Technology Leadership Standards of Education Leaders, Teachers' Technological Adoption and the Integration of Technologies in the Classroom

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Abstract

This study investigated the relationship between the technology leadership among education leaders in the Division of Laguna, the technological adoption of teachers, and the integration of technologies in the classroom. The study addressed several questions including the level of technology leadership standards among educational leaders, the level of teachers' technological adoption relative to technological acceptance and technology readiness and the level of integration of technologies in the classrooms relative to learning organization and class engagement. It also examines the significant relationship between the technology leadership standards, teachers' technological adoption and the integration of technologies in the classroom. The study sampled 333 public junior high school teachers and their 188 students from Kalayaan, Lumban, Pagsanjan, Majayjay, and Santa Cruz districts. The descriptive-correlated research method was used, and the data were collected using standardized and modified research questionnaires.

Analysis revealed that education leaders have a very high technology leadership standards based on the following weighted mean of 4.29, 4.40, 4.44, 4.43 and 4.35 with the standard deviation of 0.60, 0.59, 0.62, 0.60 and 0.59. Teachers' technological adoption in relation to technological acceptance was also very high having a weighted mean of 4.61 and 4. 31 and a standard deviation of 0.53 and 0.61, while teachers' technological adoption in relation to technology readiness garnered the weighted mean of 4.35, 3.92, 3.32, and 3.92 with the standard deviation of 0.56, 0.56, 0.88 and 0.68 which are interpreted as very high, high, moderately high and high respectively. On the other hand, the integration of technologies in the classroom in terms of learning organization scored the following weighted mean of 4.29, 4.09, 4.08 and 4. 27 with the standard deviation of 0.45, 0.54, 0.50 and 0.50 and interpreted as high, high, high and very high respectively. For the integration of technologies in the classroom in terms of class engagement the weighted mean is 4.15,3.92,4.14 and 4.19 with standard deviation of 0.55, 0.68, 0.54 and 0.58 respectively and all are interpreted as high.

The findings of the study revealed that there is a significant relationship between technology leadership standards of education leaders and teachers' technological adoption. Although the relationship was weak but statistically significant at 0.05 levels of significance which means having strong technology leadership can promote technology adoption among teachers in educational settings. Education leaders who demonstrate certain leadership standards are more likely to have teachers who adopt technology. Specifically, leadership qualities such as being an advocate for fairness and empowerment, planning strategically, and being a lifelong learner were found to be related to teachers' adoption of technology.

However, there is no significant relationship between technology leadership standards and integration of technologies in the classroom. This was determined by analyzing survey data, which showed a weak correlation and most p-values not meeting the significance alpha level of 0.05. It was found that leadership qualities such as equity and citizen advocate, visionary planner, empowering leader, system designer and connecter learner did not have a significant impact on technology integration in classrooms. This suggests that education leaders may not be able to influence how much technology is used in classrooms through their leadership practices.

The recommendations include the development of policies and guidelines on the use of technology in the classroom by the Department of Education, provisions of professional development opportunities and ensuring equitable access to technological tools and resources. Education leaders should prioritize effective use of technology for teaching practices; promote digital literacy among students through safe and responsible use policies while protecting student data privacy. Educators can communicate with education leaders about useful technology integration strategies within their own classrooms which could lead towards more effective strategies being implemented across schools and districts.

Future researchers may explore different types of educational settings using mixed method approaches alongside quantitative data collection methods for more nuanced insights into participants' experiences with integrating technologies into their teaching practices along with evaluating long-term effects by conducting follow-up surveys after several years have passed since implementation.

Keywords: Technology Leadership, Technological Adoption; Integration of Technology

Introduction

One of the school heads KRA or key result area is the Human Resource Management and Development wherein they are expected to provide technical assistance to teachers on matters pertaining to enhancement of classroom management, skills, and instructional competence and to non-teaching personnel for support services within the RPMS cycle. Meanwhile, there is a rapid advancement of technology, especially in Industrial Revolution 4.0 (IR 4.0), which evidently influencing every aspect of our lives including leaderships and education settings across the world (Schwab & Davis, 2018). Advanced technologies in IR 4.0 like Artificial Intelligence and Internet of Things are changing the role of school leaderships, approaches to teaching, and remodeling of classrooms (Hinton, 2018). This expectation and with the rampant changes in technology, it has become imperative for principals to develop their technology leadership.

According to Yucesoy and Dagli (2019), A technology leader is a person who establishes the relationship between technology and leadership by trying to reconcile human and information technology components as the most important in this process by taking an active role in executing technology.

A major component of technology leadership is how they will motivate their teachers to learn, use, and implement technology into their curriculum (Speedy and Brown, 2014). School leader's leadership predominantly concerns the use of technology aimed at teaching and learning in school, especially their role in managing ICT for instruction, learning, and other aspects related to ICT. Additionally, it has been found that ICT leadership is particularly vital for teachers to implement and foster innovations attached to ICT (Geir, 2013).

For this reason, the new roles of principals could be listed as seeking new technologies, establishing computer labs, preparing teachers to integrate ICT effectively across the curriculum, and infuse their leadership capabilities in technology integration. Seemingly, technological leaders in the school, who are the principals, must be familiar with educational technology goals and standards. They must understand the benefits of how technology should be integrated into education and be able to develop staff development programs for teachers (Beytekin, 2014). It has been suggested that integrating technology into the classroom will change the traditional teacher-student relationship, encourage students to take an active role in their education, and get them ready for a world of technology in the workplace.

The school leadership preparatory training should include technology to produce future-ready school principal who can lead teachers and students, as learning experiences become virtual and ubiquitous (Aldowah et al., 2017; Esplin, 2017). In view of the above realization and observation this study was undertaken to investigate the relationship between the technology leadership standards of education leaders, teachers' technological adoption and the integration of technologies in the classroom.

Background of the Study

According to a report by the World Economic Forum (2019), poor leadership could be the biggest barrier to a successful Fourth Industrial Revolution strategy. Apsorn, Sisan & Tungkunanan (2019) explained that, in Thai education, the problems in educational technology, most of which are administrators' lack of readiness to use in information technology. Administrators still lack the readiness in learning technology and do not see the importance of innovation and information technology. Administrators lack knowledge, lack of experience, and expertise in using media to create innovative media and information technology nor various elements for teaching and learning. Further, most of the school administrators in Thailand still lack qualities in ICT leadership, which is a major problem affecting educational administration and management at the level of the school and overall education.

The integration of technology by leaders and teachers was affected by inadequate training, incompetency in ICT, and limited access to ICT (Abdullah et al., 2015). It is evident that there is a gap in technology integration among teachers and school leaders who were not skilled to manage technology integration at schools, for example, many teachers in Malaysia faced challenges implementing Learning Management Systems like Frog Virtual Learning Environment

(Cheok & Wong, 2016). Overall implementation of the leadership behavior of school principals can be seen from their ability to manage the internal dimensions of the school so that teachers are encouraged to improve their performance (Kusmintardjo, 2014). On the other hand, a study by Aesaert et al. (2015) confirmed that lack of teacher competence in ICT can impact the achievement of students in school. In the context of Philippine education, school leaders, who are the principals and teachers, are now transforming themselves on what the Industrial Revolution 4.0 is pushing with to elevate the current education system in which their technological leadership is pointed-out on how it will further enhance the technical proficiency of their teachers.

In 2010, DepEd launched its DepEd Computerization Program or DCP (D.O. No. 78, s. 2010) which aims to provide public schools with appropriate technologies that would enhance the teaching-learning process and meet the challenges of the 21st century. But according to Tuazon (2019) the program was not fully implemented due to lack of equipment, insufficient trainings of the implementers and inadequate knowledge of the IP community about computers. Even though the Philippine government has initiated several programs and projects for the use of ICT in education, real implementation in day-to-day learning is still limited. Teachers' fear of technology still hinders the optimal use of ICT-related skills in their teaching activities. Despite various training programs having been provided to Filipino teachers, there is still a need to embark on a comprehensive and sustained in-service training for teachers.

Principals are required to act as technology leaders and teachers as facilitators, to provide the skills and knowledge for the 21st century education (Roblyer and Doering, 2014). It is principal's responsibility is to bring his teachers to adopt and integrate technology in the learning process as well as to improve their skills and proficiency in using technology in teaching in attaining the demand of the digital economy and workforce. Also, teachers are expected to ensure the positive use of ICT in teaching and learning process which is one of 37 indicators in Philippine Professional Standards for Teachers. Thus, it is the researcher's main aim to investigate the relationship between technology leadership standards of education leaders, teachers' technological adoption and the integration of technologies in the classroom.

Theoretical Framework

The justification of the research questions can be anchored on several theoretical frameworks related to the topics herein.

This study is anchored on Education 4.0.

Hussin (2018) explains that Education 4.0 is a form of response to the needs of the fourth Industrial Revolution, which aligns humans with technology to create new possibilities. The urge to fulfill skills through Education 4.0 is something immediately to be realized. But this is not easy. This is even more so if it is implemented simultaneously in the country due to the uneven aspects of ICT (Information Communication and Technology).

Fisk (2017) explains that the new vision of learning promotes learners to learn not only skills and knowledge that are needed but also to identify the source to learn these skills and knowledge. Learning is built around them as to where and how to learn and tracking of their performance is done through data-based customization. Peers become very significant in their learning. They learn together and from each other, while the teachers assume the role of facilitators in their learning.

There are nine trends related to Education 4.0 (Fisk, 2017). First, learning can be taken place anytime anywhere. e-Learning tools offer great opportunities for remote, self-paced learning. Flipped classroom approach also plays a huge role as it allows interactive learning to be done in class, while the theoretical parts to be learned outside the class time.

Second, learning will be personalized to individual students. They will be introduced to harder tasks only after a certain mastery level is achieved. More practices will be provided if the instructors see a need in it. Positive reinforcements are used to promote positive learning experience and boost students' confidence about their own academic abilities.

Third, students have a choice in determining how they want to learn. Although the learning outcomes of a course are preset by the institutions/bodies in charge of the curriculum, students are still free to choose the learning tools or techniques that they prefer. Among the options that lecturers can adopt to enable students to be creative in their learning are blended learning, flipped classroom and BYOD (Bring Your Own Device) approach.

Fourth, students will be exposed to more project-based learning. Students are required to apply their knowledge and skills in completing a couple of short-term projects. By involving in the projects, they are practicing their organizational, collaborative and time management skills which are useful in their future academic careers.

Fifth, students will be exposed to more hands-on learning through field experience such as internships, mentoring projects and collaborative projects. The advancement of the technology enables the learning of certain domains effectively, thus making more room for acquiring skills that involve human knowledge and face-to-face interaction.

Sixth, students will be exposed to data interpretation in which they are required to apply their theoretical knowledge to numbers and use their reasoning skills to make inferences based on logic and trends from given sets of data.

The manual part of mathematical literacy will become irrelevant as computers will perform the statistical analysis and predict the future trends.

Seventh, students will be assessed differently and the conventional platforms to assess students may become irrelevant or insufficient. Students' factual knowledge can be assessed during the learning process, while the application of the knowledge can be tested when they are working on their projects in the field.

Eighth, students' opinion will be considered in designing and updating the curriculum. Their inputs help the curriculum designers maintain curriculum contemporariness, up-to date and usefulness.

Lastly, students will become more independent in their own learning, thus forcing teachers to assume a new role as facilitators who will guide the students through their learning process.

The nine trends of Education 4.0 shift the major learning responsibilities from the instructors to the learners. Instructors should play their roles to support the transition and should never consider it a threat to the conventional teaching profession.

Education 4.0 is related to technology leadership in the sense that it requires leaders who are knowledgeable about and comfortable with using technology to enhance learning experiences for students. Technology leaders can help schools and educational institutions implement Education 4.0 by providing guidance on selecting appropriate e-learning tools, designing effective flipped classroom models, ensuring equitable access to ICT resources, and training teachers on how to facilitate interactive learning in class. In short, education 4.0 cannot be implemented without strong technology leadership at all levels of an educational institution or organization from top management down through teaching staffs as well as support personnel such as IT specialists or instructional designers who work behind the scenes making sure everything runs smoothly from a technical standpoint.

Education 4.0 is closely related to technological adoption because it relies heavily on the use of technology to enhance learning experiences for students. The implementation of Education 4.0 requires educational institutions and organizations to adopt new technologies such as e-learning tools, virtual classrooms, online assessments, and other digital resources that support personalized and self-paced learning anytime anywhere. Technological adoption in education can be challenging due to uneven access to ICT resources among students or teachers who may not have the necessary skills or knowledge needed for effective integration of technology into their teaching practices. However, with proper training and support from technology leaders within an organization or institution, educators can successfully adopt new technologies that align with Education 4.0 principles.

Education 4.0 is closely related to the integration of technologies in the classroom because it promotes interactive learning and self-paced learning using e-learning tools, virtual classrooms, online assessments, and other digital resources that support personalized education. In an Education 4.0 environment, teachers act as facilitators rather than instructors who guide students through their individualized learning paths using technology-based resources such as videos or simulations outside class time while interactive activities take place during class time. The integration of technology in the classroom can help create a more engaging and dynamic learning experience for students by providing them with access to a wide range of multimedia content tailored according to their mastery level which they can learn at their own pace anytime anywhere on any device connected via internet connection. Overall, Education 4.0 emphasizes integrating technology into teaching practices so that educators can provide more effective instruction while also promoting student-centered approaches where learners are empowered by having greater control over how they learn.

The study is also anchored in Education Leaders Standards.

The ISTE Standards serve as a framework for innovation and excellence in learning, teaching and leading. As a body of work, the suite of standards has guided educator practice, school improvement planning, professional growth and advances in curriculum. The ISTE Standards have been updated as learning have evolved, and now the ISTE Standards will be considered a single work comprising of four sections: Students, Educators, Educational Leaders and Coaches. As a compilation, the ISTE Standards provide a holistic and comprehensive guide to transforming systems in order to transform the lives of our students.

- Equity and Citizenship Advocate - Leaders use technology to increase equity, inclusion, and digital citizenship practices.
- Visionary Planner - Leaders engage others in establishing a vision, strategic plan and ongoing evaluation cycle for transforming learning with technology.
- Empowering Leader - Leaders create a culture where teachers and learners are empowered to use technology in innovative ways to enrich teaching and learning.
- System Designer - Leaders build teams and systems to implement, sustain and continually improve the use of technology to support learning.
- Connected Learner - Leaders model and promote continuous professional learning for themselves and others.

Technology Leadership is an important part of the ISTE Standards, as they provide guidance on how to use technology to transform learning and teaching. The standards outline roles for educational leaders such as Equity and Citizenship Advocate, Visionary Planner, Empowering Leader, System Designer and Connected Learner that are necessary in order to effectively lead with technology.

The ISTE Standards provide a comprehensive guide to transforming education with technology and include five leadership roles that involve empowering teachers and learners to use technology in innovative ways. This includes creating a culture where teachers are empowered to use technology in innovative ways, building teams and systems for implementation of the technologies, as well as promoting continuous professional development.

The ISTE Standards provide a comprehensive guide to transforming education with technology and include five leadership roles that involve integrating technologies into the classroom. This includes creating a culture where teachers are empowered to use technology in innovative ways, building teams and systems for implementation of the technologies, as well as promoting continuous professional development. Additionally, leaders should model digital citizenship practices in order to ensure equitable access for all students. The ISTE Standards provide a framework for integrating technology into the classroom in order to improve learning, teaching and leading. They include five roles for leaders that focus on increasing equity, creating strategic plans, empowering teachers and learners to use technology innovatively, building sustainable systems with technology support and promoting continuous professional learning.

One of the theory anchored in this study is Technology Acceptance Model.

The Technology Acceptance Model (TAM) is a theory that measures the willingness and intentions of computer technologies and user audiences in large organizations (Davis, 1989). TAM has earned its place in Management Information System literature as the most powerful and most widely used theory based on behavioral theories regarding the acceptance of new technologies at individual level. TAM argues that users' acceptance of technology is shaped under the influence of two basic dimensions - perceived ease of use and perceived usefulness.

Perceived ease of use and perceived usefulness are the two factors that determine the intentions of individuals regarding computer use (Davis, 1989). Perceived usefulness is defined by Davis (1989) as expressing the intentions and opinions of individuals regarding the effect of technology on their performance at work; perceived ease of use refers to the ease of use of a technology and learning how to use it without much effort (Davis, 1989).

TAM can be used to measure the willingness and intentions of technology leaders in large organizations. It suggests that their acceptance of new technologies is related to how easy it is for them to use the technology, as well as how useful they perceive it will be for their organization. By understanding these two factors, organizations can better predict and proactively counteract any resistance or reactions from technology leaders when introducing new technologies into an organization.

TAM can be used to measure teachers' willingness and intentions to adopt new computer technologies in their classrooms. It suggests that the acceptance of technology by teachers is related to how easy it is for them to use the technology, as well as how useful they perceive it will be for their students. By understanding these two factors, organizations can better predict and proactively counteract any resistance or reactions from teachers when introducing new technologies into the classroom.

TAM can be used to measure the willingness and intentions of teachers in large organizations when it comes to accepting and integrating new technologies into their classrooms. Perceived ease of use and perceived usefulness are two factors that determine how likely a teacher is to accept technology, as they relate directly to how easy or difficult it is for them to learn the technology, as well as its potential performance increase.

Another theory that we can look upon is Technology Readiness Index.

Technology readiness (TR) refers to "people's propensity to embrace and use new technologies to accomplish goals in home life and at work" (Parasuraman, 2000, p. 308). It is a combination of positive and negative technology-related beliefs. These beliefs are assumed to vary among individuals. Collectively, these coexisting beliefs determine a person's predisposition to interact with new technology (Parasuraman & Colby 2001). Furthermore, findings show that these beliefs can be categorized into four dimensions: optimism, innovativeness, discomfort, and insecurity (Parasuraman, 2000).

- Optimism is defined as "a positive view of technology and a belief that it [technology] offers people increased control, flexibility, and efficiency in their lives" (Parasuraman & Colby, 2001, p. 34). It generally captures positive feelings about technology.
- Innovativeness is defined as "a tendency to be a technology pioneer and thought leader" (Parasuraman & Colby 2001, p. 36). This dimension generally measures to what degree individuals perceive themselves as being at the forefront of technology adoption.

- Discomfort is defined as "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Parasuraman & Colby 2001, p. 41). This dimension generally measures the fear and concems people experience when confronted with technology.
- Insecurity is defined as a "distrust of technology and scepticism about its ability to work properly" (Parasuraman & Colby, 2001, p. 44). This dimension focuses on concerns people may have in face of technology-based transactions.

The Technology Readiness Index (TRI) developed by Parasuraman, recognizes the importance of attitude or technological predisposition as a key factor in the adoption of cutting-edge technology in the home or at work.

Technology readiness is related to technology leadership in that it measures a person's tendency to be an early adopter of new technologies. The innovativeness dimension of the TRI specifically focuses on how likely someone is to be at the forefront of technology adoption, which can indicate their potential as a leader in this area.

Technology readiness is relevant to teachers' technological adoption because it measures their attitude and predisposition towards new technologies. The four dimensions of the TRI can help identify how comfortable a teacher may be with using technology in the classroom, as well as any potential concerns they may have about its use. This information can then be used to inform decisions on which technologies are best suited for each individual teacher's needs.

Technology readiness is important for the successful integration of technologies in the classroom. The TRI can help identify which teachers are more likely to be open to using new technologies, as well as any potential issues they may have with them. This information can then be used to inform decisions on how best to integrate these technologies into each individual teacher's classroom environment and teaching style.

Statement of the Problem

The study aimed to determine the relationship between Technology Leadership Standards of Education Leaders in the Division of Laguna, Teachers' Technological Adoption and the Integration of Technologies in the Classroom.

Specifically, it sought to answer the following:

1. What is the level of Technology Leadership Standards of Education Leaders with regards to:
    - 1.1. Equity and Citizenship Advocate;
    - 1.2. Visionary Planner;
    - 1.3. Empowering Leader;
    - 1.4. System Designer; and
    - 1.5. Connected Learner?
2. What is the level of Teachers' Technological Adoption relative to:
    - 2.1. Technological Acceptance as to:
        - 2.1.1. Perceived Usefulness; and
        - 2.1.2. Perceived Ease of Use?
    - 2.2. Technology Readiness as to:
        - 2.2.1. Optimism;
        - 2.2.2. Innovativeness;
        - 2.2.3. Discomfort; and
        - 2.2.4. Insecurity?
3. What is the level of Integration of Technologies in the Classroom in terms of:
    - 3.1. Learning Organization as to:
        - 3.1.1. Lesson Structure;
        - 3.1.2. Teachers' Knowledge;
        - 3.1.3. Facilitation of Instruction; and
        - 3.1.4. Classroom Management?
    - 3.2. Class Engagement as to:
        - 3.2.1. Interaction;
        - 3.2.2. Students' Motivation;
        - 3.2.3. Task/Work Completion; and
        - 3.2.4. Students' Satisfaction?
4. Does Technology Leadership Standards of Educational Leaders have significant relationship on Teachers' Technological Adoption?

5. Does Technology leadership standards of educational leaders have significant relationship on the integration of technologies in the classroom?

Significance of the Study

The researcher considered that the findings of the study would be beneficial to the following individuals and groups.

Department of Education

The findings of this study might influence the agency to craft plans on how they could cater to the needs of both the school heads and teachers in terms of instructional technology and technological advancement.

Schools Division Superintendents

The findings of this study may prompt and guide our superintendents in their decision-making as to what training should be given to the school heads to equip them with technical skills that in return will allow them to train teachers effectively and provide quality technical assistance in the use and application of various technologies.

School Heads

The result of the assessment on school heads' technology leadership will aid them to give remedy to things that they need to gain and develop.

Teachers

The result of the assessment on teachers' technological adoption such as technological acceptance and readiness will create self-awareness as well as improvement on the part of our teachers to better adapt and integrate new and emerging technologies in the classroom.

Future Researchers

This study may give insights and serve as a springboard for further investigation on the influence of technology leadership on teachers' technological adoption as well as its relationship to integration of technologies in the classroom.

Scope and Delimitation

The study will assess the technology leadership of school principals in the Division of Laguna and its relationship to teachers' technological adoption and the integration of technologies in the classroom. The results of this study will serve as the basis for a technological upskilling program for school heads and ICT-related trainings for classroom teachers. Using purposive sampling technique, the respondents of this study are secondary public-school teachers and students from the districts of Kalayaan, Lumban, Pagsanjan, Majayjay, and Santa Cruz. Only schools catering junior high schools in the districts will be included in the study.

This study utilized a standardized survey instruments for teacher-respondents and modified survey instruments for students-respondents from other related studies and will cover 7 weeks in duration where 6 weeks will be spent for the data collection, and 1 week for analysis of findings, and interpretation. The researcher pre-determined the variables used in this study based on the related literature and deemed that there are other variables from other literature that can be used by future researchers in consonance with this paper.

However, several factors associated with the research design and process are expected to restrict the results of this analysis. The primary requirement for the respondents to be included in this study is that they must be stationed in a public school. This was based on the researcher's perception that the result from this study is fit for the use in public schools based on the related literature and studies mentioned herein. However, other researchers may include in their research both the teachers in elementary and senior high schools for a wider scope. On the other hand, the set of research instruments of this paper are based in the theoretical framework of this study, hence, there may be an instance that other variables related to the topics are not discussed. It is also expected that more data analysis would be needed to understand the relationship between technology leadership of school principals in the Division of Laguna, teachers' technological adoption and the integration of technologies in the classroom, which may not be included in the scope of this paper.

Definition of Terms

To ensure a better understanding of this research work, the following terms are defined.

Technology Leadership Standards for Education Leaders. These are the standards based on International Society for Technology Education (ISTE) for Education Leaders. It includes Equity and Citizenship Advocate, Visionary Planner, Empowering Leader, System Designer and Connected Learner.

Teachers' Technological Adoption. The combination of teachers' technological acceptance and technological readiness.

Technological Acceptance Model. It was designed specifically to explain computer usage behaviour. It is an adaptation of Fishbein and Azjen's (1975) theory of reasoned action (TRA), which has been successful in predicting and explaining behaviour in general (Malhotra & Galletta, 1999; Yi & Hwang, 2003). There are two central determinants in TAM: **Perceived usefulness**, which refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320); and **perceived ease of use**, which refers to "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p. 320).

Technological Readiness. It refers to "people's propensity to embrace and use new technologies to accomplish goals in home life and at work" (Parasuraman, 2000, p. 308). It is a combination of positive and negative technology-related beliefs. The beliefs are categorized into four dimensions: **optimism**, **innovativeness**, **discomfort**, and **insecurity** (Parasuraman, 2000).

Integration of Technologies. It refers to the incorporation of technology resources and technology-based practices into daily routines, work, and management of schools. Technology resources are computers and specialized software, network-based communication systems, and other equipment and infrastructure.

Learning Organization. It is comprised of lesson structure, teachers' knowledge, facilitation of instruction and classroom management.

Class Engagement. It is comprised of interaction, students' motivation, task/work completion and students' motivation.

Related Literature

A literature review was carried out, and the available materials on technological adoption, integration of technologies in the classroom and technology leadership were considered.

Teachers' technological adoption is determined by technological acceptance and technology readiness which are some of the variables found relevant in this study.

On the assumption that the successful implementation of any inclusive policy is largely dependent on educators being positive about it, a great deal of research has sought to examine teachers' attitudes towards the integration and, more recently, the inclusion of children with special educational needs in the mainstream school. (Koehler et. al., 2014) introduce a framework, called technological pedagogical content knowledge (or TPACK for short), that describes the kinds of knowledge needed by a teacher for effective technology integration. (Scherer et. al., 2018) contribute to the advancement of this understanding by examining the relations between three core technology attitudes (i.e., general attitudes towards ICT, attitudes towards ICT in education, and ease of use) and TPACK self-efficacy beliefs, based on a sample of N = 688 Flemish pre-service teachers in 18 teacher-training institutions.

The contribution of (Aquino et. al., 2018) is to reveal the meanings related to the insertion of Information and Communication Technologies found in practices proposed to students in teacher accreditation programs. The subject of (Stephan et. al., 2019) is to analyze students' technology acceptance and achievement emotions after participating in an online course (in comparison to an on-campus course) in teacher education.

Based on the reviewed literature, technological acceptance is an important factor in the successful implementation of inclusive policies, and that suitable acceptance models need to be developed in order to improve the quality of different technologies used within educational settings.

(Rohmatillah et. al., 2019) study strategy integrated learning through the model of deep discussion group activities (dmkk) based on local wisdom as efforts for establishing characters of jhs students. The DMKK model can provide opportunities for students to think deeply about a problem faced. The conclusions are based on the compilation of findings from the research studies as well as recent reflective conversations related to lessons learned that might support others in the field who are interested in moving toward an infused approach (Foulger et. al., 2019). (Rafiee et. al., 2019) study e-learning: development of a model to assess the acceptance and readiness of technology among language learners. By reviewing the related literature, a number of hypotheses were formed, and a framework was developed. The subject of (Ince-Muslu et. al., 2020) is to identify the main factors that affected the process of technology integration in mathematics education. There is no comprehensive overview of the level of technology readiness of proposed concepts. (Gil et. al., 2020) present an analysis aiming at (1) increasing the understanding of the structure and contents of the academic field

concerned with this topic; (2) determining and mapping scientific networks in this domain; (3) analyzing and visualizing Technology Readiness Level (TRL) of analyzed systems. The studies on MALL (mobile-assisted language learning) seem to be predominantly focused on benefits of specific technological advances when the advantages of MALL are discussed.

(Metruk, 2020) attempt to present a critical review of the literature which deals with MALL as further research and exploration in this area is necessary, especially with regard to challenges and barriers language teachers face when m-technologies are employed. (Zaitseva et. al., 2021) study determining the readiness status of university students in stem education and distance education course. The quantitative research method was used. (Balasubramanian et. al., 2021) propose a readiness assessment framework that encompasses the complex interplay of different underlying factors, social structures, and institutional mechanisms and that covers all key stakeholders. The purpose of (Atay et. al., 2021) is to investigate the components of college students' readiness for connectivist learning in technology-enhanced learning environments through the development of the readiness for connectivist learning scale (RCLS). (Inderanata et. al., 2023) aim to determine the effect of integrated vocational guidance on student work readiness in Vocational High Schools.

Based on the reviewed literature, technology readiness is an important factor in the successful integration of technology into education and healthcare settings. It suggests that understanding educators' attitudes towards technology integration, as well as involving end-users in the initial stages of development, are key to ensuring a successful implementation.

(Galimullina et. al., 2019) identify IT competencies that are needed to cope with the redefined curriculum. Several reviews have summarized studies on secondary school students' moderate-to-vigorous physical activity (MVPA) in physical education (PE), but no systematic review with semiquantitative assessment has been conducted to specifically identify the correlates of their MVPA (Zhou et. al., 2019). In class, students work together in assigned groups to create a diagram of their collective perceptions and identify processes for which there was the largest misalignment with those presented (Forde et. al., 2020). The starting point in developing a lesson study project is to determine a concept that is challenging for students, and then identify faculty as well as individuals from related academic support areas that may be interested in participating (Wahman et. al., 2020).

(Goh et. al., 2020) aim to review factors preventing university academics from embracing new Information and Communication Technologies (ICT) into their instructional methods and to discuss ways on how to overcome these issues. The purpose of (Babatope et. al., 2020) is to bring to light the state of education in Digital Libraries (DLs) in tertiary institutions in Nigeria, and the readiness of library schools to produce future digital librarians in Nigeria. This diversity has made it difficult to easily integrate them into educational software solutions, which is why (Santórum et. al., 2021) present a study of the characteristics, standards, and tools for creating and reusing OAs.

The reviewed literature suggests that students should work together in assigned groups to create a diagram of their collective perceptions and identify processes for which there was the largest misalignment with those presented. Additionally, it discusses ways on how university academics can embrace new Information and Communication Technologies (ICT) into their instructional methods, such as integrating learning objects into educational software solutions.

Integration of technologies in the classroom can be seen from learning organization which includes lesson structure, teachers' knowledge, facilitation of instruction, classroom management as important variables related to this study.

(Mahdum et. al., 2019) aim to investigate the perceptions and motivations of state senior high school teachers in rural districts in Indonesia towards ICT use in learning activities. The subject of (Stavroulia et. al., 2019) is to propose the use of a virtual reality (VR)-based approach to improve teacher education and life-long professional development. (Gordillo et. al., 2019) examine the instructional effectiveness of courses in MOOC format for teacher training in the safe and responsible use of ICT by analyzing three different official courses. (Sáenz et. al., 2019) use a Participatory Action Research approach, in which the object of study is not external to the researchers, as the social practices under study are performed by the same subjects who are conducting the investigation. Active and collaborative learning conditions facilitated by ICT helps to develop a knowledge-centered student community. (Amponsah et. al., 2020) give an insight into the use of ICT in the field of education, focusing on its impact on teaching learning process, quality, and accessibility of education, motivating learners, learning environment and students' academic performance.

The subject of (Yuomeyse et. al., 2020) is to investigate technological competences and technological tools usage by primary school teachers. The first purpose of (Asad et. al., 2020) is to enable students to gain wider range of knowledge and access Internet for developing a global outlook. To describe the status of the subjects and identify issues for future research (Liu et. al., 2021) utilize bibliometric and content analyses of leading journals. For the reason, one-to-one teacher-mentor matching was designed, and the details of the process were led by the teachers' preferences. Which lasted for two semesters, 54 mentors and 48 teachers were paired based on the mentors' decision whether they preferred to

work with language teachers or Mathematics teachers (Top et. al., 2021). The main subject of (Sani et. al., 2021) is to discuss the elements of information literacy competence for teachers in Malaysia.

The reviewed literature looks into how teachers in rural districts in Indonesia perceive and are more motivated to use ICT for learning activities. It also proposes the use of virtual reality (VR)-based approach to improve teacher education and life-long professional development, as well as examining the instructional effectiveness of courses in MOOC format for teacher training on using ICT safely and responsibly. Additionally, it investigates technological competences and tools usage by primary school teachers, enabling students to gain wider range of knowledge through access to the internet, bibliometric analysis of leading journals related to technology integration in education, one-to-one mentor matching between language and mathematics teachers with mentors based on their preferences over two semesters. Finally, it discusses elements that contributes towards information literacy competence among Malaysian teachers.

(Sithole et. al., 2019) study expectations, challenges and suggestions for faculty teaching online courses in higher education. Research on online education has predominantly focused on issues related to student attraction, attrition, retention, and motivation, among others. (SİRİPONGDEE et. al., 2020) study a blended learning model with iot-based technology. This qualitative research has the purpose to analyze and synthesize a model of Blended Learning (BL) with IoT-based technology. (Phillips et. al., 2020) was conducted in 40 algebra I classes in an urban school district.

(Goh et. al., 2020) aim to review factors preventing university academics from embracing new Information and Communication Technologies (ICT) into their instructional methods and to discuss ways on how to overcome these issues. (Almusharraf et. al., 2021) serve to examine the relationship, if any, between student characteristics (introversion and extraversion) and contribution in the online writing environment (social presence) and their sense of class community in online writing courses. The research was undertaken in a public university in the Kingdom of Saudi Arabia (KSA), examining a sample (N= 171, 36 males and 135 females) of EFL male and female students. (Snell-Rood et. al., 2021) use a seminar course on the COVID-19 crisis to illustrate bioinspiration as an approach to teaching biology content. (Joshi et. al., 2022) attempt to summarize research outcomes of interventions described thus far in the literature concerning the improvement of course design, delivery, and assessment strategies. Other influential work includes (Yue, 2019).

The reviewed literature attempts to summarize the research outcomes of various studies related to facilitation of instruction. It looks at topics such as faculty teaching online courses, blended learning model with IoT-based technology, factors preventing university academics from embracing new ICTs and student characteristics. The synthesis aims to provide an overview of these different areas and how they relate to each other in order to gain a better understanding of the topic.

The education system of a country should prepare students to function in today's multicultural society. In this regards (Bhattarai, 2019) focus on the issues of the management of multicultural classes, and the role of ICT-integrated pedagogy to manage such a classroom context. (Baş, 2019) investigate the relationship between classroom management skills, and self-confidence of social studies teachers. (O'Haver, 2020) use a quasi-experimental approach to test the impact of textbook-related chapter videos and companion quizzes as the pre-lecture resources in an entry-level accounting course.

Features of integrated systems in distance education will be investigated with related literature, and the popular integrated systems will be introduced and compared (Durak et. al., 2022). (Zhang et. al., 2022) present an integrated approach to explore the effects of Industry 4.0 and related ICT on smart supply chains, by combining introduction of the current national strategies in North America, the research status analysis on ICT assisted supply chains from the major North American national research councils, and a systematic literature review of the subject. In this context, research highlights the fact that the perceptions that instructors manifest about different aspects of Information and Communication Technologies (ICTs) condition these professionals' behavior towards these learning resources. In the same line (Latorre-Cosculluela et. al., 2023) aim to analyze the effects that exist between a series of dimensions related to the perception of university teaching staff on the capacity of ICTs to respond to different needs of students, on perceived efficacy and attitudes towards these tools and, lastly, on active behavior towards their use. Other influential work includes (Liu et. al., 2020).

The reviewed literature examines topics such as classroom management and integrated systems in distance education. This research also explores how instructors' perceptions about ICTs can influence their behavior towards these tools and student outcomes.

Integration of technologies in the classroom can also be seen from class engagement which includes interaction, students' motivation, task/work completion and students' satisfaction which are some of the variables relevant to the study.

(Gillow-Wiles et. al., 2019) suggest a model for designing online courses that supports TPACK development through communities of inquiry. (Alexander et. al., 2019) describe an advanced, inquiry driven undergraduate course in

Cancer Biology that combines faculty lectures typical of undergraduate courses with literature-driven discussions typical of graduate courses. Using a national sample of first-year biology doctoral students (Jeong et. al., 2019) reveal distinct categories that classify patterns of faculty and peer interaction. In class, students work together in assigned groups to create a diagram of their collective perceptions and identify processes for which there was the largest misalignment with those presented (Forde et. al., 2020). The interest in playfulness in the classroom and non-formal educational spaces seems to be growing in Science Education. In line with this trend, the main goal of this paper is to investigate how students recall knowledge of Physics while a previously created game, called PerFisica is being played (Afonso et. al., 2020).

(Gupta et. al., 2021) propose an extended Technology Acceptance Model (TAM) with ICT-based teaching and learning platform. (Leslie et. al., 2021) present theoretical discussions about advancing the demarginalization of African American students at Historically Black Colleges and Universities (HBCUs) by bringing in insights from Afrocentric and symbolic-interaction perspectives. (Almusharraf et. al., 2021) serve to examine the relationship, if any, between student characteristics (introversion and extraversion) and contribution in the online writing environment (social presence) and their sense of class community in online writing courses The research was undertaken in a public university in the Kingdom of Saudi Arabia (KSA), examining a sample (N= 171, 36 males and 135 females) of EFL male and female students.

The reviewed literature investigates how students recall knowledge while playing a game called PerFisica, propose an extended Technology Acceptance Model (TAM) with ICT-based teaching and learning platform, explore theoretical discussions about advancing the demarginalization of African American students at Historically Black Colleges and Universities (HBCUs), examine the relationship between student characteristics and contribution in online writing environments.

To examine learning style and teaching style (Toyama et. al., 2019) apply the Kolb Learning Style Inventory and the Kolb Educator Role Profile, respectively. Past literature demonstrates a demand for educational podcasts from both educators and students. (Rockhill et. al., 2019) determine the effectiveness of these podcasts on enhancing student learning in a Sport Management Event and Facilities Management class. The subject of (Romlah et. al., 2019) was to describe the learning motivation of Albarokah 448 Elementary School students using ICT based media for excel VBA on the number line material. This is valuable in the context of modern practice-oriented understanding of learning. These technologies include the ICT and case study method which help to change the students' meaning of how the foreign language important from the point of view of their proficiency that was confirmed by statistical data (Ramankulov et. al., 2019). (Magfirah, 2020) aim to determine the extent of the effectiveness of Blended Learning in increasing the learning motivation on the first semester students of the English Literature Study Program at Khairun University.

(Susilawati et. al., 2020) aim to determine how the inquiry learning model affects the learning outcomes of social studies content in grade IV elementary school students. The aim of (Veras et. al., 2020) is to systematically examine the literature on the use of the flipped classroom method in SE teaching. (Viju, 2021) study online and distance learning in Sudanese Universities: a necessity in the light of the covid-19 pandemic. A meta-analysis method is adopted and the related literature. (Hori et. al., 2021) quantified the impact of ICT utilization on the two components of self-efficacy and persistence. The creation of areas combining usability and sustainability is commonly lacking a multidisciplinary approach combining all these different perspectives.

The reviewed literature examines the roles of learning style, educational podcasts, and ICT utilization on learning motivation and outcomes in various educational settings. It also seeks to address how ICT utilization can be made more usable and sustainable by combining different perspectives.

(Komatsu et. al., 2019) address both these issues by theoretically developing, and empirically testing, task design principles for supporting students' heuristic refutation (revising conjectures and proofs through addressing counterexamples) in DGEs. These communication methods serve a dual-purpose of capturing the student-athletes' attention while perplexing the opposition.

(Monyela, 2020) study challenges of resource description and access (rda) implementation in sub-Saharan Africa: a review of literature. Qualitative research approach based on document content analysis was used. (Gubbels et. al., 2020) examine how availability of ICT resources, students' use of those resources (at school, outside school for schoolwork, outside school for leisure), and students' attitudes toward ICT (interest in ICT, perceived ICT competence, perceived ICT autonomy) relate to individual differences in performance on a digital assessment of reading in one comprehensive model using the Dutch PISA 2015 sample of 5183 15-year-olds (49.2% male). (Dlab et. al., 2020) present the results of a study of synchronous mobile computer-supported collaborative learning (mCSCL) that emphasized levels of pre-structuring in the context of primary school participants who need more guidance to benefit from the collaborative work. (Saleh et. al., 2021) discuss the most relevant work in this area to date.

The reviewed literature explores the impact of ICT on developing task design principles for supporting students'

heuristic refutation.

(Ryan et. al., 2018) study intentional rounding - an integrative literature review. A sequential explanatory mixed studies approach was used to combine qualitative and quantitative evidence in a single review. Using content analysis on assessment of a student's learning, the purpose of this paper is to investigate the effect of teaching on students through self-disclosure in E-portfolios (Shea et. al., 2019). (Gubbels et. al., 2020) examine how availability of ICT resources, students' use of those resources (at school, outside school for schoolwork, outside school for leisure), and students' attitudes toward ICT (interest in ICT, perceived ICT competence, perceived ICT autonomy) relate to individual differences in performance on a digital assessment of reading in one comprehensive model using the Dutch PISA 2015 sample of 5183 15-year-olds (49.2% male). The research team screened 955 articles, reviewed 24 full-text articles, and came to a consensus on six articles to include.

Insufficient attention has been paid by literature to evaluate whether student performance and engagement in the prior assessments could affect student achievement in the next assessments In this paper, two predictive models have been designed namely students' assessments grades and final students' performance (Al-Shabandar et. al., 2020). Among the general professional competencies there is ICT-competence, which consists in the competent use of modern information technologies. The object of the research is interactive technologies used in the conditions of distance education. The subject of the research is the degree of student satisfaction with the methods of interactive learning in the context of distance education, organized in connection with the prevention of the spread of the new coronavirus infection (COVID-19) (Ponachugin, 2020). Other influential work includes (Djoa et. al., 2021).

The reviewed literature suggests that integrating ICT into classrooms can be beneficial in terms of class management, as it allows teachers to better track student performance and engagement with their classes. Additionally, when technology was integrated into instruction, students felt more engaged with their classes which could lead to improved classroom management overall. Furthermore, Gubbels et al., 2020 found that availability of ICT resources and attitudes towards ICT had an effect on individual differences in performance on a digital assessment of reading which suggests increased engagement due to the integration of technology into instruction.

Technology leadership is an important variable relevant to this study.

In order to bridge this research gap (Birasnav et. al., 2019) examine the interlinkages between strategic leadership theory and supply chain integration theory. (Hilman et. al., 2019) examine the effects of organizational strategy, organizational structure, transformational leadership, talent management, and technology integration on university performance and the mediating effect of quality culture.

The e-leadership have been studied, during the late 1990s, with the rapid rise in advanced information technology (AIT) tools as the Internet, e-mail, video conferencing, what sap, virtual teams, virtual learning platforms. (Alam et. al., 2020) use qualitative methods to identify changes in the role of IT, management of pressures resulting from changes in the role of IT, and IT leadership in LAPAN. Other influential work includes (Tricco et. al., 2023).

The reviewed literature examines the interlinkages between strategic leadership theory and supply chain integration theory, as well as the effects of various aspects of organizational structure, leadership, and technology integration on university performance. It also reviews scientific literature on pervasive wearable health monitoring and e-leadership from 1990 - 2019.

Related Studies

The following studies were reviewed and integrated into this chapter to shed light on the issues which this present study is undertaking.

Teachers' technological adoption is determined by technological acceptance and technology readiness which are some of the variables found relevant in this study.

The contribution of (AKAR, 2019) is to test the structural relationship between web pedagogic content knowledge and technology acceptance of preservice teachers. The contribution of (Leem et. al., 2019) is to investigate the factors of teachers' beliefs concerning SMDs, and to examine teachers' technology acceptance of SMDs in their lessons. The subject of (Stephan et. al., 2019) is to analyze students' technology acceptance and achievement emotions after participating in an online course (in comparison to an on-campus course) in teacher education. (Buabeng-Andoh et. al., 2020) aim to develop and test a research model to explore the factors that influence pre-service teachers' intention to use learning management system (LMS). (Zarafshani et. al., 2020) use the Technology Acceptance Model (TAM) to predicts the level of technology acceptance by vocational agriculture teachers at the secondary levels in Iran. While a growing number of teachers use information and communication technology (ICT) for work tasks outside the formal working hours and premises, research is inconclusive how the relates to their work-life balance.

Following calls to examine the antecedents and moderating mechanisms of such behavior (Bauwens et. al., 2020) aim to examine how technology acceptance relates to work-related ICT use after hours (WIA) and work-life balance, as well as how employees' integration preference affects these relationships. (Asghar, 2021) study mobile learning technology readiness and acceptance among pre-service teachers in Pakistan during the covid-19 pandemic. The survey was conducted with 429 pre-service teachers from public and private universities in Pakistan. (Pan et. al., 2021) investigate whether technology acceptance and technological self-efficacy could be the mediators between teacher supports and students' self-directed language learning in a sample of Chinese undergraduate students. (Kolil et. al., 2022) find HM influencing teacher's BI and UB before COVID-19. Other influential work includes (Scherer et. al., 2019).

The reviewed studies examine various factors influencing teachers' technology acceptance in different contexts, such as web pedagogy, SMDs, online courses, LMSs and vocational education. It also looks at how these factors relate to work-life balance and self-directed language learning.

(Kristy et. al., 2020) study analysis of the readiness level of children encyclopedia using technology readiness index (tri). TRI is an index used to measure the readiness of users to accept and use new technology to achieve goals in their daily lives and work. (Marthasari et. al., 2020) study measuring user readiness of web-based encyclopedia for kids based on technology readiness index. Data collection was carried out using a questionnaire research instrument that distributed to students and teachers in an elementary school. (Callo et. al., 2020) investigate the factors influencing the readiness in online teaching and learning as an alternative delivery mode to continue the teaching-learning process, even the absence of face-to-face interactions between teachers and students. (Savio et. al., 2020) aim to know the teachers' readiness in implementing the Timor-Leste curriculum 2011. (Ahmad et. al., 2021) study application of the technology readiness index method to measure the level of readiness of elementary school children to carry out online-based learning at Muhammadiyah elementary schools. This method uses an index to measure the level of readiness of users in using new technology to achieve goals in everyday life.

(Kaushik et. al., 2021) identify the factors among students that can enable or inhibit students from using online learning platforms. Today's economic leaders must be in line with the global mindset in supporting a culture of innovation. The subject of (Cahyadi et. al., 2021) is to investigate the digital leadership capabilities of the G20 countries in terms of digital readiness, innovation, and competitiveness 4.0 and to determine the relationship between these variables. (Asghar, 2021) study mobile learning technology readiness and acceptance among pre-service teachers in Pakistan during the covid-19 pandemic. The survey was conducted with 429 pre-service teachers from public and private universities in Pakistan. (Rao et. al., 2021) study a survey on acceptance and readiness to use robot teaching technology among primary school science teachers. A descriptive research design was employed which utilized a survey method. Other influential work includes (MacKay et. al., 2020).

Based on the reviewed studies, technology readiness index (TRI) can be used to measure the readiness of users to accept and use new technology in different contexts. Different research instruments such as questionnaire and survey methods are used to collect data from students, teachers, and pre-service teachers. Additionally, the importance of global mindset and digital leadership capabilities in supporting a culture of innovation is discussed.

Integration of technologies in the classroom can be seen from learning organization which includes lesson structure, teachers' knowledge, facilitation of instruction, classroom management as important variables related to this study.

(Shopia et. al., 2019) was conducted to design the ICT competences- integrated syllabuses of Practical Key Teaching Competences for English Language Education Study Program. In the digital era, teachers are demanded to have the capability to cope with digital native students. (Karimah et. al., 2019) study redefining efl (english as a foreign language) teachers' roles in technology-integrated instruction. One way to approach them is by incorporating technology into instructional process. (Sumathi et. al., 2020) describe the advantages of Flipped Classroom and List of ICT Tools used for Teaching-Learning. (Cha et. al., 2020) aim to identify factors to be considered when developing Information and Communication Technology (ICT)-integrated classroom models and to suggest a conceptual framework for considering more appropriate classroom models, tailored to the environments and needs of each developing country. (Waluyo, 2020) attempt to initiate discussions on integrating the concepts of smart classroom and active learning into general English course design.

(Kundu et. al., 2020) study ingestion and integration of ICTs for pedagogy in Indian private high schools. A survey of forty teachers from twenty purposively selected private high schools was conducted using a set interview protocol. (Mlambo et. al., 2020) employ a cross-sectional survey, adapting a structured questionnaire to investigate the relationship between purposively selected 163 Gauteng educators' ICT self-efficacy beliefs and their pedagogical use of ICT. The contribution of (Buskivadze, 2021) is to investigate the sociolinguistic functions and frequency of Teacher's Code Switching (CS) in the content and language integrated (CLIL) Lesson. (Chatmaneerungcharoen et. al., 2021) aim to

identify how teachers develop their understanding of Raiwa-STEM activity, which is shown in their lesson plans. (Conway IV et. al., 2021) describe the creation and implementation of a "Content Underpinnings" course for graduate students in middle grades statistics that required students to complete a teaching for social justice lesson in a K-12 classroom.

Based on the reviewed studies, technology can be effectively integrated into language education to improve teaching and learning. It discusses different studies related to integrating technology in language education, such as identifying factors for developing ICT-integrated classroom models, investigating the relationship between teachers' ICT self-efficacy beliefs and their pedagogical use of ICT, exploring sociolinguistic functions of teachers' code switching in CLIL lessons, incorporating technology into instructional processes, advantages of flipped classrooms and lists of ICT tools used for teaching-learning.

The subject of (Şimşek et. al., 2019) was to determine the teachers' views on technological pedagogical content knowledge (TPACK)self-efficacy and the frequency of using ICT in education and to examine whether there is a differentiation in these views according to certain variables. Despite the increase in ICT tools in Ghanaian Senior High schools, most of the schools seem to be teaching ICT literacy instead of complete integration of the ICT tools in the curriculum to enhance the teaching and learning process. (Prince et. al., 2019) assess whether ICT policy has accomplished its aim, thus enhanced the teaching and learning process in all the five schools in the New Juaben District of the Eastern Region. (T.Balasubramanian, 2020) observe the attitude, competency, job satisfaction of secondary school teachers toward using ICT tools in education. The objective of (Guillén-Gámez et. al., 2020) is to analyze the use that teachers make of different ICT resources for research in terms of gender, comparing within each gender the different areas of knowledge to which the teachers belong (Science and Engineering-Architecture, Health Sciences, Art-Humanities and Social-Legal Sciences).

In that contribution of (García-Valcárcel et. al., 2021) at describing teachers' use of ICT towards collaboration from a triple perspective: what they believe (teachers' opinion), what they know (teachers' knowledge), and what they do (teachers' use). (Cuevas et. al., 2021) focus on the study of the training processes of rural education teachers who work in the Tequendama region, department of Cundinamarca (Colombia), specifically in three institutions located in the municipality of San Antonio del Tequendama. It is believed that (Khattri, 2021) provide proper recommendation and suggestions for use of ICT in education and can increase access to learning opportunities. (Medina-García et. al., 2021) present the validation and evaluation of a measurement scale on ICT literacy for inclusive education.

The reviewed studies examine various aspects of integrating ICT tools in teaching and learning processes in schools. It looks at teachers' views, self-efficacy, and frequency of using ICT; barriers and support systems for using ICT in teaching Chemistry; training processes for rural education teachers; recommendations for proper use of ICT in education; a measurement scale on ICT literacy for inclusive education; and teachers' use of ICT towards collaboration from three perspectives: opinion, knowledge, and use.

The purpose of (Arrosagaray et. al., 2019) is to analyze and compare adult students' attitudes towards ICT in three different formal learning settings: classroom face-to-face (N = 184), blended (N = 243) and distance (N = 200) language learning modes. (Sithole et. al., 2019) study expectations, challenges and suggestions for faculty teaching online courses in higher education. Research on online education has predominantly focused on issues related to student attraction, attrition, retention, and motivation, among others. To provide a diverse comprehension of teachers' TPACK (Technological, Pedagogical, and Content Knowledge) and how TPACK is reflected in practice (Ifinedo et. al., 2020) examine teacher educators' (TEs') conceptions of technology integration. (Phillips et. al., 2020) was conducted in 40 algebra I classes in an urban school district. (Villanueva et. al., 2020) describe the logistical and pedagogical efforts made in an integrated, upper-level, laboratory-based chemistry course at Georgia Gwinnett College to engage students and to develop a relevant and meaningful assignment during the COVID-19 suspension of face-to-face classes. In Ghana, schools have been encouraged to reach out to students using virtual platforms but not without challenges. This research was therefore conducted in the Northern Region of Ghana to assess senior high schools teachers' preparedness for the integration of online learning in Social Studies teaching and learning (Bariham et. al., 2020).

(Goh et. al., 2020) aim to review factors preventing university academics from embracing new Information and Communication Technologies (ICT) into their instructional methods and to discuss ways on how to overcome these issues. (SİRİPONGDEE et. al., 2020) study a blended learning model with iot-based technology. This qualitative research has the purpose to analyze and synthesize a model of Blended Learning (BL) with IoT-based technology. (Almusharraf et. al., 2021) serve to examine the relationship, if any, between student characteristics (introversion and extraversion) and contribution in the online writing environment (social presence) and their sense of class community in online writing courses. The research was undertaken in a public university in the Kingdom of Saudi Arabia (KSA), examining a sample (= 171, 36 males and 135 females) of EFL male and female students. Other influential work includes (Zhang et. al., 2018).

Based on the reviewed studies, technology can be used to enhance learning experiences in various settings, but there are challenges and considerations for both students and teachers when integrating technology into education.

The education system of a country should prepare students to function in today's multicultural society. In this regards (Bhattarai, 2019) focus on the issues of the management of multicultural classes, and the role of ICT-integrated pedagogy to manage such a classroom context. (Shopia et. al., 2019) was conducted to design the ICT competences-integrated syllabuses of Practical Key Teaching Competences for English Language Education Study Program. As a facilitator the only objective while entering a large classroom is enabling learning environment at the highest level and imparting knowledge to each and every individual by having an extensive two way communicating classroom with more discussions and interactive sessions (H et. al., 2020). (Rohyami et. al., 2020) aim to explore the effect of the application of flipped classroom cooperative learning to the learning outcomes course in volumetric testing. (Sulisworo et. al., 2020) study the analysis of the critical thinking skills between blended learning implementation: google classroom and schoology.

The sample consisted of two classes. (Konoplianyk et. al., 2021) describe the experience of flipped classroom application in teaching ESP. The aim of (Khapre et. al., 2021) was to assess the effectiveness of integrated flipped classroom and reciprocal peer teaching (RPT) using Google Classroom as a learning management system (LMS) for teaching and learning, a module of Research Methodology. In this context, research highlights the fact that the perceptions that instructors manifest about different aspects of Information and Communication Technologies (ICTs) condition these professionals' behavior towards these learning resources. In the same line (Latorre-Cosculluela et. al., 2023) aim to analyze the effects that exist between a series of dimensions related to the perception of university teaching staff on the capacity of ICTs to respond to different needs of students, on perceived efficacy and attitudes towards these tools and, lastly, on active behavior towards their use. Other influential work includes (Reisig et. al., 2019), (Liu et. al., 2020).

Based on the reviewed studies, ICT-integrated pedagogy plays an important role in a multicultural society. It reviews the current state of research related to the management of multicultural classrooms, ICT-integrated syllabuses, facilitating learning environment, the flipped classroom and its application on instructors' perceptions. This research then analyzes how these dimensions affect teaching and learning processes in such contexts.

Integration of technologies in the classroom can also be seen from class engagement which includes interaction, students' motivation, task/work completion and students' satisfaction which are some of the variables relevant to the study.

GEOC-SENSE was based on the use of active pedagogy techniques aided by information and communication technologies (ICT) to improve motivation and acquisition of transferable skills using active learning techniques and a flipped classroom structure (Huguet et. al., 2019). (Vranesic et. al., 2019) provide correlation analysis of gamification results with students' final grade and survey elements regarding student motivation perception and the importance of receiving a reward after the game. (Nezhyva et. al., 2020) analyze the introduction of interactive technology in literary education, which changes the vector of lectures to dialogic interaction with the student audience, provides a formal update of practical classes using quests and workshops. This paper, having looking through research on compliment responses from different perspectives, intends to conduct an empirical research to explore patterns and functions of teacher-student compliment response in ICT platforms of an English course in a Chinese Research University (Yang et. al., 2020). (Kharlamenko et. al., 2020) is devoted to control and feedback in foreign language teaching in a technogenic environment.

(Gupta et. al., 2021) propose an extended Technology Acceptance Model (TAM) with ICT-based teaching and learning platform. (Ling et. al., 2021) use the social network analysis method to carry out the tracking experimental research on students' daily social interaction. (Wu, 2021) find that office hour was an inferior way to communicate as in China students are allowed to have teachers' personal contact information. (Tamang et. al., 2021) explore the impact of educational technology tools on the learning achievement of B.Ed. (Almusharraf et. al., 2021) serve to examine the relationship, if any, between student characteristics (introversion and extraversion) and contribution in the online writing environment (social presence) and their sense of class community in online writing courses. The research was undertaken in a public university in the Kingdom of Saudi Arabia (KSA), examining a sample (= 171, 36 males and 135 females) of EFL male and female students.

Based on the reviewed studies, technology can be used to improve motivation, student perception, and academic achievement when integrated into educational settings. It also suggests that different techniques such as active learning, gamification, control and feedback in language teaching, social interaction tracking experiments may be beneficial for students.

The purpose of (Arthanat et. al., 2018) was to identify and conceptualize barriers and strategies for effective implementation of information communication technology (ICT) training for older adults. The purpose of (Hoerunnisa et. al., 2019) was to determine the effectiveness of the use of E-learning in multimedia classes to improve vocational students'

learning achievement and motivation. Different variables related to information and communication technologies (ICT), such as digital self-efficacy for teaching, perceived institutional support for innovation, ICT positive emotions, and satisfaction with institutional support, are key factors in the teaching-learning process. The main aim of (Moreira-Fontán et. al., 2019) is to analyze the structural relationships of these constructs with teachers' autonomous motivation and work engagement. (Basri et. al., 2019) attempt to discuss the potential benefits of using Google Apps as learning strategy to enhance ESL writing. The aim of (Shanmugam et. al., 2019) is to examine the impact of Information Communication Technology (ICT) utilization in learning science to improve students' motivation.

(Kozyr, 2020) analyze the latest research on the development of students' motivation to learn through ICT; defined the concept of "information and communication technologies" as the basis of quality educational process in the development of the information society; an attempt is made to characterize the pedagogical tasks of information and communication learning based on the study of the components of the motivational sphere of the modern generation and to describe the methodology and technology of the educational process using the latest electronic learning tools primarily computers. (Sinulingga et. al., 2020) aim to determine the effect of Learning Strategies and Achievement Motivation on students' ICT learning outcomes. The contribution of (Luthfiana et. al., 2020) is to determine ICT literacy through the assessment of school e-learning effectiveness. (Letchmanan et. al., 2021) aim to design and implement an online assessments (OA) workshop as well as evaluating the effectiveness of workshops in enhancing the ICT skills and motivation level of Tamil language teachers. Other influential work includes (Benhima et. al., 2020).

Based on the reviewed studies, ICT can be used to improve teaching and learning processes, as well as students' motivation. Different variables related to ICT are key factors in the teaching-learning process, and these need to be taken into account when designing educational strategies. Additionally, using electronic learning tools such as Google Apps can help enhance ESL writing skills. Finally, understanding how different components of a student's motivational sphere interact with each other is important for developing effective information communication technology (ICT) training programs for older adults.

The same experimental methodology was used with a different student sample population collected during the academic year to check for generalizability (Inventado et. al., 2018. (Ogunleye, 2019) examine the ICT competence level of staff members in colleges of education in Kano state of Nigeria. The contribution of (Brimo et. al., 2020) are to summarize current evidence about SLPs and other educators' explicit knowledge of language, to identify information that supports explicit knowledge of morphology, and to illustrate the use of explicit knowledge of morphology with a hypothetical case study.

The aim of (Tokareva et. al., 2021) is to determine the predictors of the readiness of higher educational institutions for the introduction of ICTs. (Horvat et. al., 2021) present the ICT use of five international student teams during three product design phases: identification of opportunities, conceptual design, embodiment design. (Murphy et. al., 2022) study time management and task prioritization curriculum for pediatric and internal medicine sub internship students. Using this technique as a model, the authors developed a workshop for medical students on an inpatient pediatric or internal medicine sub internship. The effectiveness of training faculty in laboratory teaching (the teaching of science in a laboratory setting using experiments and similar exercises) through the use of Information and Communications Technology (ICT)-virtual technologies for faculties in institutions of higher education in the Indian state of Kerala-was evaluated and measured (Bose et. al., 2022).

These reviewed studies explore the effectiveness of training faculty in laboratory teaching, including characterizing glyphosate exposures among amenity horticulturists, the ICT competence of staff members in colleges of education in Kano State, effects of induced conceptions of ability on motor learning, explicit knowledge of language, predictors for higher educational institutions' readiness to introduce ICTs into their curriculum and activities.

Today, developments in information and communication technology (ICT) have a significant influence on education sustainability. The factors influencing students' intentions towards using ICT in education sustainability, as well as their satisfaction from its use, were examined (Al-Rahmi et. al., 2020). The contribution of (Abbas et. al., 2020) was to understand the satisfaction levels of undergraduate students of Quaid-i-Azam University (QAU), Islamabad about the usage of Information and Communication Technologies (ICTs) for their academic purposes. The objective of (Jameel et. al., 2020) is to identify the factors impacting research productivity of academic staff at Cihan University Erbil, Iraq. (Kim, 2020) study to confirm the relationship between leadership trust and job satisfaction on the leadership style of managers recognized by ICT organization members. The objective of (TSEH, 2021) was to investigate students' satisfaction with service delivery in the University of Health and Allied Sciences (UHAS), Ho.

An attempt to implement blended learning as an innovative teaching and learning modality for communication theology was made at the Saint Peter's Pontifical Institute, Bangalore, India, using the lab-rotation model for one semester (Stanislaus, 2021). (Maruyama et. al., 2021) seek to clarify the emotions of elderly individuals who participated in an

online community activity with university students, and how they feel about these interactions. (Lembani et. al., 2022) investigate the preparedness and experience of students for the fast-paced convergence of ICT and higher education. Other influential work includes (Shehzadi et. al., 2020), (Sawangchai et. al., 2020).

The reviewed studies suggests that ICT has a significant influence on education sustainability and can have an impact on students' intentions towards using it, their satisfaction with its use, job satisfaction of academic staff members, service delivery in universities and elderly individuals' emotions towards online community interactions. Additionally, the studies suggest that innovative teaching and learning modalities can be implemented using ICT to improve student preparedness for the convergence of higher education with technology.

Technology leadership is an important variable relevant to this study.

(Yap, 2019) focus on school leadership and ICT integration, and on how professional development for school leaders supports principals' technology leadership practices in school. This chapter aimed to systematically evaluate theses and articles that were published between the years 2000-2019 in Turkey related to school technology leadership in terms of their topics, methods, results, and recommendations (Turan et. al., 2020). The objective of (Omar et. al., 2020) is to identify the level of technology leadership, mobile technology integration and the relationship between the two variables. The objective of (Nurjaningsih, 2020) is to explore motivations mediated by the integrated learning strategies of Communication Information Technology (ICT) for improving the technology leadership of school principals by moderating the gender variable in the virtual class seesaw during the training of strengthening the competency of the Principal of the Kendal Vocational School in 2019.

The purpose of (Totolo, 2021) are to examine the principals' transformational leadership qualities and to juxtapose this to Information Technology adoption in Botswana secondary schools. As a result, the subject of (Yusof et. al., 2021) was to identify the functions and behaviors of new leadership styles of school leaders. (Prasojo et. al., 2021) study dataset on factors affecting social media use among school principals for educational leaderships. A survey approach was the approach for the data collection (n. 257). Other influential work includes (Saraih et. al., 2021), (Trường, 2021).

The reviewed studies evaluates the impact of professional development on principals' technology leadership practices, identifies the level of technology leadership and its relationship with mobile technology integration, explores motivations for improving school principal's tech leadership, examines transformational leadership qualities in relation to information tech adoption in Botswana secondary schools, identifies new styles of school leaders and factors affecting social media use among school principals for educational purposes.

Hypotheses

The following hypothesis will be tested using 0.05 level of significance.

There is no significant relationship between the technology leadership standards of education leaders and teachers' technological adoption.

There is no significant relationship between the technology leadership standards of education leaders and the integration of technologies in the classroom.

Conceptual Framework

The technology leadership standards of education leaders will be measured by five (5) independent variables which are, equity and citizenship advocate, visionary planner, empowering leader, system designer and connected learner. While, teachers' technological adoption will be measured by two (2) independent variables, technological acceptance which includes perceived usefulness and perceived ease of use, and technological readiness.
which includes optimism, innovativeness, discomfort, and insecurity. Creswell

(2009) indicated that IVs cause, influence, or affect outcomes. The dependent variable in the study was the effective integration of new and emerging technologies in the classroom which is measured by two (2) variables, first is the learning organization which includes lesson structure, teachers' knowledge, facilitation of instruction and classroom management, second is the class engagement which includes interaction, students' motivation, task/work completion and student's satisfaction. Creswell suggested that the DV depends on the influence of the IV.

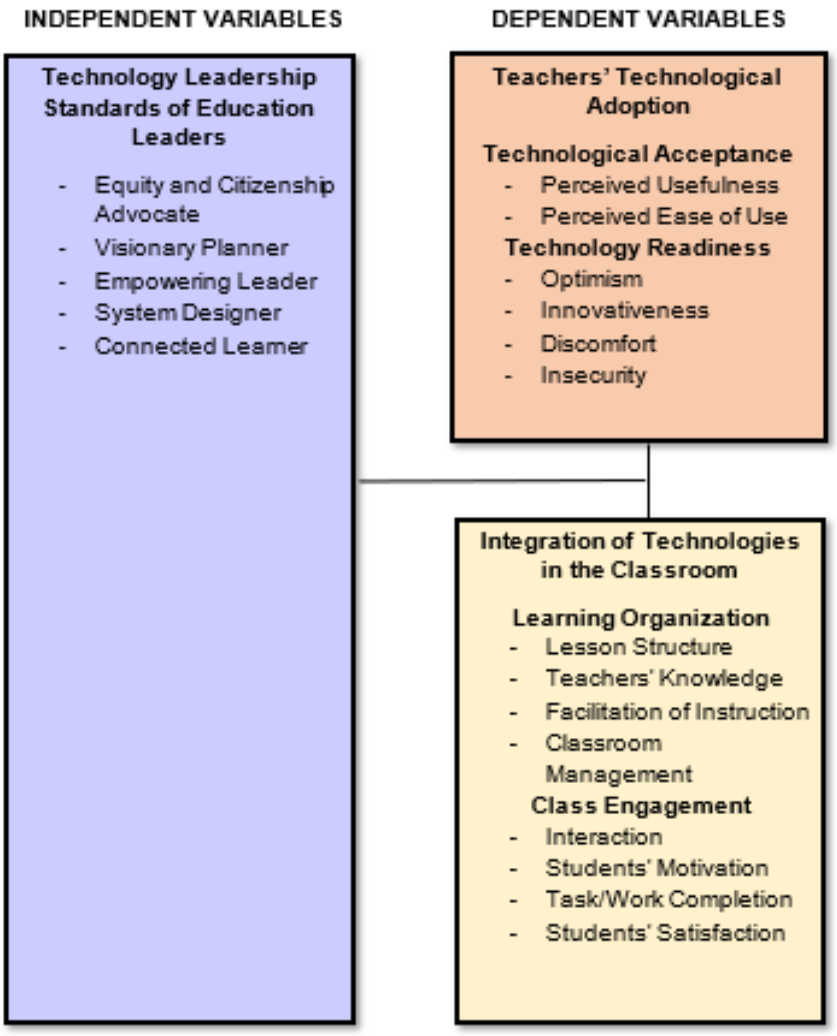

Figure 1. ***Research Paradigm of the Study.***

Research Design

This study used a descriptive-correlation design to gather the data in determining the relationship between Technology Leadership Standards of Education Leaders in the Division of Laguna, Teachers' Technological Adoption and the Integration of Technologies in the Classroom. Correlational research is a systematic investigation that aimed to determine the existence of a relationship between two or more variables and to determine the nature and degree of relationship (Prieto, et al., 2017). A correlational research design investigates relationship between variables without the researcher controlling or manipulating any of them. A correlation reflects the strength and/or direction of the relationship between two (or more) variables. The direction of a correlation can be either positive or negative.

Hence, this type of research design used to examine the relationship between the technology leadership standards of education leaders and its relationship with teacher's technological adoption and the integration technologies in the classroom.

Respondents of the Study

Using purposive sampling, the respondents of this study are public secondary school teachers and students from the districts of Kalayaan, Lumban, Pagsanjan, Majayjay, and Santa Cruz. Only schools catering junior high schools in the districts was included in the study.

Purposive sampling is 'used to select respondents that are most likely to yield appropriate and useful information' (Kelly, 2010: 317) and is a way of identifying and selecting cases that will use limited research resources effectively (Palinkas et al., 2015).

Purposive sampling strategies move away from any random form of sampling and are strategies to make sure that specific kinds of cases of those that could possibly be included are part of the final sample in the research study. The reasons for adopting a purposive strategy are based on the assumption that, given the aims and objectives of the study, specific kinds of people may hold different and important views about the ideas and issues at question and therefore need to be included in the sample (Mason, 2002; Robinson, 2014; Trost, 1986).

Research Procedure

The researcher prepared and collected all the data gathering processes based on the flow chart below.

In selecting the respondents, purposive sampling was implied. After the identification of the respondents, a hard copy of request letter was sent to them as an invitation to participate in the study. The researcher made used of paper-

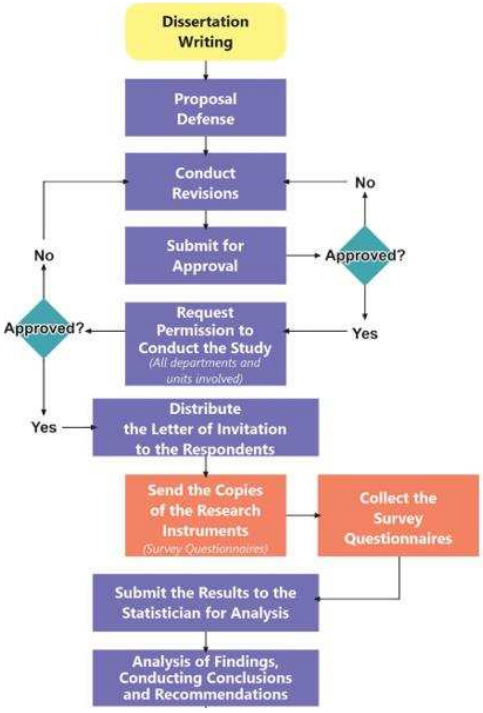

Figure 2. The Research Process Flowchart

survey as instructed by the college and attached an optical recognition mark (OMR) answer sheet to the questionnaires where the respondents shaded their responses and utilized an application called "EvalBee", an optical sheet scanner to ease and expedite the data gathering. The collection of data will be set for seven (7) weeks, and one (1) week for the analysis of findings, documentation, and interpretation. Summary, conclusions, and recommendations based on the results are discussed in Chapter 5 of this paper.

Research Instrument

This study utilized a standardized survey instruments for teacher-respondents and modified survey instruments for students-respondents from other related studies.

First, for Technology Leadership Standards of Education Leaders, a 22-item questionnaire that measures education leader's technology leadership was utilized. Items were rated using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The indicators were adapted from International Society for Technology in Education (ISTE) Standards for Education Leaders (2018) and was obtained through a written permission.

Second, for the Teachers' Technological Adoption survey scale was used as a data gathering tool. The scale is a 12-item questionnaire that measures teachers' technological acceptance. For technological readiness, a 16-item survey questionnaire will be adapted from Technology Readiness Index 2.0 (2014) to measure the technological readiness of teachers. Both were rated using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). In origin, the indicators of these questionnaires were adapted from Davies (1989) and A. Parasuraman and Rockbridge Associates, Inc., 1999 respectively and was obtained through a written permission.

Lastly, for the modified questionnaire on the Integration of Technologies in the Classroom which includes learning organization and class engagement was content validated by five (5) Subject area specialists or experts which is comprise of Master Teachers, School Heads and Supervisor from other districts excluding the places were the study was conducted. Items were rated using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability coefficient was computed by the researcher's external statistician. The grammar was checked by the English critic.

Statistical Treatment of Data

The statistical treatment of the data was used to compute, then analyze and interpret the data given by the respondents. After administering the survey questionnaire to the respondents, the data were gathered, analyzed, and interpreted.

Weighted Mean (WM) and standard deviation (SD) was utilized to determine the level of Technology Leadership of school principals in the Division of Laguna, Teachers' Technological Adoption and the Integration of Technologies in the classroom. To determine the significant relationship between Technology Leadership Standards of Education Leaders and Teachers' Technological Adoption, as well as the significant relationship Technology Leadership Standards of Education Leaders and the Integration of Technologies in the Classroom, Pearson-r Correlation and ANOVA was used.

The hypotheses of this paper will be tested using 0.05 level of significance. Statistical software and spreadsheet applications were used in tabulating and computing the statistics of the study. The data was presented to the statistician for checking, computation, and validation of the results.

Table 1 illustrates the level of Technology Leadership Standards of Education Leaders with regards to Equity and Citizenship Advocate.

From the statements above, Ensure all students have skilled teachers who actively use technology to meet student learning needs yielded the highest mean score (M=4.43, SD=0.62) and was remarked as Strongly Agree. This is followed by, Cultivate responsible online behavior, including the safe, ethical and legal use of technology with a mean score (M=4.41, SD=0.69) was also remarked as Strongly Agree. On the other hand, the statement Ensure all students have access to the technology and connectivity necessary to participate in authentic and engaging learning opportunities received the lowest mean score of responses with (M=4.14, SD=0.82) was remarked as Agree.

The level of Technology Leadership Standards of Education Leaders with regards to Equity and Citizenship

Advocate attained a weighted mean score of 4.29 and a standard deviation of 0.60 and was High among the respondents.

Table 1. Technology Leadership Standards of Education Leaders with regards to Equity and Citizenship Advocate

STATEMENTS	MEAN	S.D	REMARKS
Ensure all students have skilled teachers who actively use technology to meet student learning needs.	4.43	.62	Strongly Agree
Ensure all students have access to the technology and connectivity necessary to participate in authentic and engaging learning opportunities.	4.14	.82	Agree
Model digital citizenship by critically evaluating online resources, engaging in civil discourse online and using digital tools to contribute to positive social change.	4.20	.79	Agree
Cultivate responsible online behavior, including the safe, ethical and legal use of technology.	4.41	.69	Strongly Agree
Weighted Mean	4.29		
S.D	0.60		
Verbal Interpretation	Very High		

The survey results imply that Education Leaders have a high level of Technology Leadership Standards when it comes to Equity and Citizenship Advocate. This suggests that they are committed to ensuring students have access to skilled teachers who use technology, cultivating responsible online behavior, and providing access to technology for learning.

According to Yücesoy et al. (2019), a technology leader establishes the relationship between technology and leadership by trying to reconcile human and information technology components as the most important in this process by taking an active role in executing the technology. Ying et al 2021 said that a technology leader is also someone who can provide encouragement and motivation to his employees through the current technology infrastructure (Akcil et al., 2017).

Table 2. Technology Leadership Standards of Education Leaders with regards to Visionary Planner

STATEMENTS	MEAN	S.D	REMARKS
Engage education stakeholders in developing and adopting a shared vision for using technology to improve student success, informed by the learning sciences.	4.35	.70	Strongly Agree
Build on the shared vision by collaboratively creating a strategic plan that articulates how technology will be used to enhance learning.	4.36	.73	Strongly Agree
Evaluate progress on the strategic plan, make course corrections, measure impact and scale effective approaches for using technology to transform learning.	4.36	.70	Strongly Agree
Communicate effectively with stakeholders to gather input on the plan, celebrate successes and engage in a continuous improvement cycle.	4.41	.69	Strongly Agree
Share lessons learned, best practices, challenges and the impact of learning with technology with other education leaders who want to learn from this work.	4.51	.67	Strongly Agree
Weighted Mean	4.40		
S.D	0.58		
Verbal Interpretation	Very High		

Table 2 illustrates the level of Technology Leadership Standards of Education Leaders with regards to Visionary Planner.

From the statements above, Share lessons learned, best practices, challenges and the impact of learning with technology with other education leaders who want to learn from this work yielded the highest mean score (M=4.40, SD=0.59) and was remarked as Strongly Agree. This is followed by Communicate effectively with stakeholders to gather input on the plan, celebrate successes and engage in a continuous improvement cycle with a mean score (M=4.41, SD=0.69) was also remarked as Strongly Agree. On the other hand, the statement Engage education stakeholders in developing and adopting a shared vision for using technology to improve student success, informed by the learning sciences, received the lowest mean score of responses with (M=4.35, SD=0.70) yet was also remarked as Strongly Agree.

Leadership Standards of Education Leaders with regards to Visionary Planner attained a weighted mean score of 4.40 and a standard deviation of 0.59 and was Very High among the respondents.

The survey results imply that education leaders strongly agree with the importance of sharing lesson learned, communicating effectively with stakeholders, and engaging in developing a shared vision for using technology to improve student success.

Cho (2017) echoing the account provided by Hughes et al. (2016), vision might serve as a precursor to adoption, but not as a player in shaping how people conceptualize about devices and their uses. Thus, implementation work would pertain to technical or logistical issues facing any school regardless of its vision. Richardson et al. 2018 said that principals similarly can influence their respective school communities through shared leadership, culture building, instructional leadership, and myriad other ways that affect teaching and learning (Brown & Jacobsen, 2017; Richardson, Flora, & Bathon, 2013).

Table 3 illustrates the level of Technology Leadership Standards of Education Leaders with regards to Empowering Leader.

Table 3. Technology Leadership Standards of Education Leaders with regards to Empowering Leader

STATEMENTS	MEAN	S.D	REMARKS
Empower educators to exercise professional agency, build teacher leadership skills and pursue personalized professional learning.	4.45	.69	Strongly Agree
Build the confidence and competency of educators to put the ISTE Standards for Students and Educators into practice.	4.33	.78	Strongly Agree
Inspire a culture of innovation and collaboration that allows the time and space to explore and experiment with digital tools.	4.32	.72	Strongly Agree
Support educators in using technology to advance learning that meets the diverse learning, cultural, and social-emotional needs of individual students.	4.44	.73	Strongly Agree
Develop learning assessments that provide a personalized, actionable view of student progress in real time.	4.40	.69	Strongly Agree
Weighted Mean	4.44		
S.D	0.62		
Verbal Interpretation	Very High		

From the statements above, Empower educators to exercise professional agency, build teacher leadership skills and pursue personalized professional learning yielded the highest mean score (M=4.45, SD=0.69) and was remarked as Strongly Agree. This is followed by Support educators in using technology to advance learning that meets the diverse learning, cultural, and social-emotional needs of individual students, with a mean score (M=4.44, SD=0.73) was also remarked as Strongly Agree. On the other hand, the statement Inspire a culture of innovation and collaboration that allows the time and space to explore and experiment with digital tools received the lowest mean score of responses with (M=4.33, SD=0.72) yet was also remarked as Strongly Agree.

The level of Technology Leadership Standards of Education Leaders with regards to Empowering Leader attained a weighted mean score of 4.39 and a standard deviation of 0.62 and was Very High among the respondents.

The survey results imply that education leaders have a strong understanding of the importance of technology leadership standards for empowering leaders in education. They are supportive of educators using technology to advance learning and meeting students' diverse needs, but slightly less enthusiastic about inspiring an innovative and collaborative culture.

Leaders must train in technology use and build a portfolio of competencies that mark a rapidly emerging future (Bleich, M.R. 2021). Empowering leadership can drive success in business and, in the case of social entrepreneurship, have an immense social impact said Praszkier, R. (2017). According to Srivastava, M., & Vyas, R. (2015), empowered employees would contribute more and better to their organizational outcomes.

Table 4 illustrates the level of Technology Leadership Standards of Education Leaders with regards to System Designer.

From the statements above Protect privacy and security by ensuring that students and staff observe effective privacy and data management policies yielded the highest mean score (M=4.56, SD=0.65) and was remarked as Strongly Agree. This is followed by Ensure that resources for supporting the effective use of technology for learning are sufficient and scalable to meet future demand with a mean score (M=4.41, SD=0.70) was also remarked as Strongly Agree.

Table 4. Technology Leadership Standards of Education Leaders with regards to System Designer

STATEMENTS	MEAN	S.D	REMARKS
Lead teams to collaboratively establish robust infrastructure and systems needed to implement the strategic plan.	4.33	.72	Strongly Agree
Ensure that resources for supporting the effective use of technology for learning are sufficient and scalable to meet future demand.	4.41	.70	Strongly Agree
Protect privacy and security by ensuring that students and staff observe effective privacy and data management policies.	4.56	.65	Strongly Agree
Establish partnerships that support the strategic vision, achieve learning priorities and improve operations.	4.40	.72	Strongly Agree
Weighted Mean	4.43		
S.D	0.60		
Verbal Interpretation	Very High		

On the other hand, the statement Lead teams to collaboratively establish robust infrastructure and systems needed to implement the strategic plan received the lowest mean score of responses with (M=4.33, SD=0.72) yet was also remarked as Strongly Agree.

The level of Technology Leadership Standards of Education Leaders with regards to System Designer attained a weighted mean score of 4.43 and a standard deviation of 0.60 and was Very High among the respondents.

The survey results imply that educators prioritize protecting privacy and data management policies, ensuring there are sufficient resources to support the use of technology for learning, and establishing infrastructure and systems needed to implement a strategic plan. Participants showed a very high level of understanding of the Technology Leadership Standards in System Designer.

According to Dhamija (2021), transformational leadership style is connected to knowledge management, transactional leadership, empowering leadership, psychological capital, and e-leadership.

Table 5. Technology Leadership Standards of Education Leaders with regards to Connected Learner

STATEMENTS	MEAN	S.D	REMARKS
Set goals to remain current on emerging technologies for learning, innovations in pedagogy and advancements in the learning sciences.	4.33	.72	Strongly Agree
Participate regularly in online professional learning networks to collaboratively learn with and mentor other professionals.	4.37	.68	Strongly Agree
Use technology to regularly engage in reflective practices that support personal and professional growth.	4.34	.69	Strongly Agree
Develop the skills needed to lead and navigate change, advance systems and promote a mindset of continuous improvement for how technology can improve learning.	4.40	.70	Strongly Agree
Weighted Mean	4.36		
S.D	0.59		
Verbal Interpretation	Very High		

Table 5 illustrates the level of Technology Leadership Standards of Education Leaders with regards to Connected Learners.

From the statements above Develop the skills needed to lead and navigate change, advance systems and promote a mindset of continuous improvement for how technology can improve learning yielded the highest mean score (M=4.40, SD=0.70) and was remarked as Strongly Agree. This is followed by Participate regularly in online professional learning networks to collaboratively learn with and mentor other professionals with a mean score (M=4.37, SD=0.68) was also remarked as Strongly Agree. On the other hand, the statement Set goals to remain current on emerging technologies for learning, innovations in pedagogy and advancements in the learning sciences received the lowest mean score of responses with (M=4.33, SD=0.72) yet was also remarked as Strongly Agree.

The level of Technology Leadership Standards of Education Leaders with regards to Connected Learner attained a weighted mean score of 4.36 and a standard deviation of 0.59 and was Very High among the respondents.

The survey results imply that Education Leaders have a very high level of Technology Leadership Standards when it comes to Connected Learners. They are strongly committed to developing the skills needed for leading and navigating change, participating in online professional learning networks, and staying up-to-date with emerging technologies.

Technology leadership professionals should do more than just run distribution units or provide essential services (Kadir 2022).

Table 6 illustrates the level of Teachers' Technological Adoption Relative to Technological Acceptance as to Perceived Usefulness.

From the statements above, Using technology enables me to accomplish tasks more quickly yielded the highest mean score (M=4.68, SD=0.59) and was remarked as Strongly Agree. This is followed by Using technology makes it easier to do my work with a mean score (M=4.64, SD=0.59) was also remarked as Strongly Agree. On the other hand, the statement Using technology increases my productivity received the lowest mean score of responses with (M=4.58, SD=0.63) yet was also remarked as Strongly Agree.

Table 6. Teachers' Technological Adoption Relative to Technological Acceptance as to Perceived Usefulness

STATEMENTS	MEAN	S.D	REMARKS
Using technology enables me to accomplish tasks more quickly.	4.68	.59	Strongly Agree
Using technology improves my work performance.	4.60	.61	Strongly Agree
Using technology increases my productivity.	4.58	.63	Strongly Agree
Using technology enhances my effectiveness at work.	4.62	.61	Strongly Agree
Using technology makes it easier to do my work.	4.64	.59	Strongly Agree
I find technology useful in my work.	4.58	.63	Strongly Agree
Weighted Mean	4.61		
S.D	0.53		
Verbal Interpretation	Very High		

The level of Teachers' Technological Adoption Relative to Technological Acceptance as to Perceived Usefulness attained a weighted mean score of 4.61 and a standard deviation of 0.53 and was Very High among the respondents.

The survey results imply that respondents had a very positive attitude towards using technology, even for tasks that may not necessarily increase their productivity. This suggests that they believe technology can be beneficial in other ways, such as making work easier or helping them accomplish tasks more quickly.

Matarirano et al. (2021) said that research has shown PU influences perceptions on technology and individual interests in willingness to use technology (Yeh and Teng 2012). While, Acheampong et al. (2017) said that Perceived usefulness has been proved to be the most important factor for technology adoption (Yeh et al. 2012).

Table 7. Teachers' Technological Adoption Relative to Technological Acceptance as to Perceived Ease of Use

STATEMENTS	MEAN	S.D	REMARKS
Learning to operate technology has been easy for me.	4.29	.65	Strongly Agree
I find it easy to access technology and do what I want to do.	4.30	.72	Strongly Agree
My interaction with technology is clear and understandable.	4.32	.72	Strongly Agree
I find technology to be flexible to interact with.	4.38	.73	Strongly Agree
It is easy for me to become skillful at using technology.	4.29	.70	Strongly Agree
I find the technology easy to use.	4.27	.73	Strongly Agree
Weighted Mean	4.31		
S.D	0.61		
Verbal Interpretation	Very High		

Table 7 illustrates the level of Teachers' Technological Adoption Relative to Technological Acceptance as to Perceived Ease of Use.

From the statements above, I find technology to be flexible to interact with yielded the highest mean score (M=4.38, SD=0.73) and was remarked as Strongly Agree. This is followed by, My interaction with technology is clear and understandable with a mean score (M=4.32, SD=0.72) was also remarked as Strongly Agree. On the other hand, the

statement I find the technology easy to use received the lowest mean score of responses with (M=4.27, SD=0.73) yet was also remarked as Strongly Agree.

The level of Teachers' Technological Adoption Relative to Technological Acceptance as to Perceived Ease of Use attained a weighted mean score of 4.31 and a standard deviation of 0.61 and was Very High among the respondents.

The results of the survey imply that people generally have a positive attitude towards interacting with technology and find it to be flexible and clear. They also find it easy to use, although not as much as the other statements.

According to Komalasari et al. (2019), Perceived ease of use has a significant effect on perceived usefulness. The perception of ease of use has significant positive effect on attitude (Shen et al. 2010).

Table 8. Teachers' Technological Adoption Relative to Technology Readiness Index as to Optimism

STATEMENTS	MEAN	S.D	REMARKS
New technologies contribute to a better quality of life.	4.47	.62	Strongly Agree
Technology gives me more freedom of mobility.	4.41	.63	Strongly Agree
Technology gives people more control over their daily lives.	4.22	.74	Strongly Agree
Technology makes me more productive in my personal life.	4.31	.71	Strongly Agree
Weighted Mean	4.35		
S.D	0.56		
Verbal Interpretation	Very High		

Table 8 illustrates the level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Optimism.

From the statements above, New technologies contribute to a better quality of life yielded the highest mean score (M=4.47, SD=0.62) and was remarked as Strongly Agree. This is followed by Technology gives me more freedom of mobility with a mean score (M=4.41, SD=0.63) was also remarked as Strongly Agree. On the other hand, the statement Technology gives people more control over their daily lives received the lowest mean score of responses with (M=4.22, SD=0.74) yet was also remarked as Strongly Agree.

The level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Optimism attained a weighted mean score of 4.35 and a standard deviation of 0.56 and was Very High among the respondents.

The results of this survey imply that people generally have a positive attitude towards technology and its potential to improve their quality of life. They also suggest that teachers are highly optimistic about the use of technology in their classrooms.

Wiese et al. (2020) said that he relevance of the TRI has been demonstrated in various contexts, but it is important to note that the TRI is not a measure of competence or knowledge, but rather a mind-set that has proven to be a stable consumer characteristic (Badri et al. 2014). TR is a tendency for someone to use and accept technology to be able to complete their work, not to see whether the technology is controlled or not (2020).

Table 9 illustrates the level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Innovativeness.

From the statements above, Other people come to me for advice on new technologies yielded the highest mean score (M=4.07, SD=0.78) and was remarked as Agree. This is followed by I keep up with the latest technological developments in my areas of interest with a mean score (M=3.93, SD=0.77) was also remarked as Agree.

Table 9. Teachers' Technological Adoption Relative to Technology Readiness Index as to Innovativeness

STATEMENTS	MEAN	S.D	REMARKS
Other people come to me for advice on new technologies.	4.07	.78	Agree
In general, I am among the first in my circle of friends to acquire new technology when it appears.	3.81	.87	Agree
I can usually figure out new high-tech products and services without help from others.	3.87	.81	Agree
I keep up with the latest technological developments in my areas of interest.	3.93	.77	Agree
Weighted Mean	3.92		
S.D	0.56		
Verbal Interpretation	High		

On the other hand, the statement In general, I am among the first in my circle of friends to acquire new technology when it appears received the lowest mean score of responses with (M=3.81, SD=0.81) yet was also remarked as Agree.

The level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Innovativeness attained a weighted mean score of 3.92 and a standard deviation of 0.56 and was High among the respondents.

The survey results imply that teachers are generally knowledgeable about new technologies and willing to adopt them, but they may not be the first in their social circle to do so. This suggests that teachers have a high level of technological adoption relative to innovativeness.

According Sidek et al (2018), many studies have been conducted to examine TRI in influencing people's general beliefs about technology and its effect on behavioral intentions. The average score for the dimensions of optimism and innovativeness included in the category of very high scores (Jodi et al. 2019).

Table 10. Teachers' Technological Adoption Relative to Technology Readiness Index as to Discomfort

STATEMENTS	MEAN	S.D	REMARKS
When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do.	4.00	1.06	Agree
Technical support lines are not helpful because they don't explain things in terms I understand.	3.22	1.11	Neutral
Sometimes, I think that technology systems are not designed for use by ordinary people.	3.33	1.15	Neutral
There is no such thing as a manual for a high-tech product or *service that's written in plain language.*	3.35	1.17	Neutral
Weighted Mean	3.32		
S.D	0.88		
Verbal Interpretation	Moderately High		

Table 10 illustrates the level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Discomfort.

From the statements above, When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do yielded the highest mean score (M=4.00, SD=1.06) and was remarked as Agree. This is followed by There is no such thing as a manual for a high-tech *product or service that's written in plain language* with a mean score (M=3.35, SD=1.17) was remarked as Neutral. On the other hand, the statement *Technical support lines are not helpful because they don't explain things in terms I*

understand received the lowest mean score of responses with (M=3.22, SD=1.11) yet was also remarked as Neutral.

The level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Discomfort attained a weighted mean score of 3.32 and a standard deviation of 0.88 and was Moderately High among the respondents.

This implies that teachers are generally knowledgeable about new technologies and willing to share their knowledge with others. They may not be the first in their social circle to acquire new technology, but they still have a high level of technological adoption relative to innovativeness.

According to Devkota et al. (2021), Discomfort Index discusses about the inconvenience that the respondents face in order to adapt the technologies in the education system. Scott et al. (2021) said that the ever-changing technological landscape further entrenches teacher apprehension, as teachers feel they lack control over the technology (Badri et al., 2014).

Table 11. Teachers' Technological Adoption Relative to Technology Readiness Index as to Insecurity

STATEMENTS	MEAN	S.D	REMARKS
People are too dependent on technology to do things for them.	3.76	.97	Agree
Too much technology distracts people to a point that is harmful.	3.98	1.00	Agree
Technology lowers the quality of relationships by reducing personal interaction.	3.81	1.00	Agree
I do not feel confident doing business with a place that can only be reached online.	3.61	1.08	Agree
Weighted Mean	3.92		
S.D	0.68		
Verbal Interpretation	High		

Table 11 illustrates the level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Insecurity.

From the statements above, Too much technology distracts people to a point that is harmful yielded the highest mean score (M=3.98, SD=1.00) and was remarked as Agree. This is followed by Technology lowers the quality of relationships by reducing personal interaction with a mean score (M=3.81, SD=1.00) was also remarked as Agree. On the other hand, the statement I do not feel confident doing business with a place that can only be reached online, received the lowest mean score of responses with (M3=3.61, SD=1.08) yet was also remarked as Agree.

The level of Teachers' Technological Adoption Relative to Technology Readiness Index as to Insecurity attained a weighted mean score of 3.92 and a standard deviation of 0.677 and was High among the respondents.

The survey results imply that people are generally aware of the potential risks associated with technology, but they still trust online-only businesses for transactions. This suggests that while people may be concerned about the impact of technology on relationships and other aspects of life, they are willing to embrace it in certain contexts.

Hence, according to Badri et al. as cited by Belbase (2015), "insecurity and discomfort are inhibitors of technology readiness".

Table 12 illustrates the level of Integration of Technologies in the Classroom in terms of Learning Organization as to Lesson Structure. From the statements above Create realistic learning activities that are in line with the performance and content standards to maximize learning effectiveness yielded the highest mean score (M=4.42, SD=.66) and was remarked as Strongly Agree.

Table 12. Integration of Technologies in the Classroom in terms of Learning Organization as to Lesson Structure

STATEMENTS	MEAN	S.D	REMARKS
Use technology to create, modify, and customized learning experiences that encourage independent learning and accommodate learners' needs and variances.	4.41	.66	Strongly Agree
Create realistic learning activities that are in line with the performance and content standards to maximize learning effectiveness.	4.42	.66	Strongly Agree
Examine and apply instructional design principles to create innovation in learning environments that encourage and support learning.	4.25	.76	Strongly Agree
Conduct open and flexible learning environments where technology is used to support a variety of interactions among students, cooperative learning and peer instruction.	4.30	.74	Strongly Agree
Make learning opportunities that challenges students to use design process and computational thinking to help them become innovative and problem solver.	4.21	.90	Agree
Provide performance task that require students to locate and analyze information and to use a variety of media to clearly communicate results.	4.16	.76	Agree
Apply technology to develop student's higher order thinking skills and creativity.	4.26	.73	Strongly Agree
Weighted Mean	4.29		
S.D	0.45		
Verbal Interpretation	High		

This is followed by Use technology to create, modify, and customized learning experiences that encourage independent learning and accommodate learners' needs and variances with a mean score (M=4.41, SD=0.66) was also remarked as Strongly Agree. On the other hand, the statement Provide performance task that require students to locate and analyze information and to use a variety of media to clearly communicate results received the lowest mean score of responses with (M=4.16, SD=0.76) was remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Learning Organization as to Lesson Structure attained a weighted mean score of 4.29 and a standard deviation of 0.45 and was High among the respondents.

This implies that educators are in favor of integrating technology into classroom learning and believe it can be used to create realistic activities and customized experiences for students. It also suggests that performance tasks which require students to use a variety of media may not be as widely accepted.

Kaur (2021) said that globally, educational landscapes have undergone significant changes; schools are progressively adopting a wide variety of technological tools with which the enhancement of teaching and learning processes is believed to occur (Estes et al., 2016; Keengwe and Onchwari, 2011). Moreover, Morales et al. (2021) said that teachers using technology in their classes have transitioned from using technology as a teaching tool that serves as an extension of their conventional teaching strategies to technology as a learning tool embodying learner-centered principles (Nueva 2019), which vary substantially in their teaching practices (Liu 2016).

Table 13 illustrates the level of Integration of Technologies in the Classroom in terms of Learning Organization as to Teachers' Knowledge.

Table 13. Integration of Technologies in the Classroom in terms of Learning Organization as to Teachers' Knowledge

STATEMENTS	Mean	S.D	Remarks
Browse/search internet to collect information and resources to prepare and used during the lesson.	4.29	.87	Strongly Agree
Evaluate digital learning resources in the subject (s) taught.	4.07	.82	Agree
Use applications to prepare presentations for lessons.	4.29	.83	Strongly Agree
Create digital learning materials for students.	4.10	.83	Agree
Use electronic means of administering quizzes and examinations.	3.73	.95	Agree
Design rubrics for assessing student performance in the use of various technologies.	4.05	.76	Agree
Participate in on-line professional collaboration with peers and experts as part of personally designed plan, based on self-assessment, for professional growth in technology.	4.07	.95	Agree
Weighted Mean	4.09		
S.D	0.54		
Verbal Interpretation	High		

From the statements above, Browse/search internet to collect information and resources to prepare and used during the lesson yielded the highest mean score (M=4.29, SD=0.87) and was remarked as Strongly Agree. This is followed by Use applications to prepare presentations for lessons with a mean score (M=4.29, SD=0.83) was also remarked as Strongly Agree. On the other hand, the statement Design rubrics for assessing student performance in the use of various technologies received the lowest mean score of responses with (M=4.05, SD=0.76) was remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Learning Organization as to Teachers' Knowledge attained a weighted mean score of 4.09 and a standard deviation of 0.54 and was High among the respondents.

The study implies that teachers are integrating technology into their classrooms in order to better prepare students for the future. By using applications and searching the internet for resources, teachers can provide more engaging lessons and help students develop skills they will need in their future careers. Additionally, by designing rubrics to assess student performance with technology, teachers can ensure that students are learning effectively.

According to Susanti et al. (2019) as cited by Liu (2016), The impact of the use of learning media in the form of technology could ultimately improve the quality of the teaching process. Technology can be an amazing tool for teachers and teaching (Paciga et al. 2018). While, Murgia et al. (2021) said that beliefs and knowledge with the integration of technology to improve technology use in education.

Table 14 illustrates the level of Integration of Technologies in the Classroom in terms of Learning Organization as to Facilitation of Instruction.

From the statements above, Facilitates the use of assistive technology in learning experiences to accommodate students' unique needs yielded the highest mean score (M=4.19, SD=0.70) and was remarked as Agree. This is followed by Prepare tasks and exercises for the students with a mean score (M=4.15, SD=0.89) was also remarked as Agree. On the other hand, the statement Post homework for students in digital platform received the lowest mean score of responses with (M=3.83, SD=1.00) yet was also remarked as Agree.

Table 14. Integration of Technologies in the Classroom in terms of Learning Organization as to Facilitation of Instruction

STATEMENTS	MEAN	S.D	REMARKS
Encourage the use of technology to facilitates learning experiences that affirm diversity and provide equity	4.15	.74	Agree
Facilitates the use of assistive technology in learning experiences to accommodate students' unique needs.	4.19	.70	Agree
Effectively use synchronous and asynchronous web-based communication tools like instant messengers, voice, and teleconferencing.	4.05	.82	Agree
Post homework for students on digital platform.	3.83	1.00	Agree
Prepare tasks and exercises for the students.	4.15	.89	Agree
Distribute, share, publish and print information via print or web.	4.12	.85	Agree
Use ICT to provide feedback and/or assess student's learning.	4.11	.80	Agree
Weighted Mean	4.08		
S.D	0.50		
Verbal Interpretation	High		

The level of Integration of Technologies in the Classroom in terms of Learning Organization as to Facilitation of Instruction attained a weighted mean score of 4.08 and a standard deviation of 0.50 and was High among the respondents.

The results imply that integrating technology into the classroom can help improve teaching and learning experiences for students. It also suggests that this integration is seen as beneficial by those who responded to the survey, with a high weighted mean score of 4.08 indicating agreement among respondents.

Teachers' roles are facilitating students in technology-related knowledge, motivating them for using technology, and creating situations where students should integrate technology in learning (Najdabbasi et al. 2014).

Table 15. Integration of Technologies in the Classroom in terms of Learning Organization as to Classroom Management

STATEMENTS	Mean	S.D	Remarks
Cultivate a culture where learners take ownership of their learning goals and outcomes both independently and as part of a group.	4.26	.77	Strongly Agree
Regulate the use of technology and student learning strategies in digital platforms, virtual environments and in the actual field.	4.21	.69	Agree
Coach students in the safe, ethical and legal use of digital tools and safeguard intellectual rights and property.	4.34	.75	Strongly Agree
Exemplify and advocate management of personal data and digital identity and protect student data privacy.	4.35	.82	Strongly Agree
Model safe and responsible uses of technology and develop classroom procedures to implement school policy.	4.36	.79	Strongly Agree
Exhibit a learning culture that encourage curiosity and critical examination of online resources and promote digital literacy and media fluency.	4.17	.73	Agree
Efficiently store and organize collected information using directories, drives or databases.	4.23	.82	Strongly Agree
Weighted Mean	4.27		
S.D	0.50		
Verbal Interpretation	Very High		

Table 15 illustrates the level of Integration of Technologies in the Classroom in terms of Learning Organization as to Classroom Management.

From the statements above, Model safe and responsible uses of technology and develop classroom procedures to implement school policy yielded the highest mean score (M=4.36, SD=0.79) and was remarked as Strongly Agree. This is followed by Exemplify and advocate management of personal data and digital identity and protect student data privacy with a mean score (M=4.35, SD=0.82) was also remarked as Strongly Agree. On the other hand, the statement Exhibit a learning culture that encourage curiosity and critical examination of online resources and promote digital literacy and media fluency received the lowest mean score of responses with (M=4.17 SD=0.73) was remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Learning Organization as to Classroom Management attained a weighted mean score of 4.27 and a standard deviation of 0.50 and was Very High among the respondents.

The results of the survey imply that respondents have a very high level of integration when it comes to using technology in the classroom for learning organization and classroom management. This suggests that students are comfortable with using technology in their classrooms, and they understand how to use it responsibly.

According to Razak (2014), teachers should always be ready and well-equipped in terms of ICT competencies and positive attitude to provide ICT-based learning opportunities for students to improve their learning quality. Ghavifekr (2014) also added that teachers' well-equipped preparation with ICT tools and facilities is one of the main factors in success of technology-based teaching and learning.

Table 16 illustrates the level of Integration of Technologies in the Classroom in terms of Class Engagement as to Interaction.

Table 16. Integration of Technologies in the Classroom in terms of Class Engagement as to Interaction

STATEMENTS	MEAN	S.D	REMARKS
ICT facilitates collaborative work between students.	4.16	.78	Agree
ICT improves class climate (students more engaged, less disturbing).	4.18	.84	Agree
Students concentrate more on their learning.	4.29	.82	Strongly Agree
Students try harder on what they are learning.	4.20	.84	Agree
Students feel more autonomous in their learning.	4.04	.81	Agree
Students understand more easily what they are learning.	4.20	.82	Agree
Students remember easily what they've learned.	3.98	.95	Agree
Weighted Mean	4.15		
S.D	0.55		
Verbal Interpretation	High		

From the statements above, Students concentrate more on their learning yielded the highest mean score (M=4.29, SD=0.82) and was remarked as Strongly Agree. This is followed by Students try harder on what they are learning with a mean score (M=4.21, SD=0.84) was remarked as Agree. On the other hand, the statement Students *remember easily what they've learned* received the lowest mean score of responses with (M=3.98, SD=0.95) was remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Class Engagement as to Interaction attained a weighted mean score of 4.15and a standard deviation of 0.55 and was High among the respondents.

The survey implies that the use of technology in the classroom can lead to increased student engagement and concentration but may not necessarily result in improved memory retention.

According to Mr. et al. (2020) as cited by Liu (2016), when teachers integrate mobile learning, students not only become more engaged but also they begin to take more control over their own learning.

Table 17. Integration of Technologies in the Classroom in terms of Class Engagement as to Students' Motivation

STATEMENTS	MEAN	S.D	REMARKS
Learning using ICT is more interesting.	4.04	.87	Agree
I prefer to learn using ICT.	3.85	.86	Agree
It is more comfortable to learn using ICT.	3.82	.99	Agree
I like reading digital texts than printed texts.	3.83	1.06	Agree
I love learning ICT skills.	4.05	.89	Agree
ICT use increase my motivation to learn.	4.00	.84	Agree
I never get bored learning through ICT.	3.85	.93	Agree
Weighted Mean	3.92		
S.D	0.68		
Verbal Interpretation	High		

Table 17 illustrates the level of Integration of Technologies in the Classroom in terms of Class Engagement as to Students' Motivation.

From the statements above, I love learning ICT skills yielded the highest mean score (M=4.05, SD=0.89) and was remarked as Agree. This is followed by Learning using ICT is more interesting with a mean score (M=4.04, SD=0.87) was also remarked as Agree. On the other hand, the statement It is more comfortable to learn using ICT received the lowest mean score of responses with (M=3.82, SD=0.99 yet was also remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Class Engagement as to Students' Motivation attained a weighted mean score of 3.92 and a standard deviation of 0.68 and was High among the respondents.

The results of this survey imply that integrating technology into the classroom can have a positive impact on student engagement and motivation.

Mishra (2021) said that motivation factor is crucial for integration of ICT tools. Kozyr (2020) mentioned that modern information technologies in the learning process allow: to intensify the cognitive activity of students; provide positive motivation for learning; to conduct lessons at a high aesthetic and emotional level; to ensure a high degree of differentiation of learning (almost individualization) increase the amount of work performed in the lesson by 5-2 times; improve knowledge control; rationally organize the educational process; to increase the efficiency of the lesson, to form skills of search.

Table 18. Integration of Technologies in the Classroom in terms of Class Engagement as to Task/Work Completion

STATEMENTS	MEAN	S.D	REMARKS
Download, upload, and browse the internet for schoolwork (e.g. for preparing an essay or presentation).	4.14	.84	Agree
Browse the internet to follow up lessons (e.g. finding explanations).	4.31	.75	Strongly Agree
Use social networks for communication with teachers.	4.25	.82	Strongly Agree
Use social networks for communication with other students about schoolwork.	4.30	.80	Strongly Agree
Use learning apps and learning websites on mobile device.	4.17	.74	Agree
Posting work on social networks.	3.72	.95	Agree
Printing finished outputs.	4.04	.89	Agree
Weighted Mean	4.13		
S.D	0.54		
Verbal Interpretation	High		

Table 18 illustrates the level of Integration of Technologies in the Classroom in terms of Class Engagement as to Task/Work Completion.

From the statements above, Browse the internet to follow up lessons (e.g. finding explanations) yielded the highest mean score (M=4.31, SD=0.75) and was remarked as Strongly Agree. This is followed by Use social networks for communication with other students about schoolwork with a mean score (M=4.30, SD=0.80) was also remarked as Strongly Agree. On the other hand, the statement Posting work on social networks received the lowest mean score of responses with (M=3.72, SD=0.95) was remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Class Engagement as to Task/Work Completion attained a weighted mean score of 4.14 and a standard deviation of 0.54 and was High among the respondents.

The result of the survey implies that integrating technology into the classroom can lead to increased engagement in completing tasks and assignments. It also suggests that using the internet for follow-up lessons and communicating with other students through social networks are activities that have a high level of agreement among respondents. Finally, it shows that posting work on social networks had the lowest level of agreement among respondents.

According to Magdalena et al. (2012), majority of the students were able to solve tasks related to the used of information as consumers.

Table 19 illustrates the level of Integration of Technologies in the Classroom in terms of Class Engagement as to Students' Satisfaction.

From the statements above, ICT helps in getting new knowledge yielded the highest mean score (M=4.34, SD=0.73) and was remarked as Strongly Agree. This is followed by ICT helps in learning new skills with a mean score (M=4.32, SD=0.75) was also remarked as Strongly Agree.

Table 19. Integration of Technologies in the Classroom in terms of Class Engagement as to Students' Satisfaction

STATEMENTS	MEAN	S.D	REMARKS
ICT use supports learning.	4.21	.74	Agree
ICT helps in getting new knowledge.	4.34	.73	Strongly Agree
ICT helps in learning new skills.	4.32	.75	Strongly Agree
ICT use makes learning more varied.	4.20	.83	Agree
ICT use makes learning easier.	4.02	.87	Agree
ICT use has a positive effect on learning.	4.07	.87	Agree
ICT use makes me more involved.	4.15	.78	Agree
Weighted Mean	4.19		
S.D	0.58		
Verbal Interpretation	High		

On the other hand, the statement ICT use makes learning easier received the lowest mean score of responses with (M=4.02, SD=0.87) was remarked as Agree.

The level of Integration of Technologies in the Classroom in terms of Class Engagement as to Students' Satisfaction attained a weighted mean score of 4.39 and a standard deviation of 0.62 and was High among the respondents.

The results imply that students are generally satisfied with the integration of technology in their classrooms. They found it helpful for gaining new knowledge and learning new skills, but not necessarily easier to learn from.

According to Lemos et al. (2012) infra-structures and technological aspects, such as the website or learning management system which supports the e-learning courses, its usability, its user-friendly interface, its easiness to access and adequate technical support are also factors that influence student satisfaction in online learning, if guaranteed they can have an enabling power, but if overlooked they will act as critical barriers.

Table 20. Significant relationship between Technology Leadership Standards of Education Leaders and Teachers' Technological Adoption

Technology Leadership Standards of Education Leaders	Teacher's Technological Adoption	r value	Degree of Correlation	Analysis
Equity and Citizen Advocate	Perceived Usefulness	0.281	Weak relationship	Significant
Visionary Planner	Perceived Ease of Use	0.174	Very Weak relationship	Significant
Empowering Leader	Optimism	0.113	Very Weak relationship	Significant
System Designer	Innovativeness	0.146	Very Weak relationship	Significant
Connected Learner	Discomfort	0.050	Very Weak relationship	Significant
	Insecurity	0.146	Very Weak relationship	Significant

Scale	Strength
0.80 – 1.00	Very Strong
0.60 – 0.79	Strong
0.40 – 0.59	Moderate

0.20 – 0.39	Weak
0.00 – 0.19	Very Weak

Table 20 presents the significant relationship between Technology Leadership Standards of Education Leaders and Teachers' Technological Adoption.

The Equity and Citizen Advocate, Visionary Planner, Empowering Leader, System Designer and Connecter Learner was observed to have a significant relationship to Teacher's Technological Adoption. This is based on the computed r-values obtained from the survey with weak to very weak relationship. Furthermore, majority of the p-values obtained were less than the significance alpha 0.05, hence there is a significance.

From the findings, we can infer that at 0.05 level of significance, the null hypothesis, There is no significant relationship between Technology Leadership Standards of Ed*ucation Leaders and Teachers' Technological Adoption* is rejected. Thus, the alternative should be accepted which incites that there is a significant relationship between them.

The result of the survey implies that education leaders who demonstrate certain leadership standards are more likely to have teachers who adopt technology. This suggests that having strong leadership in the area of technology can help promote its adoption among teachers.

Principals' technological leadership had little effect on teachers' positive attitude towards the use of educational technologies (Celep, C., & Tülübaş, T. (2014). According to Gurfidan et al. (2016) as cited by Celep & Tülübaş (2014) and (Watts (2009) there were also a few studies indicating that TL was not considerably associated with teachers' attitudes towards technology and TI.

Table 21 presents the significant relationship between Technology Leadership Standards of Education Leaders and Integration of Technologies in the Classroom.

The Equity and Citizen Advocate, Visionary Planner, Empowering Leader, System Designer and Connecter Learner was not observed to have any significant relationship to Integration of Technologies in the Classroom.

Table 21. Significant relationship between the Technology Leadership Standards of Education Leaders and Integration of Technologies in the Classroom

Technology Leadership Standards of Education Leaders	Integration of Technologies in the Classroom	r value	Degree of Correlation	Analysis
Equity and Citizen Advocate	Lesson Structure	0.014	Very Weak relationship	Not Significant
Visionary Planner	*Teacher's* Knowledge	0.020	Very Weak relationship	Not Significant
Empowering Leader	Facilitation of Instruction	0.019	Very Weak relationship	Not Significant
	Classroom Management	0.022	Very Weak relationship	Not Significant
System Designer	Interaction	0.007	Very Weak relationship	Not Significant
	Students Motivation	0.024	Very Weak relationship	Not Significant
Connected Learner	Task/Work Completion	0.014	Very Weak relationship	Not Significant
	Student's Satisfaction	0.028	Very Weak relationship	Not Significant

Scale	Strength
0.80 – 1.00	Very Strong
0.60 – 0.79	Strong
0.40 – 0.59	Moderate

0.20 – 0.39	Weak
0.00 – 0.19	Very Weak

This is based on the computed r-values obtained from the survey with very weak relationship. Furthermore, majority of the p-values obtained were greater than the significance alpha 0.05, hence there is an absence of a significance.

From the findings, we can infer that at 0.05 level of significance, the null hypothesis There is no significant relationship between Technology Leadership Standards of Education Leaders and Integration of Technologies in the Classroom is accepted. Thus, the alternative should be rejected which incites that there is no significant relationship between them.

The result of the study implies that there is no significant relationship between technology leadership standards and integration of technologies in the classroom. This means that education leaders may not be able to influence how much technology is used in classrooms through their leadership practices.

According to Durff et al. (2019) as cited by Aldunate and Nussbaum (2013) claimed that teachers do not integrate technology into teaching or use technology for student learning. However, Chikasha et al. (2014) mentioned that teachers are more likely to integrate into ICT into their teaching if they believe it has potential to enhance teaching and learning.

Summary

This study aimed to determine the significant relationship between Technology Leadership Standards of Education Leaders in the Division of Laguna, Teachers' Technological Adoption, and Integration of Technologies in the Classroom.

The study addressed several questions including the level of technology leadership standards among educational leaders, the level of teachers' technological adoption relative to technological acceptance and technology readiness and the level of integration of technologies in the classrooms relative to learning organization and class engagement. It also examines the significant relationship between the technology leadership standards, teachers' technological adoption and the integration of technologies in the classroom.

The descriptive-correlated method of research was used. A total of 333 public secondary teachers handling junior high schools and their 188 students from the districts of Kalayaan, Lumban, Pagsanjan, Majayjay, and Santa Cruz were involved as respondents of the study. Purposive sampling was employed. The data were gathered through the use of a standardized and modified research questionnaires that evaluated Technology Leadership of School Principals in the Division of Laguna and its significant relationships to Teachers' Technological Adoption and the Integration of Technologies in the Classroom.

The following were the significant findings of the investigation:

It was found that Education Leaders had a high level of agreement for statements related to technology use in education. Specifically, "Ensure all students have skilled teachers who actively use technology to meet student learning needs" and "Share lessons learned, best practices, challenges and the impact of learning with technology with other education leaders who want to learn from this work" were remarked as Strongly Agree. Additionally, Leadership Standards attained by Education Leaders regarding Equity and Citizenship Advocate was High; Visionary Planner was Very High; Empowering Leader was Very High; Connected Learners was also Very High.

This implies that Education Leaders have a high level of agreement for statements related to technology use in education. This suggests that they are supportive of incorporating technology into the classroom and believe it can be beneficial for student learning. Additionally, this indicates that Education Leaders are committed to providing students with access to the necessary resources and support needed in order to effectively utilize technology in their learning experiences.

These are the findings related to teachers' adoption and acceptance of technology. It shows that education leaders have a high level of acceptance and adoption of technology in their roles, but they may not be as confident in its ability to increase productivity. Respondents strongly agreed that using technology made tasks easier and quicker, but only somewhat agreed that it increased productivity. The second finding indicates that people are generally positive towards the use of technology, believing it improves their quality of life and gives them more freedom; however, there are concerns about its potential negative effects on personal relationships.

Teachers appear to be well-equipped with the necessary skills and knowledge to effectively utilize technology in

their teaching practices; however, they may have some discomfort or insecurity towards using it due to these concerns about negative effects. Overall, while there is a high level of technological adoption among respondents across both findings relative to perceived usefulness / ease-of-use as well as optimism / innovativeness / discomfort / insecurity, reservations remain regarding the impact on productivity for education leaders specifically and potential negative consequences for all users more broadly speaking.

The findings discuss the level of integration of technology in the classroom for effective learning and engagement. It indicates that creating realistic learning activities and using technology to facilitate independent learning can enhance student engagement and motivation, while rubrics for assessing technology use received less agreement.

The results imply that integrating technology in the classroom is an effective way to maximize learning effectiveness and accommodate learners' needs. Teachers should model safe and responsible use of technology, protect student data privacy, promote digital literacy to ensure successful implementation of technological tools into classrooms. Additionally, students are more engaged when they learn with technology as it helps them follow up on lessons easily through social networks; however, they may not remember what they have learned when using it.

The findings of the survey are that there is a significant relationship between Technology Leadership Standards of Education Leaders and Teachers' Technological Adoption. This was determined by computing r-values which showed a weak to very weak relationship, as well as obtaining p-values less than the significance alpha 0.05.

The results imply that there is a significant relationship between the Technology Leadership Standards of Education Leaders and Teachers' Technological Adoption. This means that education leaders who demonstrate qualities such as Equity and Citizen Advocate, Visionary Planner, Empowering Leader, System Designer, and Connecter Learner are more likely to have teachers who are willing to adopt technology in their teaching.

The findings of the study were that there is no significant relationship between technology leadership standards and integration of technologies in the classroom. This was determined by analyzing survey data, which showed a weak correlation and most p-values not meeting the significance alpha level of 0.05.

The implications of the result are that education leaders should not rely on qualities such as being an advocate, planner, leader, designer and learner to ensure successful integration of technology in the classroom. Instead, they should focus on other strategies for successful implementation.

Conclusions

On the basis of the foregoing findings, the following conclusion was drawn:

There is a significant relationship between Technology Leadership Standards of Education Leaders and Teachers' Technological Adoption. Thus, the altenative hypothesis was supported.

The study found that education leaders who demonstrate certain leadership standards are more likely to have teachers who adopt technology. Specifically, leadership qualities such as being an advocate for fairness and empowerment, planning strategically, and being a lifelong learner were found to be related to teachers' adoption of technology. Although the relationship was weak but statistically significant at 0.05 levels of significance which means having strong technology leadership can promote technology adoption among teachers in educational settings. Therefore, it is important for educational institutions to prioritize developing strong technological leaders with these specific qualities in order to encourage greater use and integration of technology by their teaching staffs which will ultimately lead towards better learning outcomes for students through effective use digital tools in classrooms or online learning environments.

There is no significant relationship between Technology Leadership Standards of Education Leaders and Integration of Technologies in the Classroom. Thus, the null hypothesis was supported.

The study found that leadership qualities such as Equity and Citizen Advocate, Visionary Planner, Empowering Leader, System Designer and Connecter Learner did not have a significant impact on technology integration in classrooms. The data analyzed showed a weak correlation and most p-values not meeting the significance alpha level of 0.05. This suggests that education leaders may not be able to influence how much technology is used in classrooms through their leadership practices.

Recommendations

In view of the findings and conclusions of the study, the following recommendations were given:

1. The Department of Education should develop policies and guidelines that promote responsible use of technology in classrooms. The department should provide professional development opportunities for teachers to improve their skills related to technology integration into teaching practices. It is also important that all schools and districts have equitable

access towards necessary technological tools and resources needed towards successful implementation and integration into classroom settings. Similarly, DepEd can conduct evaluations and assessments identifying areas needing improvement and supports necessary towards successful implementation and integration into classrooms. Encourage research studies exploring other factors influencing Technological Adoption & Integration Strategies such as teacher attitudes or student engagement and motivation levels.

2. Education leaders should focus on developing their Technology Leadership in order to promote Teachers' Technological Adoption and Integration of Technologies in the Classroom. Specifically, they should aim to improve their skills as Equity and Citizenship Advocates, Visionary Planners, Empowering Leaders, System Designers and Connected Learners. In addition to these qualities, education leaders should also prioritize other strategies for successful integration of technology in the classroom. This may include providing teachers with professional development opportunities that focus on effective use of technology for teaching practices; ensuring access to necessary resources such as hardware and software tools; promoting digital literacy among students through safe and responsible use policies; modeling safe behavior online by protecting student data privacy. Furthermore, it is important for education leaders to recognize that while there is a high level of technological adoption among respondents across both findings relative perceived usefulness and ease-of-use as well as optimism, innovativeness, discomfort and insecurity, reservations remain regarding its impact on productivity specifically for educational leaders themselves but also potential negative consequences more broadly speaking. Therefore, it is recommended that Education Leaders continue exploring ways they can support teachers' technological adoption while addressing concerns about productivity loss or negative effects from using technology too much or improperly used which could lead them to develop policies and guidelines that promote responsible use of technology in the classroom. Education leaders should also prioritize the integration of technology into lesson plans by creating realistic learning activities that utilize technological tools to facilitate independent learning. They should encourage teachers to model safe and responsible use of technology while protecting student data privacy. Finally, education leaders must recognize the importance of ongoing evaluation and assessment when it comes to integrating technologies in classrooms. Regular assessments can help identify areas where improvements are needed or where additional support is required for successful implementation.

3. Educators should attend professional development opportunities that focus on effective use of technology in education. This will help them develop a better understanding of how to incorporate technological tools into lesson plans while ensuring student engagement and motivation. Finally, classroom teachers can communicate with education leaders about Technology Integration Strategies they have found useful within their own classrooms which could lead towards more effective strategies being implemented across schools / districts.

4. Future researchers may conduct further research to explore the relationship between technology leadership standards and integration of technologies in the classroom: While this study found no significant relationship between technology leadership standards and integration of technologies in classrooms, it is important to conduct further research to better understand how these factors may be related. Investigate other factors that may influence teachers' technological adoption: This study focused primarily on Technology Leadership Standards as a factor influencing teachers' technological adoption; however, there may be other factors at play that should also be investigated such as teacher attitudes towards technology or access to resources. Explore different types of educational settings: This study was conducted with public secondary schools within specific districts in Laguna; future studies could investigate different types of educational settings such as private schools or elementary schools. Consider using mixed-methods approaches: While this current study used a descriptive-correlated method approach utilizing standardized questionnaires only, future studies could consider incorporating qualitative methods (such as interviews) alongside quantitative data collection methods for more nuanced insights into participants' experiences with integrating technologies into their teaching practices. Future researchers can also evaluate long-term effects by conducting follow-up surveys after several years have passed since implementation.

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