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The Future of ICT Integration in Antiguan Secondary Schools: A Post-Covid Perspective

Anthony S. Donaldson[1] & W. Marc Jackman[1]

[1] Centre for Education Programmes, The University of Trinidad and Tobago, Trinidad, West Indies

Correspondence: Anthony Donaldson, Centre for Education Programmes, The University of Trinidad and Tobago, Trinidad, West Indies. Tel: 1-268-774-7850. E-mail: anthonydonaldson268@gmail.com

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Abstract

In this article, specific findings from a larger mixed-methods study that examined the leadership strategies Antiguan school principals employed to integrate technology into the curriculum are examined. In particular, the goal was to provide a greater understanding on some of the potential future applications of ICT integration in curriculum delivery, as identified by educators and school administrators. This study was anchored by the International Standards for Technology in Education (ISTE) model, an established technology leadership theoretical framework, as well as a technology integration framework, TPACK. Qualitative data were gathered from school principals and teachers through the use of semi-structured interviews (N=27). Furthermore, the qualitative data were manually coded and subjected to thematic content analysis. Regarding the future of ICT Integration in Antiguan Secondary Schools, several themes emerged such as, the need for increased online instruction, integrating AI technologies, as well as the acquisition of more advanced ICTs. The development of a contemporary technology use policy for secondary schools is one of the recommendations, along with pre- and in-service training for principals and educators.

Keywords: ICT integration, Post-Covid, future applications, curriculum delivery

1. Literature Review

Artificial intelligence and virtual reality are two examples of modern technologies that are expected to be quickly adopted by modern educational institutions. Remarkably improving the educational experience for administrators, teachers, and students should be the ultimate aim of these places of learning. Consequently, questions regarding the future applications of technology at their school were posed to all participants within this study. ICT integration in education has had an incredible impact and has been acknowledged as one of the major factors influencing the learning process (Prasojo et al., 2019). An educational setting that prepares students for the realities of the modern technology dispensation is not only critical but fundamental to functioning in a digitally oriented society (Harrell & Bynum, 2018; Schindler et al., 2017). In view of this, the Fourth Industrial Revolution demands that school administrators and educators alike be proficient and fully cognizant regarding technology related concerns (Raman & Thannimalai, 2019). On the other hand, if educators and school administration are uneasy or fail to possess the necessary technological integration abilities, students will suffer (Krawchuk, 2022; Waxman et al., 2013). Therefore, in order to support digital natives in their classrooms, school principals and educators must constantly evolve. These present considerations situate the current study which aims to identify the future possibilities of ICT Integration in Antiguan Secondary Schools. Since our world is becoming more and more perceived as globally connected, educational institutions must proficiently embrace modern technology (Hamzah et al., 2016). As such, schools must become cutting-edge, modern institutions of learning that provide outstanding educational possibilities to every student (Hamzah et al., 2016).

Additionally, current literature clearly indicates that ICT integration has numerous advantages for academic institutions. Teachers and students now have easier access to significantly more modern learning resources and tools thanks to technology (McKnight et al., 2016). Students can learn in a variety of ways when ICT is used in the educational process (McKnight et al., 2016). They also have more control over their education when technology is utilized in the classroom (Ruloff & Petko, 2022; Yarbro et al., 2016). The use of technology allows for the tailoring and differentiation of learning to accommodate the unique academic needs of students (McKnight et al., 2016). Additionally, ICT-enhanced learning environments give students more opportunity to understand the learning

process than standard classroom settings (Uygur et al., 2020). Similarly, through online forums, emails, and interactive websites, technology can be leveraged to enhance student feedback and communication (McKnight et al., 2016). Therefore, educational institutions need to thoroughly understand and successfully embrace these potential applications in order to completely reap the benefits of ICTs.

Moreover, research has shown that new breakthroughs in technology have reshaped educational institutions, from the latest development of innovative artificial intelligence (AI) chatbots like ChatGPT to the expanding ubiquity of virtual-reality capabilities that stretch the bounds of educational possibilities (Spector, 2024). Students that use various forms of technology in the classroom such as virtual platforms become actively involved in achieving educational targets (Drexel University, n.d.). Additionally, the way that students learn in the classroom can be greatly impacted by the use of basic technologies such as PowerPoints, games, online homework assignments, and online grading systems (Drexel University, n.d.). In actuality, technology is continuously evolving and its rate of advancement appears to be escalating (Schloffel, 2024). In order to accommodate the requirements for these evolving ICT skills and attitudes, high school education has experienced a shift, with educators now acting more as guides (Schloffel, 2024). The integration of ICTs facilitates the delivery of tailored instruction which caters to each student's specific needs while maintaining a more inclusive learning environment (University of Drexel, n.d.). Given the possibility of resource depletion, it is therefore imperative that schools choose the most appropriate ICT resources that correspond to their expanding technology requirements (Spector, 2024).

Furthermore, school curricula must emphasize career-focused training with a foundation in computer literacy, spreadsheet manipulation, and database comprehension (Schloffel, 2024). To be responsive to the ways in which today's learners assimilate and integrate knowledge, school administrators, teachers, and educational planners must continually reevaluate the process of learning (Schloffel, 2024). Therefore, with the widespread availability of ChatGPT and other chatbots that may be used to create reading assignments or mentor students through the writing process, generative AI has become a game-changer for both technology and education (Spector, 2024). Immersive technologies such as virtual and augmented reality are predicted to become increasingly popular in classrooms (Spector, 2024). The gamification of educational activities which frequently uses animated videos with interactive components to grab and retain students' interest is another trend that is anticipated to pick up momentum (Spector, 2024). The development of Virtual Reality (VR) technology has also created opportunities for experiential learning where students can practice and explore concepts in ways that are not possible with conventional didactic approaches (Feridun & Bayraktar, 2024). Through the use of virtual reality technology, students can now engage with material in formats that promote a sense of realness which can enhance the effective recall of the subject matter (Feridun & Bayraktar, 2024). Given that Covid 19 has forced the advancement of educational technology at all levels of education, significant research in the Caribbean region with regard to its future prospects is in the nascent stage. Thus, the Antiguan secondary school context provides fertile ground to begin to look at what might evolve in the not-too-distant future. In order to explore the future possibilities as identified in this study, the research questions below were utilized.

1.1 Research Questions

1. What are the future possibilities of ICT integration in the curriculum for secondary school principals?
2. What are the future possibilities of ICT integration in the curriculum for secondary school teachers?
3. What are the future possibilities of ICT integration in the curriculum for secondary school students?

2. Method

This study employed the TPACK model as well as the International Standards for Technology in Education (ISTE) theoretical frameworks. The public school system is Antigua has a total of 12 secondary school principals, 18 deputy principals, and 769 secondary school teachers. For this study, a purposive sample was selected that was comprised of two teachers from each school (n = 18) and nine out of the twelve (9/12) school principals. These participants consented to twenty-seven (27) semi-structured interviews. This sample plan was created based on the researcher's assessment of who would provide the most helpful information to meet the goals of the study (Etikan & Bala, 2017). In order to achieve data saturation, the point at which acquiring additional knowledge about an issue would no longer yield new insights, the researcher estimated that 27 interviews would be sufficient (Hennink & Kaiser, 2022). Research indicates that this non-random technique does not require a minimum or maximum number of participants (Etikan et al., 2016).

2.1 Participants

Each participant was given a pseudonym in order to conceal his/her identity. Teacher participants were classified as T1, T2…to T18, whereas principal participants were identified as P1, P2, ...to P9. Out of the nine principals,

four were male and five were female. Five of the principals were between the ages of 36 and 50, while the remaining four were more than 51 years old. Two of the principals had more than 20 years of experience, while the majority, six, had over 30 years of experience in the field. Among the teacher participants, there were three males and fifteen females. Twelve teachers were between the ages of 36 and 50, five were in the 20–35 age range, and only one was older than 51. Teacher participants included deputy principals, Social Studies, IT, Math and other educators. Teacher participants have been teaching at their current school for a minimum of one year, and a maximum of 19 years.

2.2 Data Collection and Analysis

Permission to conduct this study was obtained from the Ministry of Education, the research sites, and the Institutional Review Board (IRB) at the University of Trinidad and Tobago. Throughout the approval process, the relevant authorities were consulted orally, in writing, and electronically. Forms requesting consent from participants were then created and distributed. The data gathering process started as soon as research participants received and signed the consent forms. In-person interviews with teachers and school principals were arranged at a time and place of their choosing. The sessions took place on the school grounds during regular school hours, contingent upon the responders' availability. Interview subjects were also given information regarding the approximate start and end timings of the sessions which lasted up to an hour. Audio-visual recording and verbatim transcription of the sessions were not allowed to proceed without prior approval from the participants. Furthermore, the freedom to leave the study at any time and without penalty was communicated to the participants.

The researcher used a Microsoft Word tool to transcribe the data after the interviews were over. To ensure accuracy of the data, a Word document containing the transcription of the data was sent to each participant via email prior to the process's continuation. Thematic content analysis was then applied to the qualitative data. The process for theme analysis followed the six-step outline provided by Braun and Clarke (2006). These include familiarizing oneself with the data, developing preliminary codes, searching for themes, reviewing themes, finding and categorizing themes, and preparing the report (Braun & Clarke, 2006). The researcher's deep dive into the data, which involved reading and rereading to produce an initial set of codes was one of the most important tasks in this process. Themes were developed and refined based on these codes. Overall, the study showed that both administrators and educators believed that ICT integration in a future context may impact principals, educators as well as students.

3. Results

3.1 What Are the Future Possibilities of ICT Integration in Curriculum for Secondary School Principals?

The research questions were used to analyze the interview content and determine the themes related to future possibilities of ICT integration relevant to the main stakeholders in the education system. Consequently, each section below begins with the specific research question under examination. The themes that emerged as future applications of ICT integration within the secondary school context were divided into possibilities for principals, teachers and students, as can be seen in Figure 1 below. We will first examine the themes as they relate to the work of the school principal.

Theme 1- Becoming paperless

Using technology to transform schools into paperless organizations was one of the themes that came from a large number of participants' interviews. T7 commented, "*we're getting to the point where all our records are going to be electronically filed… I think eventually we are going to come out of that era where we are using paper for student data."* T8 offered a suggestion regarding student files containing personal data, "e*ven with the PD (personal detail) files, I want to see those things online."* T4 believed that more exams can be completed online in order to reduce paper consumption, "w*e were moving along in the path of having more online exams, cutting out the whole printing and the paper and all of the issues that come with that physical stuff."* The views of teachers were validated by the perspectives of school principals.

Additionally, school administrators envisage an educational setting in which technology will largely eliminate the need for paper. P2 commented, "o*ne thing I would really like to see happen where technology is concerned within the school is to get rid of all this paper, I would really like to see that we go paperless*." Similarly, P8 remarked *"administratively it (technology) is very beneficial because it cuts down a lot on the labor, the intensiveness in terms of accumulating data through paperwork and going through, so many piles of documents.*" School principals can automate many aspects of their administrative work. Participants reported that among other things, record keeping, timetables, administering exams, and student registration could all be done online. Less paper use in the classroom may contribute to more engaging, equitable, and varied instruction while also saving

money for educational institutions. Without a doubt, this could be a game-changing use of technology in school administration because it can lessen the need for actual classroom spaces, increase storage and retrieval capabilities, save an incredible amount of time when preparing documents, and give other stakeholders digital access to necessary data.

Theme 2- Advanced ICT equipment

A salient theme that emerged from the interviews with participants concerning the possible applications of technology for education administrators included schools' increasing procurement of cutting-edge technology. Many schools do not currently have all the technology tools needed to enhance the learning process to the fullest extent possible (Garba et al., 2015). As examples of advanced technological applications that maybe employed within a secondary school context, several participants mentioned the use of an intercom system, classrooms equipped with state-of-the-art ICT tools, and technologies that would help in the proper monitoring of students on a regular basis. P3 stated, "a*s a principal, you're in your office, you want to send a message to the teachers, you could have an intercom where you can stay in your office and you can call a teacher."* In a similar vein, P6 commented on the proposal for an ideal classroom space, in which technology applications and tools play a key role within the learning environment as well as where each student has access to adequate technological devices. P6 elaborated, "*one of my dreams would be classrooms that have a computer for each student, you have a projector that's dropped from the center."*

P4 anticipated that in the future, students will be monitored via technology, where instead of writing in a book, they will be able to scan themselves in when they arrive to school, "*we are hoping that in the future we'll get to a point that instead of writing in a book, they come and scan themselves in and we'll be able to know time and place*." P5 mentioned the prospect of having software that makes it easier and takes less time from the principal, where particular duties can be delegated to someone at a lower echelon in school management, "*you can have a software, you can use technology to make it easier, take less time from the principal and also it could be passed on to somebody at a lower level."* It has been observed that numerous Antiguan secondary schools do not have sufficient access to the latest technological advances necessary to effectively carry out the ICT integration agenda. Consequently, participants thought that in order for these educational facilities to achieve their desired results, they needed to make sure they were given the requisite technological equipment. This is an important issue because if schools keep using outdated ICT resources, they will not be able to effectively integrate technology and achieve optimal results. The relevant educational authorities would need to provide financial resources in order to establish this capacity to use technology in a constructive way.

Theme 3- The use of AI

A number of participants suggested that employing artificial intelligence (AI) to complete administrative and instructional tasks is another important way that principals of schools may utilize technology in the near future. AI may be able to maintain students' interest in their studies. It may be tailored to meet the different learning styles of learners and create new opportunities to keep them engaged. Additionally, both principals and teachers can employ AI to carry out administrative tasks. T6 remarked, "*I believe that is one (AI) aspect of the tech that we need to really be looking at and preparing ourselves."* T18 discussed the importance of providing students and teachers with the required training in order to maximize the advantages provided by AI within the learning environment, "t*he use of artificial intelligence and training the children to use that and training the teachers especially to use that to leverage their lessons and to also make them more productive to get more stuff done."* When asked about prospective uses of technology for principals, T11 felt that the usage of AI would be interesting to administrators since it would make their work considerably simpler in terms of completing routine duties, "w*e had a retreat, and in that retreat, we learned about artificial intelligence and ChatGPT…technology is exciting to administrators because it will make their work much easier."* Participants agreed that, although it will require the required training, AI might benefit educators by making their tasks easier. Furthermore, a number of individuals have expressed ethical concerns in relation to the application of AI in educational settings, even in light of the potential significant benefits from these ICT technologies. As a result, educational administrators must make a deliberate effort moving forward to appropriately balance these many concerns.

3.2 What Are the Future Possibilities of ICT Integration in Curriculum for Secondary School Teachers?

Two major themes emerged regarding the ways in which teachers might employ technology in the near future to support educational activities: a stronger focus on online planning, assessment, and instruction; and the integration of improved smart technology to facilitate learning.

Theme 1- Online planning, assessment and teaching

A number of participants agreed that effective technology integration in schools may boost teachers' productivity when it comes to planning, delivering lessons, and conducting assessments. Using technology to design lessons and deliver online instruction to students who are unable to attend in-person sessions were among issues highlighted by the participants. P3 had this to say, "*I'm hoping that we can reach the stage where even though you may have the face-to-face teaching, somebody can be somewhere else and they are gaining from whatever is done in the classroom*." P4 emphasized the use of AI as an arsenal for strengthening teachers' educational efficacy in the learning environment, "*the issue of artificial intelligence has become popular. We have to improve our mechanisms to help teachers to see how it can be used as a tool to incorporate it into teaching*. T1 believed that one of the future uses of technology is online lesson planning, where educators' work can be easily adjusted, saved and retrieved at a later time, "f*or teachers now, we can do lesson planning online, utilizing something where we can go and do our lesson plans…a software so that we can go in and insert our lessons and save."* According to T18, AI has the potential to be implemented in both the lesson planning and assessment processes, "*there are software right now where you can just scan the paper and it actually takes the name of every child who did that exam, all the marks come in as a grade."* The world, in particular educational systems, learned the value of blended and distance learning instructional approaches owing to COVID 19 (Daniel, 2020). Many educational institutions were forced to lock their doors as soon as the pandemic struck (Daniel, 2020). Those who could not change course swiftly were unable to adapt to the new normal. During this time, the majority of educational institutions were required to provide students with options for remote learning. As such, this theme highlights how crucial it is for teachers to be able to remotely use technology in order to prepare for and fulfill their duties in the classroom.

Theme 2- Smart Technology

A student's ability to think critically and apply knowledge to complete assignments is often required, therefore, integrating technology into the classroom helps foster these intellectual and analytical skills. A number of participants mentioned the growing use of smart technology as a potential use of technology in the future. T18 suggested the use of smart boards, *"we need to really get with the program. Smart Board is a good thing."* Likewise, T2 commented on the utilization of smart boards within the classroom environment, "*I would love to have a smartboard, I would like to do away with the White Board and the markers…you don't have to be setting up a projector, everything is already in the class for you*." T12 believed that smart technology can be effectively utilized to capture the interest of students, "*having smartboards, Smart TV, those kinds of things that would grab the attention of the children. I think that they could definitely be used successfully in teaching."* In reality, a number of Antigua's schools lack the funding necessary for them to have access to smart technology. As obtaining these technological devices will need a significant financial investment from the relevant authorities, participants believe that this should be a future priority of school administrators. There is no doubt that in a smart technology environment, teachers' roles will shift to those more comparable to facilitators in a framework of student-centered pedagogy.

3.3 What Are the Future Possibilities of ICT Integration in Curriculum for Secondary School Students?

Theme 1- Completing Work Online

The ability for students to do their coursework online emerged as one of the key concepts regarding how technology would be used by educators in the future. Participants envisioned a learning environment where students can work effectively from almost anywhere and are not dependent on being physically present in order to complete tasks. With the help of this kind of innovative teaching, students will develop the necessary skills required to operate in a technological environment and become globally competitive. T8 addressed the novel opportunities for students to study at institutions of higher learning from around the world, while staying in the comfort of their own homes, "*the way the world is going, technology has helped a lot of young people study without having to incur the cost of buying a plane ticket, paying for school fees somewhere else."* T10 emphasized the power of technology in enabling students the prospect of submitting coursework online. T10 elaborated, "*technology is becoming more and more advanced and getting students behind the computer, getting them understanding certain aspects of how to use the computer would only benefit them, using the computer to do certain assignments."* In a comparable manner, T16 pointed out the notion of learners completing assignments electronically which could culminate in reduced expenses for parents, "*I think more and more we can move away from the paper and more of our assignments should be online. Students will be able to turn in their assignments online, which would even eliminate costs for parents."* Thanks to technology, students can now do their assignments from home in a comfortable environment (Chen, 2015). The learning process is not limited to

a teacher-student relationship in a physical classroom. Students are capable of becoming self-reliant and choose for themselves what and when to study (Shamir-Inbal & Blau, 2021). Students can work at their own pace and a variety of learning styles are supported by technology. Given that we live in a time of rapid change and that students seek out multiple options and avenues to pursue their educational objectives, this issue becomes increasingly essential. Many people want a learning method that can be adjusted to our modern technological realities rather than one that is rigid.

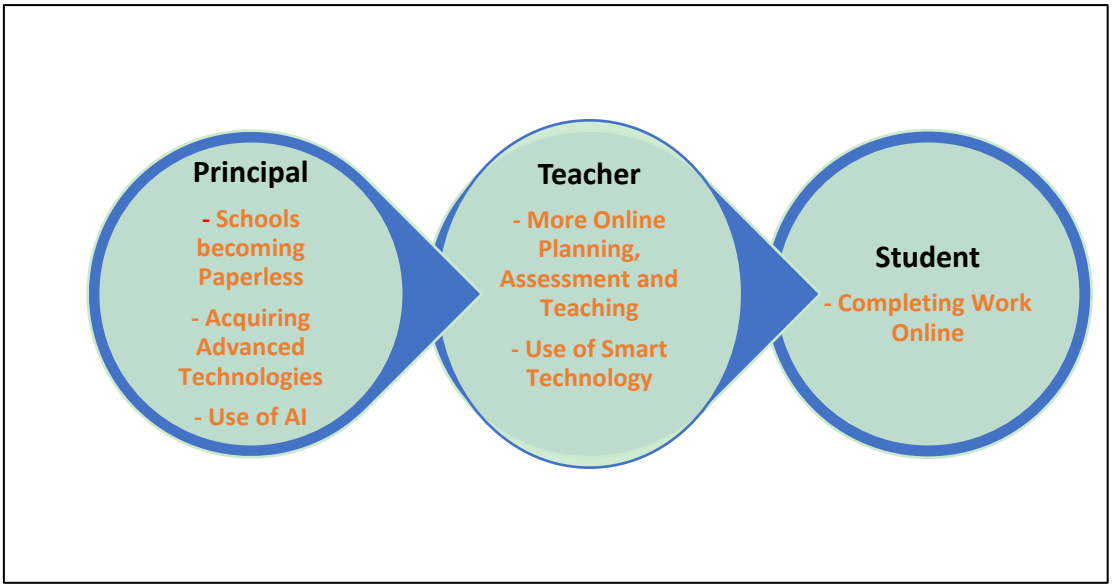

Figure 1. Future Possibilities of Technology Integration

4. Discussion

4.1 Future Possibilities of Technology Integration in Antiguan Secondary Schools

The aforementioned research questions looked at how administrators, teachers, and students might use technology in the future. Every participant in the study was asked to explain how they see technology being used in an educational context in the near future. For school principals, three main themes emerged: educational institutions going paperless, implementing more advanced technology for learning, and effectively utilizing AI for teaching.

Future Possibilities for School Principals

Becoming Paperless

Participants thought that school principals would be able to digitize student records in the not-too-distant future, which would lower the need for paper. The results of this study also showed that, in the future, schools might forgo paper exams in favor of online evaluations like those the CSEC has implemented which are quicker and, in certain cases, enable instant assignment grading. Participants also highlighted the possibility of future benefits from ICT integration for administrative objectives, such as the creation of more physical space by minimizing the accumulation of paperwork stacks, which may be extremely time-consuming.

The previously indicated result implies that the electronic archiving of student and other records may considerably reduce the effort required for pertinent stakeholders to find the information they seek without requiring manual searches. Furthermore, because of the risk of the virus spreading during COVID 19, very little interaction with paper-based material occurred. Educators and principals of schools frequently worked from home using technological devices. It implies that rather than printing or photocopying documents, administrators would be able to carry out their tasks more quickly via electronic means. In the years ahead, paperless transactions might signify the need for fewer employees.

In order to reduce the workload of educators and create a central repository that can be accessed by various MOE-affiliated agencies, the Malaysian Ministry of Education introduced the School Management System (SMS) with the main goal of developing a single information management application for all educational institutions

(Leong et al., 2016). Technology could thus significantly lessen the requirement for paper-based documentation while also establishing a centralized archive that will be available to several education partners.

The utilization of technology benefits school administration since it drastically lowers the labor intensity of administrative tasks. The need for large file cabinets and other physical storage spaces may be significantly reduced when technology is utilized to handle administrative duties. Because of ICT integration, Antigua's secondary schools may become leaner and more efficient in the next stage of their transformation. Among many other advantages, efficient technology integration may dramatically reduce the need for physical learning environments, which may result in costs savings for both students and the schools themselves.

Sophisticated Technology

The study brought attention to yet another possible benefit of ICT integration for leaders in education: the purchase of more advanced technology for secondary schools and other academic institutions. The results of the study showed that a number of Antiguan secondary schools lacked certain contemporary ICT resources, including devices that could aid in regular student tracking, intercom systems that facilitate effective communication, and classrooms equipped with technology for instructional purposes. Participants imagined a time when every student would have a computer in the classroom in addition to projectors, smartboards, and other technological aids that would improve learning.

It is hoped that in the future, schools will employ more advanced ICT resources to carry out management-related tasks, despite the fact this research indicates that some Antiguan school administrators still rely on outdated technology to carry out their jobs. Based on the aforementioned finding, it appears that many educational institutions are unable to purchase such cutting-edge ICT equipment because of limited funding. Notwithstanding this, administrators are still prepared to put in the extra work necessary to acquire these instructional resources because they recognize their value and significance. In light of this, the government, the educational community, and the corporate sector will all need to contribute responsibly to this worthwhile endeavor of acquiring ICT resources.

Studies have indicated that technology has become an indispensable part of education, especially when it comes to substituting interactive digital whiteboards for conventional chalkboards and using students' personal electronics as instructional devices (Sakthivel & Radha, 2021). As such, there are a number of crucial factors to take into account when choosing these cutting-edge technological devices for educational and administrative purposes. However, when determining what kind of digital tools to obtain and how to use them in the context of instruction, proper infrastructure is often overlooked (Harrell & Bynum, 2018). Consequently, a number of factors should be taken into consideration while making these decisions, including the device's purpose and range, the use of suitable furniture, and a reliable internet connection (Harrell & Bynum, 2018).

The results of this study showed that a number of Antiguan secondary schools lacked the most up-to-date equipment needed to effectively progress the ICT integration agenda. As such, these educational establishments ought to ensure that they have access to cutting-edge technology tools in order to accomplish their intended goals. The matter at hand is crucial because if secondary schools continue utilizing antiquated ICT resources, they will not be able to successfully integrate technology and produce the best possible results. Developing the ability to actively incorporate technology might necessitate financial support from the relevant education authorities. Education partners such as alumni associations may need to provide schools with more support in order to acquire the ICT resources they need. Furthermore, it may be necessary to provide the proper training for these new technologies' effective use once they become available.

Use of AI

In the not-too-distant future, school principals can leverage technology by incorporating artificial intelligence (AI) to accomplish administrative and instructional responsibilities. The results of this study indicate that administrators are enthusiastic about implementing AI because it will simplify their work. Participants did note, however, that educational institutions were behind considerably in their comprehension of artificial intelligence (AI) and its potential applications. If schools are to reap the full benefits of using AI, they must receive sufficient training in its efficient integration. The results of this research reinforced the participants' belief given that many students were already using AI technologies to complete their coursework.

This finding indicates that educational policymakers and school administrators may find artificial intelligence to be of great use in accomplishing critical goals. Artificial Intelligence offers the capacity to predict academic student performance and aid in formulating strategies to enhance learner outcomes. Principals can use artificial intelligence (AI) to analyze massive amounts of administrative and academic data and identify new trends in

education. AI is therefore able to recognize areas that need additional support. Working smarter, not harder, is more crucial in today's environment. Therefore, this research suggests that artificial intelligence (AI) can be effectively employed to execute a variety of jobs that were previously completed by manual labor, whether under normal circumstances or during a pandemic, natural disaster, or other type of crisis.

Artificial intelligence and other contemporary technologies are changing classroom design, teaching methods, and the responsibilities of school administrators (Raman & Thannimalai, 2019). Studies show that artificial intelligence (AI) can assist in the training of school administrators by providing real-time insights into their decision-making abilities (Wang, 2021). Given that AI systems have enormous processing power and can outperform humans in a variety of tasks, including face recognition and speech comprehension, many educational administrators have chosen to implement facial recognition software as part of their efforts to increase school safety (Wang, 2021). About 40% of the work that educators do now will be replaced by AI within the next ten years, especially for tasks that are unrelated to teaching, such tracking students' progress (Wang, 2021). In light of this, the literature places great emphasis on the various benefits that AI may offer to educational institutions. To be more precise, school districts and administrators may use AI to assess behavior, academic achievement, and attendance rates of students in order to identify those who are most likely to struggle (Murphy, 2019).

Since students are already utilizing the technology, school officials should make every effort to anticipate and stay ahead of developments regarding the usage of AI. Secondary school principals in Antigua should make sure that teachers and students have the skills needed to properly incorporate artificial intelligence into the classroom. While there are many potential advantages to integrating AI that could help change our educational landscapes, school administrators should carefully consider ethical concerns about student usage in particular in order to mitigate plagiarism and other major problems with assignment completion. Teaching students to think independently and analytically is one of the main objectives of education; as such, the use of technology, especially artificial intelligence (AI), should not interfere with this goal.

4.2 Future Possibilities for Teachers

Online Planning, Assessment, and Instruction

The study's findings highlighted important areas for future technological use by educators such as a greater emphasis on online learning, planning, and assessment. The integration of AI to support teachers in delivering instruction was reported by the participants as having significant potential. The results of the study showed that, in contrast to the outdated plan books that have been used, teachers were especially excited about generating online lesson plans because they can be easily saved and adjusted for future use. Teachers also envision a time of instantaneous grade generation within an online student assessment environment.

The results of the current study indicate that while face-to-face classrooms will continue to exist, educators will be able, in a greater way, to use technology to engage students who are unable to physically attend sessions for whatever reason. This finding demonstrates the potential of integrating technology, in which educators can now work with greater effectiveness in the context of their tasks of preparing instruction and measuring student achievement. Furthermore, this study may suggest that should another pandemic, natural disaster or crisis occur, educators may continue to utilize ICTs to stay connected with their students. The significant disruption caused by Covid-19 underscored the necessity for educational establishments to become digitally adept and prepared to transition to remote or hybrid modalities of instruction in the event of necessity. However, the educator's overall pedagogical approach for incorporating these technologies is crucial to this process.

As things stand, the needs of learners are changing, technology is developing, processes are becoming more digital, as well as internationalization has increased our reach (Raman & Thannimalai, 2019). Teachers faced the issue of designing courses, homework, assignments, and assessments that were acceptable for the online environment when the Covid-19 pandemic forced them to work from home (Winter et al., 2021). ICT integration is changing how teachers instruct today's students as a result. According to research, teachers may utilize ICT to evaluate students since online exams give students the opportunity to evaluate their own learning critically and receive quick feedback on their comprehension level (Sakthivel & Radha, 2021). However, achieving the intended result of technology integration, that is, using ICTs to support modern teaching and learning does not depend solely on technology-related elements, as educators' pedagogical decisions are critical in determining how to incorporate the right technology into the classroom (Tondeur et al., 2017). As a result, it is crucial that teachers use ICTs to accomplish specific tasks; yet, technology integration needs to be founded in a comprehensive pedagogical approach.

This finding's implications point to the necessity of providing sufficient educational tools to support this degree of online instruction, planning, and evaluation. Furthermore, in order for educators to effectively incorporate ICTs to

accomplish these goals, it might be necessary to have reliable and steady internet connectivity. Furthermore, teachers may need to acquire the necessary technological competences in order to integrate technology to become more proficient in online instructional planning and student evaluation. Teachers must be at ease and confident in incorporating ICT tools into the classroom if they are to replace some of the more established teaching strategies and materials.

Smart Technology

The increasing use of smart technology in the educational setting was another potential use for ICTs. According to this study, teachers favored using smartboards in the classroom over conventional whiteboards and markers. Participants believed that classrooms can be equipped with all of the resources needed for instruction rather than requiring teachers to carry around equipment as is the case in certain institutions. Participants generally believed that incorporating smart technologies into the classroom would be extremely beneficial for both teachers and students in terms of student engagement and the technology's ability to meet the needs of a wide variety of learners.

The secondary schools in Antigua in particular need technological modifications in order to cater to contemporary educational needs. Given that our current students are adequately equipped to deal with the realities of the digital world, integrating smart technology may prove to be a profitable investment (Harrell & Bynum, 2018; Schindler et al., 2017). By implementing different educational activities that incorporate smart technology, which should be based on the educator's pedagogical philosophies, significant progress can be made in addressing the school's curriculum. The finding points to teachers' discontent with the way traditional teaching tools like chalkboards, markers, and blackboards have been employed. It's possible to argue that these dated, labor-intensive teaching resources fail to adequately fulfill the diverse needs of today's students. Smart technology integration has the ability to create learning environments that are exciting, interactive, and engaging, a goal shared by many educators.

According to current research, the Malaysian government established Smart Schools with the goal of incorporating ICT into the classroom in order to give the next generation of students the skills they need to succeed in the increasingly technologically advanced global economy (Leong et al., 2016). Significant advancements in education have been brought about by smart technology, including smartphones, tablets, and smart pads. These devices have allowed for resource-rich, flexible, autonomous, and ICT-enabled instruction in South Korea (Leem & Sung, 2019). Since smart technology can be integrated to address the needs of different types of learners while simultaneously increasing student autonomy. This could have positive effects on both educators and students.

The latter finding suggests that educational institutions, especially secondary schools, should set aside more funding to acquire these smart technologies. School administrators should carefully budget for these technologies, as they may need a large investment, and should also look for other financing sources. The results further show that in order to effectively integrate these smart devices for instructional purposes, school administration, teachers, and students may need more sophisticated training. Additionally, the administration of the school may need to create a well-thought-out technology usage policy that regulates the use of these costly and delicate resources in order to integrate these smart technologies.

4.3 Future Possibilities for Students

Completing Tasks Online

One theme that emerged from the participants' responses regarding how students might use technology in the future is their ability to successfully complete their coursework online. Due to technological advancements and societal changes, secondary school students can now be better prepared for their post-secondary education, which may involve online courses. The findings of this research suggest that teachers should switch from using traditional pen and paper tests to online coursework completion options for students.

The result indicated above suggests that students may be able to save a significant amount of money on their future educational costs. The ability of students to complete coursework online may benefit parents, educators, and educational institutions because it allows students to complete assignments electronically and avoids the need to purchase specific educational resources or pay for transportation to and from school. Using ICT resources, students may be able to continue their education even in the event of a pandemic like COVID-19 or other natural or man-made disasters. Additionally, there are tools like Google Docs and Slides that would enable communication between teachers and students. These tools provide learners and teachers with unlimited access and minimum geographic barriers.

Studies have indicated that a growing proportion of students is utilizing online learning due to their attraction toward customized instruction, and their enthusiasm for utilizing technology (Depew, 2015). Compared to

traditional education, online learning offers students a number of significant advantages such as improved access to learning materials, individualized and personalized instruction, increased motivation, the digitization of repetitive tasks for efficient time management, and cost savings through material reuse (Depew, 2015). Expanding the opportunities for learning outside of traditional classrooms is made possible in large part by educational technologies (Chen, 2015). Students now have greater flexibility over where, when, and how they learn thanks to technology (Shamir-Inbal & Blau, 2021). Unfortunately, a number of students still have not acquired possess the necessary digital skills in school to seek post-secondary education. Technology integration is therefore essential for preparing students for success in college and the workplace (Harrell & Bynum, 2018). The results of this study highlighted the significance and advantages of teachers moving away from traditional pen and paper assignments by providing students with the option of completing coursework online, which may help them to prepare for the future.

Students must learn how to efficiently integrate these ICT technologies if they are to effectively complete their academic work online. Therefore, this finding may prove important when it comes to schools giving students the right kind of guidance about the integration of these educational technology. It is imperative that students acquire the skills necessary to not only operate ICT devices but also to successfully traverse the vast amount of accurate and inaccurate information available online. Moreover, in order for students to do their work, they also require proper access to internet-connected devices. In addition, parents' ought to actively supervise their children as they complete their schoolwork at home.

5. Conclusion and Recommendations

The purpose of this study was to investigate some of the future possibilities of ICT integration in Antiguan public secondary schools. The study found that ICT integration can positively affect the administrative work of principals and teachers. It also found that students could benefit in ways that will make them more ready for the world of work and university level studies. These future possibilities included paper reduction which can positively reduce the carbon footprint of each school and consequently the country. ICT integration is also seen to hold the potential to modernize the school environment with current technology and replace routine tasks with efficient digital alternatives. Teachers can enhance their classroom learning experiences with new digital pedagogies that excite and engage students and reduce time spent on instructional planning and assessment. Future possibilities also envision the incorporation and use of AI technologies to improve the overall academic experience.

Therefore, the researchers recommend that Ministry officials should actively seek out the services of technology experts in order to create cost-effective ICT integration training programs for pre-service and in-service school principals and educators that take into account cutting-edge educational technology applications. These programs may be taught online, in a mixed learning environment, or in-person to accommodate working professionals. A comprehensive modern ICT integration plan should also be implemented, allowing individuals in positions of power to effectively oversee and manage this crucial undertaking in all of Antigua's public secondary schools. One of the most significant issues to focus on is how students use ICT in the classroom. For instance, this strategy needs to include specific guidance on how AI can be used in education. Incorporating AI into the classroom raises ethical concerns that need to be clearly addressed in this type of document. Finally, the study might have an impact on how creative technology policies that address the particular needs of our contemporary society are developed in Antigua and other developing countries in the region. Further studies may concentrate on future possibilities within private secondary schools setting.

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