended learning as well as the creation of a learning environment oriented on the needs of the students (Gonzales et al., 2018). In a technology-enhanced classroom, giving students easy access to electronic devices and tools can also lead to improved academic performance, increased discipline, increased attendance, and improved graduation rates and achievement (Schmitz et al., 2022).

Delgado et al. (2015) argue that children in technologically advanced surroundings demonstrate higher engagement, research capabilities, and collaborative abilities in addition to increased academic accomplishment. Grani & Maranguni (2019) add to this by proposing that technology learning models can also encourage differentiation by providing new learning opportunities. Additionally, the use of multimedia and multimodality in technology-based training lends itself to supporting a variety of learning styles, including visual-spatial, aural, and kinesthetic (Shakroum, 2017). Technology integration can also be utilized outside of the classroom to enhance communication and encourage collaboration. Parents and teachers, for instance, were discovered to prefer asynchronous modes of communication, such as parent to teacher, parent to parent, and social posts that can be made with applications (Thompson et al.al., 2015).

For today's students, who do not view technology as something new but rather as air, the incorporation of technology into classroom also correlates with authenticity (Greve & Tan, 2021). According to Netexplo and Information (2019), since students are already accustomed to using technology, its presence is no longer noteworthy for them. Additionally, students want technology to be useful to them. Pechenkina & Aeschliman (2017) posited that university students, for instance, strongly prefer blended learning over in-person or entirely online study

because to its improved flexibility and the notion that it increases material comprehension. Downes and Bishop discovered that middle school students consistently believed that technology was interesting and helpful for their learning, but they cautioned against doing so because "teachers may find themselves increasingly at odds with established low-tech standards, curriculum, and assessments as they tap into students' increasingly pro-technology dispositions" (p. 12).

Effects of Technology

More studies are demonstrating how utilizing technology in the classroom can enhance students' learning (Raja & Nagasubramani, 2018; Tsay et al., 2018; Bhagat et al., 2019). For instance, Müller and Mildenberger (2021) discovered that using technology in the experimental condition was preferable to more traditional training, with a substantial positive small to moderate effect size.

Other studies have claimed that student accomplishment results are still variable (Chen et al., 2018; Chai et al., 2017). For instance, results from a statewide program in Maine indicated no impact on student achievement. Additionally, Kuyatt et al. (2015) indicated that on state examinations, students who regularly employed technology in the course material did not score better than their peers. Similarly, according to the OECD (2015), data "reveal no meaningful gain in student accomplishment in reading, mathematics, or science among the nations that have heavily invested in ICT for education" (p. 3).

Having said that, there is broad agreement in the research that using instructional technology in the classroom effectively can be a tool for achieving particular objectives (OECD, 2015, 2016; Collins & Halverson, 2018). This is also the widespread agreement among researchers that constructivist approaches to technology integration yield the best results (Hunter, 2015; Sullivan, 2015).

Challenges of technology integration

First, using technology, whether on students' own devices or those that are provided by the student, poses a risk to their privacy and security (Kumar et al., 2019). These dangers are issues that would not be there if technology did not exist. Additionally, the effects of using

computers in the classroom are, at best, mixed, with regular users performing "a lot worse in most learning outcomes" than more moderate users (OECD, 2015, p. 3).

Additionally, excessive use of digital technology has been linked to a number of detrimental physical and psychological impacts (Mustafaolu, 2018). Furthermore, Nobre (2020) stated that these negative effects are sometimes linked not only to the technologies themselves but also to the absence or decline of other activities that have been replaced by the use of technology. For instance, it has been suggested that an increase in musculoskeletal problems is associated with a steady rise in the use of digital technology at home and at school, at the expense of other activities (Mustafaolu, 2018).

Likewise, the excessive use of technology has also been associated with lifetime cardiovascular risk and obesity, with this association now being seen as early as childhood (Seo, 2018). Similar to how too much screen time and not enough outside time has been linked to eye damage (Pratt, 2021).

There are many different ideas about the digital divide, but most of them emphasize four things: attitudes, access, abilities, and types of usage (Scheerder, 2017). Additionally, there is growing collection of research that indicates the digital gap is changing from a divide in access to a divide in usage (Talaee & Noroozi, 2019; Schmid & Petko, 2019). Harold (2017) postulates that the application of technology in education may actually worsen inequality because it affects various groups differently, leading to wider gaps in student achievement.

Technology Integration Accountability

Tseng et al. (2022) argued that when assessing the success of technological integration, evaluation and research should be coupled. Technology leaders must put in place evaluation procedures that aid teachers' technical advancement. They should adopt well-respected technology standards, like those offered by the International Society for Technology in Education (ISTE), to guide the advancement of their technological integration in order to achieve this. Tseng et al. (2022) discovered in their study that evaluation and research significantly aided successful technological leadership. Examples of two extensively used and studied assessing techniques for instructional technology include the Substitution, Augmentation, Modification,

and Redefinition model (SMAR) and the Technology Pedagogical Content Knowledge model (TPACK). Both the introspective and evaluative paradigms are covered in great detail.

Tseng et al. (2022) postulates technology executives must establish procedures for grading instructors' technological proficiency on a scale or according to a framework. A framework for grading technology integration is provided by Ruben Puentedura's SAMR (Substitution, Augmented, Modification, Redefinition) model, a technology-integrated evaluation technique (Nair & Chuan, 2021). The key to using the SAMR model, according to Lacruz (2018), is to stop viewing it as an evaluation tool and start viewing it as a strategy to help teachers keep up with technology and be able to redesign traditional teaching techniques utilizing technology. In order to promote the development of skills for the twenty-first century, SAMR strives to support teachers' and students' technological growth and competency (Hilton, 2016). Teachers face increased risk and uncertainty when seeking to integrate technology into their class planning. Consequently, SAMR is intended to provide the tools necessary to facilitate such a procedure (Hilton, 2016). As shown in Figure 1, the SAMR approach divides the use of technology in the classroom into four categories: substitution, augmentation, modification, and transformation. The SAMR model is shown in Figure 1 below.

Figure 1

SAMR Model

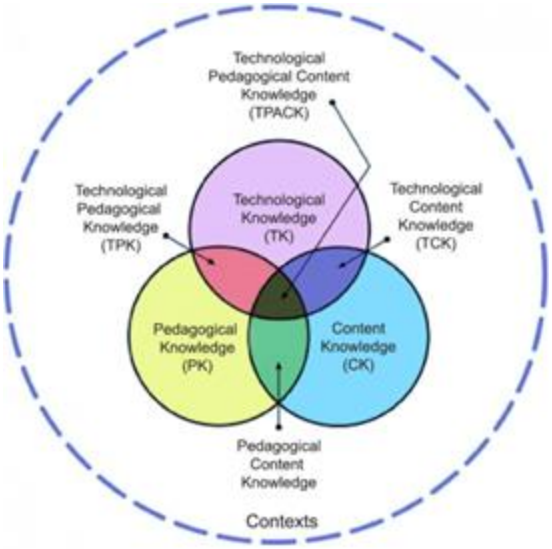
Note: Adapted from Hilton, J. T. (2016). A Case Study of the Application of SAMR andTPACK for Reflection on Technology Integration into Two Social Studies Classrooms. *The Social Studies*, *107*(2), 68–73. https://doi.org/10.1080/00377996.2015.1124376

The tasks of Substitution and Augmentation are classed as enhancement, meaning they employ technology to replace or improve current tools in the lesson, as opposed to the jobs of Modification and Redefinition, which give new opportunities for learning that are not easily attainable without technology (Kirkland, 2014). The SAMR technique essentially provides a way to evaluate every educational task or lesson to determine the level of complexity and technology integration a teacher has employed for a specific lesson activity (Hilton, 2016).

In order to assist teachers in providing successful technology-infused instruction as another tool for technology integration, the Technological Pedagogical Content Knowledge (TPACK) framework integrates elements of content, pedagogy, and technology (Hilton, 2016). Figure 2 below illustrates how the TPACK framework is based on the three essential domains of technical knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). Pedagogy and content (PCK), technology and content (TCK), and pedagogy and technology (PT) are all connected at three points in the framework, according to Hilton (2016). (TPK). The center is where the three domains converge to produce technical pedagogical content knowledge (TPACK). The paradigm claims that each of the three domains can function independently as well as jointly to ensure appropriate technological integration in the classroom (Hilton, 2016). Hilton (2016), posited that he TPACK paradigm essentially enables educators and technology leaders to reevaluate their use of technology to ensure that elements of good technology use, engaging pedagogy, and relevant content combine to generate more effective education.

Figure 2

TPACK Model



Note: Adapted from Hilton, J. T. (2016). A Case Study of the Application of SAMR andTPACK for Reflection on Technology Integration into Two Social Studies Classrooms. *The Social Studies*, *107*(2), 68–73. https://doi.org/10.1080/00377996.2015.1124376

According to Tunjera and Chigona (2020), the TPACK and SAMR models' effects on teacher practice and pedagogy are attested to by teachers' abilities, competencies, and apparent change in behavior and attitude toward instructional technology. According to the two researchers, instructors and technology leaders can evaluate each teacher's degree of technology integration using both frameworks, which enables them to make changes to how they design their technology-enhanced lessons. Additionally, the success of the TPACK and SAMR frameworks rests on the commitment of the instructors to enhancing and expanding the effectiveness of their teaching techniques (Fallon, 2020). Although both models give teachers and technology professionals evaluative frameworks to use when considering their use of instructional technology practices, Hilton (2016) argued that the SAMR model has been reported as the preferred tool by instructors.

Additionally, studies have indicated that due to the rapid advancement of instructional technology, districts or buildings must evaluate their technology implementation plans each year in order to incorporate the results into current and future technology planning procedures (Tseng

et al., 2022; Karlin et al., 2018). According to Tseng et al. (2022), the evaluation process should take into account how teachers are using technology in the district or building as well as how new and old technologies compare in terms of costs, advantages, and effects. Leaders in technology will have the data they need from this evaluation to effectively assess and improve the technology initiatives in their district or school (Tseng et al., 2022).

Professional Development

According to Sancar and Deryakulu (2021), activities that assist people increase their skills, competence, and knowledge as teachers are known as professional development (PD). It is a methodical professional learning process that modifies instruction and improves student learning results (King, 2016). Furthermore, according to Darling-Hammond et al. (2017), professional development that emphasizes teaching strategies connected to specific curricular content improves teacher learning in classroom settings. This component places a conscious emphasis on developing curriculum and pedagogies that are particular to disciplines like math, science, or reading. Active learning is a part of professional development as well (Sancar & Deryakulu, 2021). By incorporating instructors directly in the development and evaluation of instructional strategies, active learning provides them with the opportunity to engage in the same kind of learning that they are designing for their students (Khan, et al., 2017). The researchers also propose that this kind of professional development (PD) makes use of real-world materials, interactive activities, and other methods to give highly contextualized professional learning that is deeply embedded. The traditional lecture-based learning environments and models, which have nothing to do with teachers' classrooms and students, are replaced by this approach (Khan, et al., 2017). According to Sancar and Deryakulu (2021), in high-quality PD, instructors have the chance to collaborate on their learning and exchange ideas, typically in professional settings. By working together, teachers can create communities that enhance the culture and instruction of their entire grade level, department, school, and/or district (Darling-Hammond et al., 2017). Importantly, for PD to be successful, coaching and expert help are required. According to Khan et al. (2017), coaching and expert support comprise the sharing of subject-matter expertise and instructional approaches that have been scientifically demonstrated effective. Finally, high-quality professional learning often includes built-in time for teachers to reflect on, gain feedback on, and make modifications to their practice. This is done through promoting introspection and

requesting feedback (Darling-Hammond et al., 2017). With both feedback and reflection, teachers can thoughtfully develop toward the expert visions of practice (Brownell et al., 2019). Therefore, teachers must be given enough time to study, practice, implement, and evaluate new tactics. They will be able to modify their procedures as a result.

Teachers must first learn how to use the technology if they are to be expected to deliver student-centered education that incorporates the technology integration necessary to fulfill the needs of 21st century learners (Gray & DiLoreto, 2016; Jan, 2017; Ertmer et al., 2015). One of the major elements influencing the adoption of educational technology is widely acknowledged in the literature to be professional development (Kebritchi et al., 2017; Ali, 2020). According to Sullivan (2015), assuming that all teachers—or any particular set of teachers—already possess the basic knowledge required to conduct a technological program will surely result in failure or, at the very least, frustration. As a result, there is also agreement that professional development for technology integration should be tailored based on demands (Moore, 2018; Tondeur et al., 2017).

Summary

Chapter Two examined the significance of leadership as it relates to technology integration. Daily the education system is adjusting to accommodate 21st century technology and school administration and school leadership teams are at the helm of implementing these changes. Transformational and adaptive leadership are the framework which explains the approaches school administration must implement to achieve success.

CHAPTER THREE: METHODOLOGY

Introduction

The methods and procedures for data collection and analysis that the researcher used for this study are extensively discussed in this chapter. The preceding chapter noted that it was essential to investigate the role of school leaders in the integration of technology for school effectiveness in Georgetown, Guyana, given the era of advanced technology and an unprecedented virtual teaching and learning landscape in schools nationally.

The research topic, methodological criteria for the selection of reading sources for analysis, the research technique and design, and ethical considerations for the research and data analysis process are all outlined in this chapter.

Research Approach and Design

The study was carried out utilizing qualitative inquiry techniques. In general, qualitative study research seeks to provide a wealth of knowledge on how issues are resolved, what results are reached, and how professional learning investments may result in a positive, progressive transformation (Malloch, 2020). To enhance students' learning results, several school systems have already started utilizing technology. Due to this, qualitative research has developed into a crucial tool for outlining the objectives, difficulties, solutions, and successes that inform the various parties involved in long-term, strategic technology planning and enable educational leaders to create and implement a practical framework for change. It's an excellent technique for evaluating the leadership traits displayed by administrators. Because it will make the phenomenon comprehensible, this study methodology is beneficial (Kalpokas & Radivojevic, 2021).

The researcher was able to use a grounded theory research strategy and a qualitative multiple study analysis by choosing nine prior qualitative scientific journal article investigations. The multiple case study design is an effective qualitative research tool for examining the relationships between individual, social, behavioral, psychological, organizational, cultural, and environmental factors that affect organizational and leadership development (Halkias et al., 2022). For case study research, a thorough examination of participants' viewpoints on the incident in its original context is necessary. The study has already undergone a qualitative multiple study analysis. The researcher triangulates the many themes, identifying concepts that converge and diverge as well as other components, and creates reflective explanations for the

phenomenon being studied by creating a framework out of these substantive subjects and emergent concepts (Leedy 2021).

Sociologists Barney Glaser and Anselm Strauss created grounded theory in the 1960s, and it is now acknowledged as a common qualitative approach for social science research (Corbin & Strauss, 2015). In order to develop a theory about a research subject, grounded theory is utilized methodically and continuously to gather and analyze data (Chun Tie et al., 2019). Selecting an area of interest, gathering data (often through observations, interviews, public documents, media, or records), coding the data, noting potential connections between coded elements, organizing codes, conducting a review of the literature, and finally writing the emergent theory are the typical steps in conducting grounded theory research. The way the theory is derived from the evidence the researcher has collected is what distinguishes grounded theory from other qualitative methodologies. Grounded theory research aims to create a comprehensive, conceptual understanding of a process, activity, or interaction based on the observations of study participants (Creswell, 2017).

Methodological criteria for selection of reading sources for analysis

To find journal articles on the role of school leaders in integrating technology, the researcher conducted a methodical, extensive search for all relevant peer-reviewed and journal articles studies. A vast amount of data could be accessed from the sources that were used. The University of Tennessee (2021) claims that secondary data can cover a wide range of exceptionally thorough and original studies, including some of the biggest and most exacting data collectors. The researcher conducted a thorough search of these published publications for any references of the key terms "principals and technology integration," "principal's role in technology integration," "technology integration in schools," and "challenges experienced by principals in integrating technology." Furthermore, the key terms made it possible to conduct a complete literature search.

Inclusion and Exclusion Criteria

The acquisition of data for this study was evaluated in light of a number of considerations. In order to index the selected publications, the terms "technology integration," "integration of technology," "educational technology," "school principals," "role of school leaders," and "school leadership" were employed. To ensure that the data used was pertinent, the

publication period was extended to cover the period 2017 through 2022. The journal articles to be selected was not limited to no specific country, however the language must be in English.

For the purpose of this study, exclusion criteria for articles that were not pertinent were set. As a result, the removal of data was based on the publication date as well as journal articles that was published before to 2017. In the end, nine journal articles were identified. The secondary data that were selected for this study only concentrated on the search phrases that pertain to it and were easily accessible. Theses/dissertations and journals were the two categories of documents examined.

Search

In order to find relevant material, Boolean operators were used. Boolean operators, often known as AND, OR, NOT, or AND NOT, are simple words that are used as conjunctions in searches to combine or exclude keywords in order to produce more specialized and helpful results (Scott et al., 2009). This helped save time and effort by removing unsuitable returns that had to be scanned before being destroyed. As a result, search terms including technology integration, school leaders and technology integration, school principals and technology integration, and technology integration and role of school leaders were used. A plethora of search terms were used in order to get the most relevant results. For instance, 1, 385, 876 items were received from ProQuest after the initial query. Following the use of search control procedures, however, 658,876 data were returned. The only search parameters utilized were academic journals, dissertations and theses, publication dates, and peer reviews. Additional limiters that were implemented returned a total of 114 data. Further limiters utilizing the phrases "Integration of Technology" AND "role of school leaders" were used in the final attempt, which produced 15 data. The most appropriate articles were selected using criteria including accessibility, relevance, and publication date.

Many search engines offer immediate access to secondary data. In order to get relevant information about this topic ‘the role of school leaders in the integration of technology for school effectiveness in Georgetown, Guyana’ it was crucial to consult a number of different sources. Journal Storage (JSTRO), EBSCO, Educational Resources Information Center (ERIC), Google Scholar, and ProQuest were some of the internet search engines that were employed to find

further research outputs. However, all journal articles that were selected were from ProQuest library database provided through UNICAF university.

Ethical Consideration

Your research processes and designs are governed by a set of rules known as ethical concerns in research (Velip, 2018). To ensure that both the private and public can easily grasp and gain insight into the study's goal—which is to explore how school leaders may effectively integrate technology for school effectiveness—a scientific, rational, and acceptable methodology is required. By conducting this investigation, it was to ensure that the literature sources are reliable, appropriate, and respected. High impact factor journals were examined to understand better the literature on school leaders in technology integration.

The study upheld objectivity and neutrality when presenting the findings. When it was practical, plagiarism was carefully taken into account during the review process. It is always expected that whatever one writes must be presented in their own words and generated from their own thinking because plagiarism is considered to be a misconduct (Montoneri et al., 2020). As a result, the work or idea was duly acknowledged by giving credit to the appropriate author using the APA reference style and in-text citation.

Data Analysis Procedure

In qualitative data analysis, textual patterns and themes are identified, scrutinized, and evaluated to see how they contribute to the resolution of the ongoing research questions (Maxwell, 2021). Several peer-reviewed publications and journal articles on principal involvement in technology integration in schools were discovered. The academic journals were looked at one by one. After identifying recurring themes, the information was arranged.

Delimitations

Nine journal articles, each focusing on leadership experiences in educational technology, were the only case studies to be included in the comparative case study analysis. The populations of leaders and educators that have been identified by the research served as the demographic factors for this investigation. The nine academic journal articles' qualitative extrapolations were the only part of the case study analysis that was employed. The generalizability of the findings and the replication of the study are further restricted by the scope and constraints of the case

study analysis technique and the qualitative approach. The nine chosen journal articles gave responses that were used in the analysis.

Summary

Chapter Three contained the key information relevant to the study. Through the analysis of several case studies, the goal of this qualitative research study using a grounded theory technique is to clarify the role of school leaders in the integration of technology for the success of schools in Georgetown, Guyana. Because of how education is changing as a result of the usage of technology in the classroom, effective leadership is needed (Malik, 2018). In order to address students' current needs, school administrators must possess the qualities, provide the opportunities, and provide the resources essential for the successful integration of technology into the classroom.

In Chapter four, the researcher used the qualitative data matrix to assist in organizing and classifying the data from the nine journal articles, exploring words and word combinations to correlate concepts and enabling a more logical and systematic analysis of the data.

CHAPTER FOUR: DATA ANALYSIS AND RESULTS

Introduction

Nine journal articles were selected for study in order to highlight the grounded theory guiding the role of school leaders in the efficient use of technology in schools in Georgetown, Guyana. These nine journal articles selected are subjected to a detailed comparative analysis in the following chapter to identify any common themes, findings, and conclusions. The analysis methods described above were used to document and analyze the triangulation of data sets and the ensuing emergent themes**.**

Analysis of data

Table 1

Analysis of Studies Used in Research

Author & Date	Research Topic	Research focus	Guiding Theoretical framework	Findings	Themes Discovered
Woodward (2018)	A case study exploring effective leadership for technology integration in three Southeastern U.S. elementary school.	Qualitative multiple case study to identify the effective leadership practices of school leaders in technology integration in three southeaster, US elementary schools	Distributed leadership Transformational Leadership	1. Technology plan provided specific steps to effectively integrate technology 2. Administrators need to offer professional development, opportunities to ensure proper use, implementation and confidence. 3. Technology leaders need to possess interpersonal skills to effectively integrate technology at their school 4. Leaders must embrace innovative technologies in the classroom.	1. Technology Action Plan (SMAR and TPACK) to provide guidance to school leaders in monitoring technology integration in their school. 2. The relevance of professional development in equipping administrators and employees to successfully implement instructional

					technology in the classroom 3. Transformational Skills is required for effective technology integration.
Kipp (2019)	A qualitative case study identifying leadership roles that significantly impact the integration of technology in secondary schools.	Qualitative multiple case study to investigate the behaviours of secondary school principals in the integration of technology	Learning center leadership framework	1. It is important for leaders to establish and support a vision concerning technology implementation 2. It is essential for principals to be instructional leaders and connect curriculum and instruction to the integration of technology. Effective principals support communication, collaboration and professional development through the professional community	1. SAMR model to identify practice with technology in the classroom at various cognitive levels 2. Faculty and staff must receive professional development in order to successfully implement technology.
Schaaf (2020)	An investigation of technology leadership skills of principals in the state of	Quantitative study design to examine the digital leadership	Visionary Leadership	1. Principals identified Digital Citizenship as the most competent for technology leadership	

	Illinois	actions of participants and whether these actions promote and encourage teacher participation in instructional technology professional development.		
Vyas (2020)	Perspectives of the superintendent and principals: Leadership for technology integration.	Quantitative study to assess the differences that exist between superintendents and principals in their roles as technology leaders.	Transformational Leadership	1. Effective collaboration between principals and superintendent advances technology integration.

Schoenbart (2019)	Principal's perceptions of their technology leadership & behaviors: A mixed method study	Mixed method study to investigate technology leadership of school principals	Self-efficacy theory Transformational Leadership theory	1. Education Leaders Technology Survey (ELST) have a high level of internal reliability 2. Technology leadership behaviours are transformational leadership behaviour 3. Demographics may not play an important role in technology leadership Principals have a generally high level of self-efficacy as technology leaders	Transformational leadership behaviours developing and redefining shared vision, fostering professional and collaborative culture and helping teachers grow are important to effective integration of technology.
Loor (2021)	The impact systems design and leadership practices have on technology integration and adaptation at the K-12 school level during a time of change.	Comparative case study to explore teacher and leader perspectives to understand the impact that leadership practice has with technology integration	Professional Capital Framework Disciplines of Learning Organisations	1. To influence teachers' use of instructional technology, technology leaders need to possess certain set of interpersonal skills. 2. Support for educational technologies must be accessible.. 3. Technology accountability is an important aspect in technology integration.	1. Interpersonal skills patience, humility, and approachable allow school leaders to develop confidence and communicate change efforts efficiently. 2. Professional Development is essential for the successful integration

		within k-12 school during a time of change			of technology in the classroom 3. Instructional Technology Action Plan (SMAR and TPACK) guides the effective implementation of the integration of technology in schools.
Fraser (2020)	Teacher's perception of technology leadership that impact technology use in the classroom	Case study to investigate teacher's perceptions of technology leadership that impact technology used in the classroom at one particular school.	TPACK framework SAMR Model	1. Technology leaders require many skills and attributes including TPACK, interpersonal skills and collaboration but their effectiveness is largely dependent on vision. 2. Teachers believe that the school is highly successful integrating technology in pedagogical appropriate way 3. Technology professional development at this school is	1. Abundant and supported professional development is central for an organization to develop. 2. Technology leaders require interpersonal skills and collaboration for their effectiveness.

				standardized, differentiated and available as needed 4. The school provides an abundance of opportunities to help teachers better understand how to use technology in the classroom.
Pretto (2021)	The impact of COVID-19 on instructional leader	Phenomenolo-gical qualitative study to explore and compare the lived experience of principals of elementary, middle and high schools in the Northeastern United states during the COVID-19 pandemic	Instructional leadership	1. The principals' capacity to fulfill their responsibilities as instructional leaders was hampered by the absence of policies or changes to existing ones at the federal, state, and district levels. 2. Inequities in how remote and blended learning fulfilled students' needs were exacerbated by ingrained irregularities in the way that educational programs were delivered, over which principals had limited direct influence. 3. In order to maintain an educational program centered on student learning in the face of the

				epidemic, administrators urgently needed to use technology. 4. In an effort to recreate the pre-pandemic school experience for children in remote and blended learning, the principal's position as instructional leader was reinterpreted in light of the COVID-19 pandemic, which substantially changed the basic framework necessary for a free suitable education.
Freeman (2020)	Effects of site leadership on technology implementation: A quantitative case study.	Quantitative nonexperi-mental study to address the lack of clear guidance to site and district leadership on how to effectively lead	Transformational leadership	1. There is a need for an active presence of principal and site leaders to monitor the amount and type of technology that is implemented in teacher lesson plans. 2. Professional development provided to teachers for the implementation of technology and teacher perception of principal leadership

staff members through the technology implementation process.

are the most compiling factors leading teachers to implement technology in their lesson design.

3. There is need for strong leadership when implementing an initiative, in this case, technology implementation in teacher lesson plans.

Discussion of Findings

This study considered the literature review and themes from the analysis to provide an insight into the roles of school leaders in integration of technology for school effectiveness in Georgetown Guyana.

Research Question One

Research question one in this study investigated the leadership qualities required for integration of technology for school's effectiveness in Georgetown, Guyana. The themes that emerged from the data analysis showed that leaders needed a particular set of interpersonal skills and transformational behaviours for effectively integrate of technology for school effectiveness.

Theme One: Interpersonal skills

The skills we employ on a daily basis to interact and connect with people, both individually and in groups, are known as interpersonal skills (Koprowska, 2020). Loor's (2021) study postulates that school leaders need to possess three crucial interpersonal qualities patience, humility, and approachability for the effective integration of technology.

Patience

The ability for patience is the capability to remain composed while anticipating an outcome that you need or want (Dhiman & Kumar, 2022). When interacting with teachers, school administrators need to be patient. In general, being patient increases the chance that your coworkers will think well of you. Some teachers exhibit a phobia of technology, thus in order for them to be successful in the classroom, they will need ongoing support and supervision. The support teachers require to be productive must therefore be continuously provided by school administrators. Moreover, school leaders must have the patience to understand and accept that different teachers have varying technological proficiency as well as the patience to listen to them and respect their point of view. School leaders involved in the Loor's (2021) study echoed this perspective when they indicated that, like learners, some educators are more skilled than others. As a result, patience permits technology leaders to communicate or approach educators on technology integration differently, which foster trust.

Humility

Narvaez (2019) proposed that modest, selfless, and considerate behavior is an indication of humility. Essentially, humility is the ability to see yourself as you are. You recognize your strengths and success, but also understand your weaknesses and limitations. As a school leader one must be able to recognize and strive to learn from others during a period of transformation. Loor (2021) study indicated that school leaders must be humble enough to accept help from other when it is needed and brave enough to work alongside teachers. As a leader it can be hugely helpful. You do not assume that you always have the answer or know the best way forward. This can have a negative impact on your school and the effective integration of technology. Instead as a humble leader, you can recognize when and where you need help or outside input. Xu et al. (2019), posited that humble leaders tend to possess the following qualities: a willingness to learn, the capacity to admit incompetence, strong listening abilities, a focus on collaboration and willingness to admit when they are wrong. Moreover, humility can manifest in different ways in different people, however, at the core it is about recognizing that being a leader does not make you invincible, but like every other person you have areas where you can grow change, and improve (Xu et al., 2019)

Approachable

Loor (2021) research identifies approachable as another interpersonal quality. Before anything else, technology leaders must be approachable and empathetic. Eich (2017) asserts that having a friendly demeanor is a professional trait that encourages a variety of job advantages, including networking, career promotion, information access, and other advantages. Approachability is even more important for leaders at all levels. Moreover, approachable leaders emphasize the importance of the human element in their leadership style. They comprehend that effective leader do not exploit, but rather, they encourage (Eich, 2017). Being approachable is essential for developing relationships with your co-workers and for forming a strong team where ideas can flow and trust can be established. Moreover Loor's (2021) study indicates that Ensuring teachers feel comfortable enough to approach a technology school leader with questions or concerns about instructional technology is a key component of being approachable.

Theme 2: Transformational behaviours

Other than interpersonal qualities that leaders should possess, it was discovered in the second theme and the literature review leaders should also have transformational leadership skills. According to Schoenbart's (2019) research, principals demonstrated transformational leadership behaviors in their roles as technology leaders. Transformational leaders concentrate on creating and redefining a common vision, encouraging a professional and collaborative culture, and supporting the development of teachers (Day et al., 2020; Mayers & Gethers, 2018).

Creating and redefining vision

A transformational leadership strategy brings about change in both social institutions and individuals. In its optimal state, it brings about significant and constructive change in the followers with the ultimate objective of transforming followers into leaders. This must be done by modelling the change that is required. Schoenbart's (2019) research posited that school leaders need to engage with the technology as a practitioner first in order to positively implement the change required. This view resonates with Kouzes and Postner (2012) who in their work stated that leading by example is more effective than commanding.

Encouraging a professional and collaborative culture

Transformational school leaders develop school environments where innovation collaboration and professionalism are a part of the school's culture. Schoenbart's (2019) study reveals school leaders support their vision by empowering others, modelling, and supporting effective and equitable instructional practices. Further, this viewpoint concord with Anthony (2021) and Kouzes and Posner (2012), who stated that to encourage followers, leaders must be able to inspire others to take initiative, promote teamwork, and establish relationship.

Supporting the development of teachers

While the results from Schoenbart's (2019) study recognize teacher skills as an area of challenging for integration of technology, it also recognizes the need to support teacher in their growth, comfort, and professional learning. This resonates with the viewpoint of Balcerzky, (2021) and Kouzes and Posner (2012). According to these researchers, leaders should foster an environment that values community, service, excellence, and fostering the success of others.

These results are consistent with research from Raman et al. (2019), which contends that to successfully integrate technology for school effectiveness, certain skills are required, including the development and expression of a vision, the desire to engage in lifelong learning, knowledge of various instructional practices, application of the change process, and manifestation of interpersonal skills.

Research Question Two

The second research question for this study examines the opportunities school administrators in Georgetown, Guyana, must provide for technology integration. Over the past few decades, there has been a growth in the educational usage of technology in classrooms (Hanover Research, 2014). Additionally, leaders and educators need to learn how to use digital technologies if they want to employ technology in their classrooms and schools efficiently (Amhag et al., 2019; Hanover Research, 2014). Before this can happen, professional development opportunities must be available to inform and teach employees, be continuous, and foster relationships with employees. (Hanover Research, 2014).

Establishing a culture of connection and collaboration for staff and students in respect to digital learning is among the most important tasks school administrators can accomplish. The majority of the staff originally lacked the expertise and abilities to successfully incorporate technology in their schools (Woodward, 2018). Individuals do not become proficient users of technology and digital tools until the leaders emphasized the value of professional development, established training sessions, and provided trainings; this is consistent with the literature, which claims that it is the structured professional development that results in improved student learning outcomes and adjustments to teaching strategies (King, 2016).

Professional development options give staff members the education and experience necessary to understand digital tools, adapt their teaching methods and lesson plans, and use in the classroom to improve student learning. Additionally, outstanding PD gives opportunities for educators to interact and exchange ideas, according to supporting literature (Sancar & Deryakulu, 2021)

In Fraser's (2020) research, it was indicated that excellent coaching teams and the backing of executives create an environment where staff members may grow, learn, and be

encouraged to integrate technology. This is supported by Khan et al.'s (2017) literate because, in their opinion, sharing content knowledge and evidence-based strategies while concentrating on the particular needs of teachers constitutes coaching and expert support. Therefore, the conclusion that leaders who effectively use professional development for their staff will foster an atmosphere for ongoing growth and enhancement for the incorporation of technology has been confirmed and established.

Fraser's (2020) research further demonstrates that the school's professional development strategy is positioned with pedagogically good practices and is systematically standardized, systematically differentiated, and available as needed. In addition, encouragement and support for extending or promoting learning extends beyond certification. This idea of basic training as a bare minimum for instructors is significant since it is in line with the literature's general view that teachers must first master the technology in order to integrate it into the classroom (Gray & DiLoreto, 2016; Jan, 2017; Ertmer et al., 2015).

Fraser's (2020) findings also show that teachers are pushed to improve the level of integration if they have a foundational understanding of the technologies. Coaches collaborate to plan, educate, practice, and advance technology. These elements work together to make the school's use of technology professional development continual, practical, gradually focused, reflective, collaborative, needs-based, and theory-based, which is in line with best practice literature (Kebritchi et al., 2017; Ali, 2020).

There are numerous options to aid instructors in developing their knowledge of utilizing technology in the classroom. This starts through recognizing needs that are expected, followed by offering support to satisfy those needs. This covers fundamental instruction, beginning with how to operate technological equipment at the school and how to apply it to learning. Additionally, there is continual training that mainly aims to raise the level of technology integration. Large staff meetings, smaller meetings where teams work together, and individual teachers all help to achieve this. While much more professional development is differentiated by interest, topic matter, or need, some of it is uniform. Additionally, a significant portion of it occurs in lessons where co-teaching, modeling, and observation are encouraged. These teachers and the literature both hold a high value for this informal teacher learning, and both agree that technology integration professional development should be tailored to individual requirements

(Moore, 2018; Tondeur et al., 2017). There is a lot of literature that supports using coaches or mentors (Knight, 2019; Moody, 2019). Professional development can adapt depending on the situation. Technology leaders will work to find solutions to issues as they arise. When they are unable to do so internally, they serve as a liaison between their teachers and the outside world.

Research Question Three

There needs to be some method of gauging the success of technology integration in classrooms. As a result, it is crucial for technology leaders to put an evaluation process in place to assess the success of technology integration. There are two models for evaluating instructional technology: TPACK and SAMR. Unlike the SAMR (Substitute, Augmentation, Modification, Redefinition) model, which is a technology integration evaluation tool, technological pedagogical content knowledge (TPACK) is a comprehensive framework created to combine aspects of content, pedagogy, and technology in a manner that will "assist teachers in delivering effective technology-infused instruction" (Hilton, 2016, p.69).

The SAMR approach gives teachers the tools they need to keep up with technology and rethink tried-and-true teaching techniques. According to the literature, SAMR aims to promote teachers' and students' technological progress and competency to foster the growth of 21st century abilities (Hilton, 2016). Leaders also expect technology to be used in ways that are pedagogically sound, giving them a chance to reevaluate and gauge their progress. As suggested in the literature, the TPACK model enables technology executives and instructors to review how they use technology to make sure that effective teaching practices, interesting pedagogy, and relevant material are combined (Hilton, 2016).

Re-assessment of research question

Since qualitative research questions try to examine or explain phenomena rather than provide a clear noothetic explanation, they are typically more general and imprecisely stated (White, 2017). They might just incorporate one concept, but the most probably do. Instead of focusing on how changes in one variable influence changes in another, we are seeking to study the experiences, understandings, and interpretations that people have about the concepts in our research issue.

After analyzing the findings, it became clear that there was little information regarding the leadership styles used by administrators to ensure successful technology integration. As a result, the researcher had to restructure the research questions to address the leadership qualities needed for successful technology integration for school effectiveness. In addition, the researcher had to restructure the second research question to make it more relatable because it was intended to address the resources that administrators and teachers view as necessary for successfully implementing technology integration. As a result, the second research question was realigned to examine the guiding model and/or framework school leaders need to use for the effective integration of technology for school's effectiveness in Georgetown, Guyana. Further, there was no researcher question that aimed to explore the opportunities offered by the school administrators for the efficient use of technology. Studies provided data relating to the necessity of professional development and its significance; as a result, one of the research questions was changed to explore the opportunities related to technology, specifically what opportunities school leaders should provide for the integration of technology for the effectiveness of the school.

The key points of the study are summarized in Chapter 5, along with the study's theoretical and methodological contributions, suggestions for additional research, its strengths and limitations, and its implications for practice or policy.

CHAPTER FIVE: CONCLUSIONS AND DISCUSSIONS

Summary

This qualitative desk study aimed to identify the role of school leaders in the integration of technology for secondary school's effectiveness in Georgetown, Guyana. This study also sought to identify the leadership skills that administrators will need to effectively play their part in integrating technology into schools. It also looks at the possibilities for integrating technology that educational administrators must offer for schools to function effectively. To create effective technology integration leadership practices in their institution in the current educational environment, school leaders need knowledge, counsel, and facts.

In addition to assisting people and organizations in adapting and thriving in the face of adversity, adaptive leadership also helps them get ready for the process of transformation (Heifetz et al., 2009). Principals must use new strategies and skills, as well as the leadership to organize teams, to adapt to the changes that technology has brought about in the twenty-first century. The paradigm of transformative leadership can also be used to examine technology leadership. An effective style of leadership that seems to best promote digital innovation is transformational leadership (Antonopoulou et al., 2021).

Chapter Three contained the key information relevant to the study. Through the analysis of nine research journals, the goal of this qualitative research study using a grounded theory technique is to elucidate the role of school leaders in the successful integration of technology in Georgetown, Guyana's schools. Because of how education is changing as a result of the usage of technology in the classroom, effective leadership is needed (Malik, 2018). In order to accommodate students' changing needs, school administrators must possess the qualities, provide the opportunities, and provide the resources essential for the successful integration of technology into the classroom.

Nine journal articles were selected for analysis in order to demonstrate the grounded theory guiding the role of school leaders in the integration of technology for school effectiveness in Georgetown, Guyana. A thorough comparison analysis was used in Chapter Four to uncover any discrepancies or inconsistencies in the nine journal articles discussed in the summary of Chapter three as well as to uncover common themes, findings, and conclusions among the

identified studies. The qualitative analysis matrix was used in comparative analysis. Using the analysis techniques described above, the triangulation of data sets and subsequent emergent themes were documented and discussed.

The literature review and the themes provided insights which attempted to answer the research questions. In answering research question 1, this study discovered that school leaders require interpersonal qualities patience, humility and approachable along with transformational behaviours such as the ability to redefine vision, create collaboration and professional school culture, and ability to help their teachers. For research question 2, this study discovered that professional development must be standardized with differentiation by interest, subject area and teacher's need. In addition, adequate time must be given for same and on a continuous basis. Further, research question 3 discovered that the TPACK Model and SAMR Model are most effective to assess and evaluate the process of implementing technology.

Conclusion

The desktop research study's goal was to determine the qualities of effective leadership required for the successful adoption of technology in Georgetown, Guyana's schools. The study was built on the theories of transformational leadership and adaptive leadership. While adaptive leadership assists individuals and groups in overcoming obstacles and prepares them with the tools necessary to manage change, transformational leadership is a crucial component supporting the influence of technology integration.

The purpose of the desktop research study was to identify the characteristics of successful leadership necessary for the adoption of technology in Georgetown, Guyana's schools. The theories of transformational leadership and adaptive leadership served as the foundation for the study. Transformational leadership is an essential element supporting the influence of technology integration, whereas adaptive leadership enables individuals and groups overcome challenges and equips them with the tools needed to manage change.

Nine scholarly journals that were acquired from the ProQuest database served as the mechanism for addressing these research questions. To find conclusions, the qualitative grounded theory method was used.

Strengths and Limitations

Journal articles were used as the main sources of secondary data for this study. In order to ascertain the involvement of school leaders in the integration of technology for the efficacy of schools in Georgetown, Guyana, these secondary data sources were retrieved from the ProQuest database. The opportunity to investigate the various findings on the function of school leaders in the integration of technology is provided by the emphasis on recent publications.

However, there are several restrictions found in this study. The first limitation was the methodology. The researcher was subjected to conduct a desktop study as it was the requirement of the university, as a partial completion of the master's degree. Further, even though the secondary data source offered a vast number of data, the quantity was constrained because the data were either out-of-date or unrelated to the issue at hand. In addition, there were lack of studies relating to the topic of interest for Guyana, since the search databases returned no article on this topic relating to Guyana. Finally, because the study was self-funded, there were no resources to access paid data bases. This resulted in failure to accessing the full texts of at least four potential journal articles.

Implication for Practices

The most important practical implication is that it is totally feasible to properly integrate technology to the point that, in the absence of technology, learning would not be as high-quality. As a result, it is essential that all schools strive to achieve this since it is both possible and necessary to positively influence learning (Hunter, 2017; OECD, 2015), and because lacking technological literacy is a weakness (OECD, 2015; USDEO, 2016, 2017). Additionally, as the digital environment is the students' natural environment, any hope for student-centered learning should commence there. Further the digital milieu is students' native environment so any hope for student centered learning should meet them there. To do any less will do students, and between countries because technology acts as an amplifier. As a result, in order to provide an equal educational experience to the students, schools and school systems need extensive reform and significant funding increases. Schools require resources to support technology and significantly raise standards.

Professional development should begin when teachers join schools and at the commencement of each new academic year to get people up to basic understanding of the

technology and how it can be used for teaching and learning and administrative duties. The professional development should then continue in an ongoing situated way so that each school leader and teachers' technology integration can be continually improved while additional technologies are incrementally introduced. The school's use of coaches chosen from their most proficient teachers actually work alongside other teachers appears to have been particularly effective in this regard and may provide a model to replicate to overcome many of the challenges.

However, investing in proper infrastructure and professional development alone is unlikely to lead to improve integration of technology. What is need is transformational leaders with transformational behaviors and interpersonal skills. These leaders need to begin as a change agent and promote an inclusive culture of change and growth by authentically modelling it. A culture where educators see themselves as empowered lifelong learners who will never be done improving and who are supported along their journey with extensive relevant professional development and the necessary evolving infrastructure. As such, the importance of having the right leaders in place is critical.

Less lofty implications for the role of school leaders in the integration of technology include the need for schools to use the SAMR model and TPACK framework (Hilton, 2016; Kirkland, 2017). The TPACK paradigm has had a considerable impact on instructional technology. By using this strategy, leaders could create environments that encourage explicit professional development in terms of curriculum, pedagogy, and technology. The type of knowledge that educators require in order to integrate technology into their lessons is highlighted by TPACK. Leaders must take the SAMR model into account given how swiftly technology is currently evolving. Through the lens of the SAMR model, leaders can recognize the degree of technological integration.

Recommendation for Further Research

- In evaluating the literature on the role of school administrators in integrating technology for school success, this study has made an important contribution. However, there are suggestions that, if pursued, will clarify the role that school administrators have in incorporating technology. Evidently, primary research, more precisely action research, offers more first-hand information than secondary data research, which was used for this

study. Thus, if researchers conduct primary research, they will achieve superior and broader findings and get a deeper, broader, and more objective understanding of the phenomena surrounding the role of school leaders in integrating technology.

- The evaluation of finds on professional development indicated that that the abundance of professional development offered leads positive results. Therefore, a better understanding of professional development best practices for integration of technology, what works and why, are clearly areas in need of research (Huberts et al., 2020). Similarly, research on the effects of frequent promotion of technology used has on the implementation would shine more light on its role in facilitating the integration of technology.
- While technology changes fast, the theories and models that underline technology integration best practices such as SAMR and TPACK are evolving much slower (Savignano, 2017). There is a need for more general research on SAMR due to the widespread use of it by educators and the paucity of existing literature. (Hamilton, 2016; La Cruz, 2018) as well as how it used in combinations the TPACK framework (Hilton, 2016; Kriek etal., 2016)

Appendices

Research Dissemination

The audiences for this study are members of the Ministry of Education Guyana, headteachers and teachers in senior position such as Heads of Departments and Senior Master/Mistresses. This study targets senior officials of the Ministry of Education Guyana and all other officials in senior positions in the schools to sensitize them on the role of school leaders in the integration of technology for school's effectiveness. In the same vien, educational policy makers are targeted as a result of their roles in educational policies and making plans. These policy makers need to create polices and benchmarks to measure integration of technology. This thus will ensure the effective integration of technology for school's effectiveness. The research aims to educate senior teachers and headteachers on their responsibilities in ensuring that technology is effectively integrated into their schools.

The results of this study will be disseminated through focus group discussions and presentations. Through the facilitation of focus group discussions, the data gathered from this study will be discussed to get feedback from educational practitioners of like status; headteachers, Heads of Department and Senior Masters/Mistresses. In addition, presentations will be done at various meetings facilitated by the Ministry of Education Guyana.

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