THE LEVEL OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) INTEGRATION IN SAN RAFAEL INTEGRATED SCHOOL

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ABSTRACT

ICT integration in education is viewed to impact students on teaching and learning significantly. There are factors affecting ICT integration; as such, this quantitative descriptive research design aimed to determine the level of ICT integration in terms of leadership, curriculum, infrastructure, faculty, and environment. The adaptive survey questionnaire from Castillo (2017) was distributed to the grades 5 and 6 of San Rafael Integrated School teachers and students. The tabulation and data analysis revealed that the level of ICT integration is rarely practiced. Moreover, in local schools, ICT practice also revealed that the respondents differ significantly in terms of sex and role in a school. However, it did not show any differences in terms of grade level.

Keyword: *ICT integration, leadership, curriculum, infrastructure, faculty, & environment*

1. INTRODUCTION

Integration of Information and Communication Technology (ICT) into teaching and learning has become a major issue for many educators in developing nations, particularly in the Philippines (Bonifacio, 2013). Students become more involved in their work when ICT is included in lessons because technology allows many ways to make it more engaging and enjoyable to teach subjects differently (ICT Education Solution, 2022). However, there are still some areas that were not able to integrate ICT into teaching and learning. Despite the significant resources allocated to integrated technology in the classroom, many teachers struggled and have not used technology successfully (Hyndman, 2018). English language teachers from primary schools in Kutching's Satok district in Bangladesh participated in a case study. According to the findings, they could not integrate computer technology into teaching and learning because of a lack of resources, training, and time constraints (Parvin & Salam, 2015; Khalid, 2007). As cited by Adarkwah (2021), in Ghana, Africa, both teachers and students lacked efficacy and creativity in using ICT. As surveyed that there were 67% of estimated public school teachers did not integrate ICT into their teaching. Also, in Poznan Ponland, it is found that the local school teachers did not use technology in teaching due to money and school budget obstacles (Glasel, 2018). In the Philippines, as reflected in the survey of Southeast Asian Ministers of Education Organization, poor ICT integration was observed due to a lack of ICT infrastructures (Dela Rosa, 2016; SEAMEO, 2001). A study about public schools in Manila reported that the ratio of the availability of computers is 1:63, and out of 88% of the schools having internet, only 50% of their students had access (Dela Rosa, 2016).

Lim and friends (2013) state that the factors that support integrating ICT into the teaching and learning process include technological infrastructures, teachers' beliefs and practices, curriculum, school leadership, and professional development. As supported by Castillo (2017) in the case study of ICT integration in the Philippines, there are five major indicators in ICT integration beyond the school grounds, at home, and community: leadership, curriculum, infrastructure, faculty, and environment. It is in this light, that the researcher was highly encouraged to conduct a descriptive quantitative study focusing on the factors affecting ICT integration. This study included its relative components underlying the variables under the study. Furthermore, the researcher found that it was the first to conduct the study in the locality. Moreover, the researcher hoped that this study's result would determine the level of ICT integration in terms of leadership, curriculum, infrastructure, faculty, and environment.

2. REVIEW OF RELATED LITERATURE

This study focused on ICT integration. As such, this chapter presents and discusses the related literature significantly correlated with the research topic. Specifically, this includes ICT in instruction, ICTs in a learner centered-environment, ICT integration in the Philippines, government initiatives in ICT integration, requirements for efficient implementation of ICT integration, and potential challenges in ICT integration.

2.1 ICT in Instruction

Information and Communication Technology (ICT) can help support innovative educational approaches and make difficult-to-implement methods like simulation and cooperative learning more viable. According to educators, it can also increase student learning outcomes and effectiveness (Bonifacio, 2013). It helps high-quality courses by increasing student motivation, connecting students to various knowledge sources, supporting active in-class and out-of-class learning settings, and allowing teachers to devote more time to facilitation (Akay, 2016). Teachers employ computers in various ways as they use them to study material, create teacher lessons, and display class webpages, movies, or other educational materials (Hughes, 2021). All critical system pieces are seamlessly merged to form a whole, giving integration a sense of completion or wholeness (Chang, 2012). Erasmus Learning Academy (2021) emphasized a growing trend toward integrating ICT into teaching and training. It allows the faculty teachers to participate in the ICT training courses, where participants will develop concrete ICT skills and best practices. Over the last decade, schools have seen an exponential expansion in the use of ICT for learning and teaching, especially with the introduction of the Internet, and what's fascinating is not just that there's more technology but that there are more varieties of technology from which teachers can choose, depending on their pedagogical inclinations (Choy, Suan & Chee, 2012). As cited by Bonifacio (2013), Preservice training and programs that are relevant and sensitive to the school system's needs can improve the quality of education and increase teaching efficiency. This will give teachers sufficient topic knowledge, various teaching approaches and strategies, and ongoing professional development. These initiatives will introduce children to new information channels and build self-guided learning materials that emphasize learning rather than teaching (Bonifacio, 2013).

Students in elementary grades primarily had minimal knowledge about computers. Many studies have found that children often practiced use a computer for watching videos and game playing (Wu, 2003). As for teachers, they were found to have minimum knowledge about computers, and they often practiced used computer technology for preparing instructional materials and helping to improve the quality of instruction. In integrating the use of computers in teaching and learning, it is the teacher's job to guide the students, whereas the computer will serve as a supplement to instruction (Wu, 2003). ICT also has the potential to prepare students for life in the twenty-first century, in which students who master ICT skills are better prepared to meet future issues because they have a better knowledge of them (Grimus, 2000). As stated by Bransford, Brown, and Cocking (2000), ICT use can assist students in building the competencies required for today's globalization. This is also because that ICT may assist students in developing abilities, increasing motivation, and broadening their knowledge and information (Hussian et al., 2011; Grabe & Grabe, 2007).

Hatlevik (2018) stated that ICT had become an integrated and important part of modern life, and its rapid evolution is transforming how work and learning are. However, not all teachers today have the skills necessary to educate by utilizing digital technology (Hatlevik, 2018). ICT integration encourages students to use digital technologies to fulfill open-ended challenges or real-world research issues and to create school-related projects (Technology for Kids, 2022). Digital media such as Facebook allows teachers to create groups for educational purposes and establish a good connection between the teacher and the student through communication and dissemination of educational information in digital media (Cunha, Kruistu, & Oers, 2016). Schools use ICT tools to communicate, create, transmit, save, and manage information (Learning Portal, 2022). Moreover, Child Hope Programs Philippines (CHPP, 2021) mentioned that teachers customize the use of technology to reach out to their students outside the school vicinity. Technology enables teachers to improve their instruction by providing exciting activities through online platforms.

2.2 ICT in a Learner-Centered Environment

Moeller & Reitzes (2011) highlighted that ICT is transforming the way people process, access, and disseminate information where technological skills are among the qualities the future employers seek, the school institutions and other departments are adapting to the demand to deliver technology-savvy students. With this, school institutions need to incorporate ICT in their programs to prepare students for their future careers (Moeller & Reitzes, 2011). As postulated to the educational philosophy of Hyes et al. (2001), ICT can support shifting students' instructions into learner-centered. Learner-Centered Education (LCE) emphasizes the experiences of teachers and students that aid the motivation of teaching, learning, and achievement. With this, ICT can be used to improve the integration of learning-centered principles by supporting the needs and capabilities of learners

and teachers while encouraging creativity and critical (Lawrence, 2015). ICT-supported education can help students acquire the knowledge and skills they need to succeed in life if properly designed and implemented or when properly deployed. ICTs, particularly computers and Internet technologies, offer new approaches to teaching and learning rather than merely allowing teachers and students to do what they have always done better (Tinio, 2002). As Bonifacio (2013) emphasized, active learning is one of the learning methods that ICT may foster. Active learning involves students in learning through activities such as reading, writing, conversation, and problem-solving. When active learning approaches are used, such as the use of tech in the classroom, student interest in learning improves (Shaikh & Alagannawar, 2018). In the ICT- assisted learning, as highlighted by the United Nations Educational Scientific and Cultural Organizations (UNESCO 2009), it mobilizes instruments for information examination, computation, and analysis, offering a platform for student inquiry, analysis, and creation of new knowledge. ICT-assisted learning allows students to adopt an inquiry-based approach to engage with real-world situations and ideas. Learners learn at their own time and, when appropriate, work in-depth on real-world challenges, making learning less abstract and relevant to their living circumstances (Curtis, 2001). Increased learner engagement is promoted through ICT-assisted learning through collaboration. There are several advantages of using ICT. It encourages and allows students to study and learn together to solve a problem, complete a task or assignment, or through collaborative work (Education Hack, 2017). ICT-assisted learning empowers students, teachers, and professionals to engage and collaborate regardless of location. It allows students to collaborate with people from various cultures, enhancing their teamwork, communication skills, and global awareness. It depicts lifelong learning by widening the learning environment to include peers, mentors, and experts from many professions (UNESCO, 2009).

According to Suefert (2000), students are given tools to design their learning process, carry them out, evaluate, and improve them. With the use of PowerPoint, different learning can be handled or accommodated. Its use enables enhancement of the class activities. Students with various learning styles may benefit from its use because PowerPoint presentation is considered a comprehensive tool. As such, having the ICT tool can help students have more self-centered learning experiences that can help them acquire knowledge and reflect critically (Shasberge, 2002). As stated in ICT Education Solutions in Australia (2022), it must first comprehend ICT capacity to comprehend ICT integration in education. Its ultimate goal was to make technology use transparent. This means that the students get to concentrate on utilizing ICT to attain other goals that they do not even realize they are doing so. As ICT capability is best developed in meaningful, subject-related situations, the transparent use of ICT in subject learning ultimately defines what ICT integration stands for in education. In addition, incorporating ICT into education extends beyond the pressure as a teacher to effectively integrate ICT into the teaching practices. Punter et al. (2016) stated that male students possess better computer skills than females. Boys are more motivated to explore diverse uses of computers as a result of the perceived masculinity of computers, improving their knowledge and confidence (Ertl and Helling, 2011). According to research, girls' computer use is often practiced limited to schooling. However, boys use computers far more frequently for leisure activities, as emphasized by the British Educational Communication and Technology Agency (BECTA, 2008).

Favorable ICT equipment situation plays a vital role in the use of ICT in education by the teachers and the students. Many students and teachers in higher grades are more equipped with ICT-related skills than those in lower grades. Students and teachers who lack the potential, experience, and skills to access ICT equipment indicate that they will not be given priority in the issuance to own or access ICT equipment (Gerick, Eickelmann, & Bos, 2017). As cited by the Organization for Economic Cooperation and Development (OECD, 2015), those who use computers in school moderately have a somewhat higher level of attainment than the students who use computers only sometimes. The report shows that there were 72% of students aged 15 and above have their own computer at home, which indicates that students that belong to higher grades are considerably required to use computers and the internet for they were already expected to be aware and properly use computers (OECD, 2015). It was also reported that teachers from higher grade levels in ICT leadership reported higher levels of perceived usefulness of computers, perceived learning outcomes for students, and more frequent use of computers (Hatlevik & Arnseth, 2012).

ICT is integral in education however, many studies had pointed out that boys are more skilled to access computer than girls. School teachers were frequently eager to assist girls by demonstrating how to accomplish computer activities while boys were frequently encouraged to find out themselves, resulting in increased self-confidence (Volman, 1994). In the study of Volman & Eck, (2001) revealed that teachers were unaware of their occasionally gender-based instruction since there were not enough computer-literate female teachers who could serve as role models for girls. As supported by the study of Computer in Education by Janssen and Plomp (1993); COMPED (1992), most students in the country's primary, secondary, and higher schools outperformed girls in functional knowledge and skills in ICT. According to Meelissen (2008), the disadvantage of girls in

computing attitudes had grown less obvious. Where gender differences were found, girls were more likely to have a less favorable attitude towards computers than boys. The beliefs and attitudes of teachers towards information and communications technologies (ICT) in teaching and learning are central to the successful implementation of new technologies (Gebhardt et al., 2019). Female teachers using technology effectively provide a role models for young women at school. However, previous studies have shown that female teachers are less likely to use computers personally than their male counterparts (Gebhardt et al., 2019). According to Hasan et al. (2022), the analysis between males and females ICT use and skills did not reveal any differences in which the measures of ICT self-efficacy were not equivalent for male and female students, but still male students were more confident than female students about using ICT, but this confidence was not reflected in measured computer literacy. Additionally, as emphasized by Pokropek and Borgonovi (2021), ICT use also differs significantly in their grade level, by which a lower grade level is found to have low access to ICT than the usage of higher grades. As supported by Gerick, Eickelmann, and Bos (2017), in terms of teachers and students, they differ significantly in terms of access to ICT equipment and ICT integration in teaching and learning. Teachers and students on higher grade levels often practiced use ICT for teaching and learning more oriented and thoughtful than lower grade teachers. Moreover, there were less favorable students to access computers in lower grades than those in higher grades provided with great ICT equipment. With this, teachers are encouraged to integrate ICT into their teaching. There is evidence that the effectiveness of this integration depends largely on teachers' preparedness to do so, which is directly related to their confidence and knowledge in using ICT and their beliefs about the value of ICT in education.

2.3 ICT Integration in Philippine Education

The 2010 National Framework Plan for ICTs in Basic Education highlighted that several government policies support the incorporation of ICTs into basic education in the Philippines. The National Economic Development Authority (NEDA, 2004) cited that the Philippine Medium Term Development Plan (MTDP) year 2004 was the first of these national programs, which considers ICT as a development tool as such ICT would be used as a potent enabler or capacity development. As a result, it will be targeted directly at certain development goals such as universal basic education and lifelong learning, among others (NEDA, 2004). The MTPDP calls for the widespread use of computers to support teaching-learning processes, the promotion of e-learning and information literacy, and the establishment of e-learning competency (NEDA, 2004). The 2002 Basic Education Curriculum (BEC) acknowledges the need to use ICTs for the acquisition of life skills, a reflective awareness, and internalization of knowledge. BEC is envisioned as an interactive curriculum that encourages integrated teaching and interdisciplinary, contextual, and authentic learning, as well as the development of the person's many bits of intelligence. The use of ICTs in all learning areas is recommended as a way to promote increased interactivity, broaden access to knowledge that will enrich learning, and improve skills in obtaining, processing, and using information, as well as in solving mathematical issues and problems of logic (BEC, 2002).

The Philippine Department of Education Computerization Program (DCP) 2009 implemented policies on the usage of ICT where its elements, including software and multimedia, are typically utilized to augment instruction specifically: (1) technology must first be studied as a separate subject before being applied to other learning areas as a tool for learning how to study; (2) application of computer skills to other learning areas is a curriculum policy based on the principle that teaching and learning should not be textbook-driven, and educational processes should take advantage of technological developments, including the use of ICT in teaching and learning, where appropriate; and (3) an education modernization program will provide schools with facilities, equipment, materials, and skills, as well as introduce new learning and delivery methods (DCP, 2009). The majority of the funds needed to utilize ICT in education come from the government. On the other hand, the DepEd works with other government agencies, local governments, and the private sector to fund various aspects of developing an ICT program in education. In the usage of ICT, what sorts of improvements in knowledge, skills, and competencies are required of instructors and students? Few countries have developed technology usage standards to serve as a foundation for building knowledge, skills, and competencies in the use of ICT, as well as measuring outcomes of ICT use versus goals specified (Curtis, 2001).

As mentioned in the study of Wang & Woo (2007), the pedagogical design for efficient use of ICT, not the availability of technology, is the major factor that determines the effectiveness of learning as such computers should be integrated into the curriculum rather than the other way around. As a result, effective ICT integration should focus on pedagogical design, justifying how and why technology is used. Integrating ICT into the learning process effectively has the ability to engage students (Wang & Woo, 2007). Schools and universities are increasingly presenting themselves as cutting-edge educational institutions by delivering instruction via web-based technologies or via the Internet. Even so, according to Paje et al. (2021), there were no available websites accessible by the teachers based on the computer technology instruction in the country. This computer

based-technology instruction includes word processing, spreadsheets, MS publisher, Windows Media Player, Google, and YouTube. Distance education programs have emerged in the Philippines in recent years, particularly at the tertiary level, with the largest being the University of the Philippines Open University (UPOU), which provides undergraduate and graduate degree programs approved by the Commission on Higher Education (Bonifacio, 2013).

2.4 Government Initiatives in ICT Integration

The Restructured Basic Education Curriculum was created in 2002. It was the goal of this project to develop an interactive curriculum that supports integrated teaching and multidisciplinary, contextual, and authentic learning (Bonifacio, 2013; RBEC, 2002). In most cases, there were too few available computers for too many students in the local school; with this, it is very difficult to integrate computer use into instruction (Trucano, 2011). School online platform such as the DepEd Commons was designed to give access to online review, materials, and open educational resources and to support distance learning modalities; however, this platform was only accessible by teachers (DepEd Privacy Policy, 2022). As cited by Bhattacharjee and Deb (2016), administrators, teachers, and students use ICT technologies for the betterment of teaching and learning, especially in providing tools to enhance learning and for the efficiency in creating assignments and projects. The use of technology in instruction and a higher emphasis on computer literacy in all learning areas in every school where equipment is accessible enable interactivity as the 2009 Philippine Education Technology Master Plan provides: (1) all public secondary schools with an appropriate educational technology package; (2) 75% of public secondary schools will have a computer laboratory room with basic multimedia equipment; (3) all public secondary schools will have an electronic library system. 4) At least 75% of public secondary school teachers must be trained in basic computer skills, Internet use, and computer-assisted instruction; and (5) all learning areas of the curriculum must be able to incorporate the use of ICT, where suitable (DCP 2010).

According to the National Center for Education Statistics (NCES, 2000), majority of public school teachers with access to computers or the internet in their classroom or elsewhere indicated they used computers or the internet a lot in creating instructional materials. The DOST Engineering Science Education Project (ESEP, 2013) provided computers to 110 public high schools, while the DOST Computer Literacy Program provided computers to another 68 public high schools thus, the Department of Science and Technology (DOST) continues to allocate PHP 20,000,000 to 30,000,000 (US$ 400,000 to 600,000) per year to assist computer purchase in schools and in 2002 - 2003, 125 public high schools were to receive ten to fifteen computers, as well as teacher training programs. As highlighted by Hani (2022), the DepEd Computerization Program provides ICT packages, and IT infrastructure in public schools was allocated 11.3 billion for the 2022 National Expenditure Program. As per the undersecretary for the finance sector, DepEd received 629.8 billion from the proposed 17.02 trillion estimated budget for the incoming year. The available data and information reveal that the Philippines has enthusiastically embraced ICT in education while several programs have successfully equipped a number of schools with ICT facilities, thanks to the Department of Education's assistance and collaboration with the private sector (Belawati, 2004). Nonetheless, the initiatives have not ensured that teachers utilize the facilities to their maximum potential for instruction (Belawati, 2004). However, in a recent study by Trading Economics (2020), access to electricity was reported for 98.84% of the population of the entire Philippines. Also, the Philippines (Navarro, 2022) still struggle to complete the electrification of schools. Computer package delivery was not met, and the country has low computer and internet access rates.

2.5 Requirements for Efficient Implementation of ICT Integration in the Philippines

Plan for Implementation. As stated by Simeon (2022), the country is far behind, and the growing issues and problems of ICT integration are having an impact on student learning outcomes. The public schools, particularly in the Philippines, are having more investments in school projects in ICT, such as electricity, computer, and internet access (Simeon, 2022). The Department of Science and Technology (DOST) annually shares a government network that facilitates the deployment and integration of ICT projects, especially those that deliver common government services (Balucanag, 2013). Department of Education (DEPED, 2005) initiated the National Strategic Planning Initiative for ICTs in Basic Education as part of a system-wide reform initiative to bring Philippine basic education out of a crisis. As highlighted in the study of Bonifacio (2013), the appropriateness, effectiveness, and sustainability of ICTs in basic education are all defined in this National Framework Plan. The learning aim and objective to be fulfilled, the content of the information and its availability and accessibility to students are all factors to consider when selecting an ICT resource. The most appropriate ICT tool does not have to be the newest or most expensive on the market. The degree to which stated aims and objectives are met is referred to as effectiveness. When used correctly, ICTs can improve motivation and engagement in the learning process, develop multiple intelligences, facilitate comprehension of abstract concepts, promote inquiry and exploration through the use of interactive learning resources, improve

information literacy, critical thinking, problem-solving, and other higher order thinking skills, and enhance information literacy, critical thinking, problem-solving, and other higher order thinking skills. ICT can aid collaborative and cooperative learning by allowing students to communicate and collaborate with one another while also developing lifetime learning abilities, such as knowing how to study. The extent to which an ICT-based project (in the context of basic education) may continue after initial project financing or assistance has finished is characterized as sustainability (Bonifacio, 2013).

Teacher Education. The usage of technology in education has an impact on a student's academic outcomes, which are frequently used to measure instructional efficacy, in other words, a student's use of technology is a reflection of the teacher's integration of technology into teaching and curricula, and it also has an impact on the teacher's efficacy (Chang, 2012). According to a study, the usage of technology by teachers has a significant impact on pupils' academic progress. A teacher's technical literacy directly impacts whether pupils can incorporate technology into the curriculum to improve their academic performance (Chang, 2012). According to Cominghud and Gelacio (2020), public elementary schools in the country highly use ICT in terms of curriculum. This is based on the evident integration of ICT through interactive presentations in the use of digital equipment and facilities. Also, teachers are sensitized to attend seminars and workshops on the need to maximally utilize available e-learning technologies in school. Educators must be well-versed in their subject matter and up to date on their discipline's content standards and instructional methods. Teacher candidates should learn how to use technology in a way that helps them meet the content standards (Almekhlafi & Almeqdadi, 2010). (1) Conduct training on effective technology integration; (2) supply teachers with appropriate ICT tools in the classroom; (3) give teachers with incentives and awards for exceptional technology integration in their classrooms. (4) give teachers some time off so they can plan effectively for technology integration in teaching and learning; (5) investigate the use of technology in classrooms at all levels, including public and private schools; (6) look into the impact of technology integration on student achievement and attitude. (7) Assess the use of technology in relation to curriculum objectives and outcomes. The teacher's positive or negative attitude toward the use of ICT impacts its utilization. If the teacher has a bad attitude toward them despite having outstanding facilities, he/she will not utilize the ICT tools in the class (Eger et al., 2018). As supported by Lawrence and Tar (2018), the teacher factors include age, gender, educational experience, knowledge of ICTs, and attitude towards them. As a result, it is noted that the teacher who has skills or knowledge is in a better position to judge the usefulness of adopting and integrating ICT into teaching and learning-related activities (Eger et al., 2018). Moreover, teachers' fear of technology still prevents them from making the best use of ICT-related abilities in their classrooms. Although Filipino teachers have received numerous training programs, there is still a need for thorough and long-term in-service training (Bonifacio, 2013).

Technological Leadership. Chang (2012) cited that School administrators, such as the principal, must be schooled in vision, strategy, and administration to be experienced and successful technical leaders, which is the most crucial aspect of technological leadership. As illuminated in the study of Ghavifekr et al. (2013), most teachers are normal users, and many teachers more frequently use ICT in the teachers' room for their work rather than using it in their classroom for teaching and learning. As revealed in the study of Tomaro (2018), there was a successful integration of ICT in education due to local school policies to add ICT training, provision of computer infrastructures, integration of ICT in the curriculum in a strategized manner, strong leadership, and lastly are the available ICT resources in the school environment. A technological leader must develop a vision of how technology will affect school reform. The most significant responsibilities of a technology leader are planning and providing resources for staff development, followed by ICT tools and infrastructure support, assessment, and research (Chang 2012). Technology leadership requires ICT teachers or faculty to use technology in the classroom effectively. As such, he/she exhibits a wide understanding of the functions of ICT tools and equipment such as computers and internet computers and internet that are commonly used for the preparation and development of lesson plans, instructional materials, and its use for recording routine tasks, activities, and other classroom-related activities (Smerdon et al., 2000). Additionally, effective technological leaders must implement systems for assessing each teacher's progress to transform their perspective and realize the significance of ICT in education, a systematic development program for these leaders' requirements must be developed. (Chang, 2012).

2.6 Potential Challenges in ICT Integration

Every country faces comparable obstacles in integrating ICT into its educational institutions. Despite the benefits that ICT provides, many local, national, and regional government organizations still do not give it the attention and priority it needs. One key difficulty is providing basic ICT connectivity to young people living in impoverished regions or rural areas that are often practiced overlooked by policymakers (Gutterman et al., 2009).

Lack of resources. In integrating ICT, the most significant source of energy to run and operate the ICT equipment is electricity (Anwar, 2021). In the Philippines, particularly in rural regions, there is a challenge to provide people with reliable energy, for nearly 30% of Filipinos live in areas where there is no electricity or where brownouts occur (Bostwick, 2022). According to Simeon (2022) that one of the infrastructure constraints among the Philippine schools has low computer and low internet access rates, unlike many of its neighboring countries. Another infrastructure constraint among Philippines schools is the lack of electricity access. The country is among those that have yet to achieve universal access to schools to electricity. As supported by the survey of Globe Telecom (2016), in primary schools in the country, only 14% have internet access, while the 86% have no data connectivity. In the year 2011, the Philippines' Department of Education estimated that there were more than 7,000 schools with no access to electricity (Valerio (2014). Added also by Ra (2016), access to ICT in the region's schools in the country is limited due to infrastructure constraints, a lack of investment and research into the uses of ICT in education, and a lack of capacity of teachers and school leaders to use ICT to enhance the quality of teaching and learning. As cited by Usluel, Askar, and Bas (2008), computers are mostly used in Philippine schools for formal study of technology in predominantly senior high school classrooms, with minimal application to other learning areas. The shortage of ICT resources has hampered the incorporation of technology across the curriculum because out-of-school kids and adults participating in non-formal education programs typically do not have access to computers. There is relatively limited usage of information technology in non-formal education. The insufficiency or absence of ICT facilities appears to be an important hurdle in research studies focusing on the barriers to adopting ICT (Usluel, Askar & Bas, 2008). The ICT practices also matter in how the school or institution administers policies on ICT integration. In the study of Castillo (2017), found that there was a limited application of ICT in education due to the absence of ICT standards, guidelines, and policies to fund and invest in ICT projects for the local schools in the Philippines.

The Philippines (Bonifacio, 2013) faces challenges in implementing ICT curriculum requirements due to a lack of fundamental infrastructures such as classrooms and Internet access. Although the Philippines never practiced lags behind neighboring Southeast Asian countries in terms of ICT infrastructure in government and business, there is still much to be done in schools, particularly in public and rural schools. For many public schools in the Philippines, computers are generally purchased using school funds or donated by the government and private organizations. Not every elementary or high school has a computer lab. As mentioned by Moreno (2015), the implementation of the use of ICT in teaching depends upon sufficient access to ICT tools, ICT open-minded teachers, and the government and stakeholders' facilitation in the integration of ICT in school. There was thirty-nine percent of teachers, faculty, staff, and administrators in public schools reported by the National Center for Education Statistics (NCES, 2000) that they had limited access to computers or internet somewhere in their schools because there were only a few sets of available computers given to the school to be used for instruction and other learning areas. The study by Tinio (2002) found that only half or less of the teachers and students in the majority of the schools studied were able to use the computer as an educational tool in a 2002 assessment of ICT. In 100 Philippine public secondary schools, pupils in their junior and senior years used computers most frequently in computer classes for most public schools. Using computers for other topic areas such as math and science is still a challenge. Despite the fact that more secondary schools now have computers, the student-to-computer and teacher-to-computer ratios remain alarmingly low. The limited amount and variety of subject-specific educational software available in schools is another explanation for the absence of ICT integration in teaching. Office software or productivity tools for word processing, slide presentations, numeric spreadsheets, and database administration are commonly used in schools. There is a scarcity of educational software for learning Science, English, and Mathematics. Another key reason for the restricted use of ICT in classroom instruction is the lack of formal curricular standards and guidelines for integrating computers into subject areas (Tinio, 2002).

Teachers Knowledge, Skills and Attitude. Many teachers in public schools have a serious challenge in using ICT in their teaching. 84.2% of the teachers struggle in using technology in the classroom because they lack ICT skills and other ICT services (Oduor, 2018). According to Trucano (2005), teachers frequently access ICT technologies such as laptops and computers for routine tasks such as record keeping, lesson plan development, information presentation, and basic information searchers on the internet. However, a large majority of Public schools in the country fail to compare and align technology plans and lack in providing assessment and assistance to students in improving and modifying instruction. This is due to the lack of teachers' knowledge, experience, training, and leadership in ICT (Quidasol, 2020). It is important for teachers to comprehend the precise role of ICT in order to deal with changes in student education properly. Children in Grade 6 or higher are reported to be using social networks mainly to keep in touch with their family and friends and find information (Badri et al., 2017). In the use of digital devices among children the lack of parental control over internet use is viewed to impact children who frequently use computers and the internet for game playing and

web surfing rather than spending their time on homework (Badri et al., 2017). Teachers are less likely to incorporate technology into their lessons unless they accept the idea that using technology in the classroom is a requirement. The central questions in terms of technology acceptability are how people view technology and what circumstances contribute to its underuse (Kiraz & Ozdemir, 2006). As cited by Quidasol (2020), a large majority of Public schools in the country fail to compare and align technology plans and lack in providing assessment and assistance to students in improving and modifying instruction. This is due to the lack of teachers' knowledge, experience, training, and leadership in ICT. Valdez (2019) highlighted that children in the Philippines prefer access to the internet as a source of information, such as updates on new toys launched on the internet, rather than for communication purposes. Sutton & Kafai (1999) mentioned how children use computers at home and school. It reveals that children are more dedicated to game playing, followed by various other software activities. The teacher's lack of technical and pedagogical knowledge and skills to employ accessible ICTs in the classroom becomes a big stumbling block. Technology-assisted instruction necessitates the development of not only information, skills, and behaviors but also proper attitudes (Kim & Baylor, 2008). Concerns, confidence, and other factors may impact attitudes. Pre-service teachers' attitudes toward technology, for example, are influenced by their ability to use it. The lack of technical and pedagogical knowledge and skills among teachers makes it difficult to use accessible ICTs in the classroom. Technology-assisted learning necessitates not only the acquisition of knowledge, skills, and behaviors but also the cultivation of appropriate attitudes (Kim & Baylor, 2008).

Role of Leadership. One of the most fundamental issues in educational reform is that educators lack a clear and consistent understanding of why change is necessary, what it entails, and how to proceed. We need leaders who can make substantial changes in school learning cultures to achieve long-term improvement (Fullan, 2002). To put it another way, changing the mindsets and perspectives of end-users, who are actually the teachers, and making them more open to change is just as vital as the technology itself. Teachers who resist change frequently are not opposing the necessity for change; rather, they are avoiding engaging in something for which they lack the essential knowledge and skills (Choy, Suan & Chee, 2012). Furthermore, teachers should always be ready and well-equipped in terms of ICT competencies and have a positive attitude to provide ICT-based learning opportunities for students to improve their learning quality (Ghavifekr et al., 2013). Future studies need to consider other aspects of ICT integration, especially from the management point of view, such as strategic planning and policy-making.

3. METHODOLOGY

3.1 Research Design

The study used the descriptive quantitative research design. This research design was used to determine the profile of the respondents and to measure the level of ICT integration in terms of leadership, curriculum, infrastructure, faculty, and environment. Additionally, this study aimed to determine the differences between the variables under the study.

3.2 Research Instrument

This study used an adapted survey questionnaire as a research instrument in gathering the data. This adapted questionnaire comes from a case study of ICT integration in Philippine provincial public schools in San Isidro Davao Oriental post K-12 implementation (Castillo, 2017). There were nine to fourteen 9-14 questions for each indicator, namely, leadership, curriculum, infrastructure, faculty, and environment.

3.3 Respondents of the Study

The respondents of the study are grouped into two: grades five and grade six. Since the study's respondents have these two grade levels, the researcher employed stratified random sampling. The sample's computation was determined using the slovins formula at 5% error. Table 1 shows the distribution of respondents.

Table 1: Distribution of respondents

Grade Level	No. of Student	Percentage	No. of Respondents
5	60	49%	46
6	62	51%	47
Total	122	100%	93
Grade Level	No. of Teachers	Percentage	No. of Respondents
5	5	56%	5
6	4	44%	4
Total	9	100%	9

4. RESULTS AND DISCUSSION

Presented in this section are the discussion on the presentation and analysis of findings.

4.1 Profile of Respondents

Table 2 shows the frequency and percentage of the respondents in San Rafael Integrated School. The majority of the respondents are female in terms of sex, with a percentage of 53.9%. Respondents are equally distributed with a percentage of 50% for each grade level. In terms of role in the school, the majority of the respondents are students with 84.45%.

Table 2: Profile of respondents in terms of sex, grade level and role in school

Category	Frequency	Percentage
Male	47	46.10
Female	55	53.90
Grade 5	51	50.00
Grade 6	51	50.00
Student	93	84.45
Teacher	9	14.52
Total	102	100.00

4.2 Level of ICT Integration

Table 3 shows that the level of ICT integration in terms of leadership is rarely practiced. The rare integration has contributed to "Investments for school projects are allocated to ICT," which was described as never practiced. This finding is supported by Castillo (2017). There was a limited application of ICT in education due to the absence of ICT standards, guidelines, and policies to fund and invest in ICT projects for the local schools in the Philippines. This finding contradicts the study of Simeon (2022). Since the country is far behind, the growing issues and problems of ICT integration impact student learning outcomes. The public schools, particularly in the Philippines, are having more investments in school projects in ICT, such as electricity, computer, and internet access. Added by Balucanag (2013), the Department of Science and Technology (DOST) annually shares a government network that facilitates the deployment and integration of ICT projects, especially those that deliver common government services.

Table 3: Level of ICT integration in terms of leadership

Description	Standard Deviation	Mean	Remarks
1. Budget given to ICT development.	0.74	2.02	rarely practiced
2. Investments for school projects are allocated to ICT.	0.79	1.65	never practiced
3. ICT priorities/projects are dedicated to teacher development/training.	0.58	2.16	rarely practiced
4. Administration uses computers/the internet as a means of communication to parents of students in the school.	0.84	2.31	rarely practiced
5. Administration uses computers/Internet as a communication tool with other schools within the Philippines.	0.90	2.19	rarely practiced
6. Administration uses computers/Internet as a means of communication with other schools/teachers outside of the Philippines.	0.57	1.76	rarely practiced
7. Faculty and staff regularly use computers in teaching.	0.76	2.34	rarely practiced
8. Faculty and staff regularly use the Internet for teaching.	1.76	1.95	rarely practiced
9. Faculty and staff regularly use computers for record keeping.	1.00	2.39	rarely practiced
Average	0.38	2.10	rarely practiced

Further, the result reveals that "Faculty and staff regularly use computers for record keeping" was also described as rarely practiced due to the rare ICT practice in leadership. As reflected in the study of Smerdon et al. (2000), the teacher and faculty frequently use technology in the classroom and exhibit a wide understanding of ICT tools and equipment functions. Teachers (Trucano, 2005) access ICT technologies such as laptops and computers for routine tasks such as record keeping, lesson plan development, information presentation, and basic information searches on the internet.

Moreover, the majority of the responses in leadership were described as rarely practiced. This finding is supported by the study by Quidasol (2020). A large majority of Public schools in the country fail to compare and align technology plans and lack in providing assessment and assistance to students in improving and modifying instruction. This is due to the lack of teachers' knowledge, experience, training, and leadership in ICT. There was thirty-nine percent of teachers, faculty, staff, and administrators in public schools that had limited access to computers or internet somewhere in their schools because there were only a few sets of available computers given to the school to be used for instruction and other learning areas (National Center for Education Statistics (NCES, 200). The educational leadership in schools with regard to educational integration of ICT requires the elaboration and development of a plan on the school's ICT policy, where the expectations, goals, contents, and actions regarding the use of ICT by educational agents are specified (Area et al., 2018)

Table 4 shows that the level of ICT integration in the curriculum is rarely practiced. The rare practice highly contributed to "Student projects that use computers/Internet as a means to exchange information from students/schools from other countries," which is described as never practiced.

Table 4: Level of ICT integration in terms of curriculum

Description	Standard Deviation	Mean	Remarks
1. Training frequency to teachers for ICT-related topics.	0.75	2.15	rarely practiced
2. Frequency of computers/Internet usage during faculty presentations and meetings.	0.84	1.97	rarely practiced
3. Frequency in training related to the appropriate use of ICT, involving non-government institutions, conducted within an academic year.	0.86	2.01	rarely practiced
4. Subjects taught in school that uses educational software in their curriculum.	0.74	1.67	never practiced
5. Student projects use computers/Internet within the same class.	0.78	2.18	rarely practiced
6. Student projects use computers/Internet in schools with other cities.	0.64	1.53	never practiced
7. Student projects that use computers/Internet with schools from another country.	0.75	1.65	never practiced
8. Student projects that use computers/the Internet to exchange information from students/schools from other countries.	0.59	1.30	never practiced
9. Internet/computers are used as a means to communicate with parents or other members of the community about activities in school.	0.95	2.04	rarely practiced
10. Use of computers/Internet as a means of gathering and analyzing data from resource materials on topics related to key subjects.	0.93	2.07	rarely practiced
11. Use of the Internet/computers as a means to obtain evidence for topics related to key subjects.	0.98	1.98	rarely practiced
12. Use of the Internet/computers as a means to use graphics in reporting related to key subjects.	0.77	1.60	never practiced
13. The usage of the Internet/computers as a means of collecting information about another culture or country.	0.69	1.60	never practiced
14. Usage of the Internet/computers as a means to draw predictions or conclusions from information generated from resource materials related to key subjects	0.67	1.56	never practiced
Average	0.32	1.81	rarely

			practiced

ICT integration encourages students to use digital technologies to fulfil open-ended challenges or research real-world issues and to create school related projects (Technology for Kids, 2022). This finding is supported by study of Valdez (2019) that children in the Philippines prefer access to internet as source of information's such as updates of new toys launched from the internet rather than on communication purposes. As cited by Badri et al. (2017) children in Grade 6 or higher reported to be using social networks mainly for keeping in touch with their family and friends, and to find information.

However, on the other hand, the rare practice of ICT in the curriculum in "student projects use computers/Internet within the same class," was described as rarely practiced. This result contradicts the study of Sutton & Kafai (1999) on how children use a computer in their homes and school. It reveals that children are more dedicated to game playing followed by various other software activities. This finding is also supported in the study of Badri et al. (2017) on the use of digital devices among children. The lack of parental control over internet use is viewed to impact children's use of computers and the internet for game playing and web surfing rather than spending their time on homework.

Moreover, the results also found that majority of the responses were described as rarely practiced. This finding is contradicting the study of Cominghud & Gelacio (2020), public elementary schools in the country highly used ICT in terms of curriculum. This is based on the evident integration of ICT through interactive presentations in the use of digital equipment and facilities. Also, teachers are sensitized in attending seminars and workshops on the need to maximally utilized available e-learning technologies in school (Cominghud & Gelacio, 2020). As added by Bonifacio (2013), another key reason for the restricted use of ICT in classroom instruction is the lack of formal ICT curriculum standards and guidelines for integrating computers into subject areas.

Table 5 shows that the level of ICT integration in terms of infrastructure is rarely practiced. This rare practice in ICT integration contributed to "the bandwidth of the Internet used in school," which was described as never practiced. This finding is supported by Simeon (2022) that one of the infrastructure constraints among the Philippine schools has low computer and low internet access rates, unlike many of its neighboring countries. One of the issues with ICT integration is the limited access or connectivity to the internet (Ghavikr et al., 2013). Also, as supported by Globe Telecom (2016), in primary schools in the country, only 14% have internet access, while the 86% have no data connectivity.

Table 5: Level of ICT integration in terms of infrastructure

Description	Standard Deviation	Mean	Remarks
1. Availability is there for multimedia devices in the number of classrooms in the school.	0.85	1.90	rarely practiced
2. 'Device 'usage per student.	0.60	1.40	never practiced
3. Functioning computers are connected to the Internet.	0.64	1.34	never practiced
4. The bandwidth of the Internet used in school.	0.38	1.09	never practiced
5. Students use the Internet.	0.52	1.19	never practiced
6. Utilization of educational software for the key subjects in school.	0.72	1.39	never practiced
7. Budget allotted to ICT is allocated for new hardware in school.	0.71	1.53	never practiced
8. Budget allotted to ICT is allocated to new software.	0.74	1.47	never practiced
9. Budget allotted to ICT is allocated to the maintenance of computers.	0.63	1.93	rarely practiced
10. Budget allotted to ICT is allocated to the maintenance of the Internet.	0.39	1.16	never practiced
11. Availability of electricity in school for the whole academic year.	0.33	3.95	always
12. Computers maintained.	0.68	2.10	rarely

			practiced
13. Teachers/students trained in ICT usage for classroom use.	0.73	2.70	often practiced
Average	0.23	1.78	rarely practiced

ICT integration encourages students to use digital technologies to fulfill open-ended challenges or real-world research issues and to create school-related projects (Technology for Kids, 2022). This finding is supported by the study by Valdez (2019). Children in the Philippines prefer access to the internet as a source of information, such as updates on new toys launched on the internet, rather than for communication purposes. As cited by Badri et al. (2017), children in Grade 6 or higher reported using social networks mainly for keeping in touch with their family and friends and finding information.

Moreover, the result also reveals that the majority of the responses were described as never practiced. This finding is supported by the study by Ra (2016). Access to ICT in the region's schools in the country is limited due to infrastructure constraints, a lack of investment and research into the uses of ICT in education, and a lack of capacity of teachers and school leaders to use ICT to enhance the quality of teaching and learning. In most cases, there were too few available computers for too many students in the local school. With this, it is very difficult to integrate computer use into instruction (Trucano, 2011). ICT infrastructures (Wong et al., 2011) are the perceived availability and sustainability of ICT tools supplied in schools, such as hardware, software, and peripheral equipment.

Table 6 shows the level of ICT integration in terms of faculty is rarely practiced. In fact, the rare practice highly contributed to "teachers use the Internet/computers as a means to communicate with teachers from other countries," which was described as never practiced. School uses a variety of ICT tools to communicate, create, transmit, save, and manage information (Learning Portal, 2022). As supported by Child Hope Programs Philippines (CHPP, 2021), the local school teachers have customized the use of technology in reaching out to their students outside the school vicinity, and the use of technology enables them to improve their instruction and provide exciting activities through online platforms. Digital media such as Facebook opens the possibility for teachers to create groups for educational purposes, and they've potentially established a good connection between the teacher and the student through communicating and disseminating educational information in digital media (Cunha, Kruistu, & Oers, 2016).

On the other hand, the result also reveals that the frequency in the use of the internet/computers by teachers as a means of gathering information related to lessons taught in class was described as often practiced. Teachers employ computers in various ways as they utilize them to study material, create teacher lessons, and display class webpages, movies, or other educational materials (Hughes, 2021). According to the National Center for Education Statistics (NCES, 2000), the majority of public school teachers with access to computers or the internet in their classroom or elsewhere indicated they used computers or the internet a lot in creating instructional materials.

Table 6: Level of ICT integration in terms of faculty

Description	Standard Deviation	Mean	Remarks
1. Teachers use computers as a teaching tool in their lectures in class.	0.68	2.42	rarely practiced
2. Teachers that use the Internet as a teaching tool in their lectures in class.	0.75	1.88	rarely practiced
3. Frequency in the use of computers by teachers during assessment in class.	0.88	2.21	rarely practiced
4. Frequency in the use of the Internet by teachers during assessment in class.	0.67	1.85	rarely practiced
5. Teachers use the Internet/computers to obtain information related to lessons taught in class.	0.92	2.53	often practiced
6. Frequency in the use of the Internet/computers by teachers as a means of gathering information related to lessons taught in class.	0.88	2.68	often practiced
7. Teachers use the Internet/computers as a means to gather or collect additional/supplemental data or information related to	0.86	2.53	often practiced

Description	Standard Deviation	Mean	Remarks
the curricula of their lessons.			
8. Teachers use the Internet/computers as a means to communicate with o their students or parents of their pupils.	0.76	1.58	never practiced
9. Teachers use the Internet/computers as a means to communicate with their co-teachers in the school.	0.92	2.58	often practiced
10. Teachers that use the Internet/computers as a means to communicate with teachers in other schools.	0.81	2.32	often practiced
11. Teachers use the Internet/computers as a means to communicate with teachers from other countries.	0.85	1.47	never practiced
Average	0.44	2.17	rarely practiced

Moreover, results also found that majority of the responses were described as often practiced. These findings are supported by the study of Bhattacharjee and Deb (2016), that the local school administrators, teachers, and students frequently use ICT technologies to improve teaching and learning, especially in providing tools to enhance learning and for the efficiency in creating assignments and projects. Teachers' ICT integration in terms of teaching and learning uses ICT in preparing lessons and reports, using the internet to search for instructional materials using ICT for communication purposes, and using ICT for online activities and assignments (Kamaruddin et al., 2017).

Table 7 result shows that ICT integration in terms of environment is rarely practiced. This is due to businesses in school using websites, which was described as never practiced. This finding is supported in the study of Paje et al. (2021). There were no available websites but applications accessible by the teachers based on the computer technology instruction in the country. This computer-based instruction includes word processing, spreadsheets, MS publisher, Windows Media Player, Google, and YouTube (Paje et al., 2021). School online platform such as the DepEd Commons was designed to give access to online review, materials, and open educational resources and to support distance learning modalities; however, this platform was only accessible by teachers (DepEd Privacy Policy, 2022).

However, the use of electricity, which is described as often practiced, least contributed to the rare practice of ICT integration in terms of the environment. As mentioned in the survey of the Energy Information Administration (EIA, 2021), modern existence is impossible without electricity. Electricity is used for lighting, heating, electronics, and many more.

Table 7: Level of ICT integration in terms of environment

Description	Standard Deviation	Mean	Remarks
1. Households in school use electricity.	0.81	3.14	often practiced
2. Households in school access television.	0.92	2.78	often practiced
3. Households in school access computers.	0.87	2.28	rarely practiced
4. Households in school access the Internet.	0.72	1.76	rarely practiced
5. Population is covered by mobile access.	0.78	2.27	rarely practiced
6. Population use computers.	0.58	1.69	never practiced
7. Population access Internet.	0.84	1.95	rarely practiced
8. Businesses in school use computers.	0.83	1.84	rarely practiced
9. Businesses in school access the Internet.	0.75	1.42	never practiced
10. Businesses in school use websites.	0.49	1.20	never practiced
Average	0.30	2.03	rarely practiced

As supported by Trading Economics (2020), access to electricity was reported to 98.84% of the population of the entire Philippines as of 2020. In the Philippines (Bostwick, 2022), particularly in rural regions, providing people with reliable energy is challenging, for nearly 30% of Filipinos live in areas where there is no electricity or where brownouts occur.

Moreover, the result also reveals that the majority of the responses were described as rarely practiced. The Philippines (Navarro, 2022) still struggles to complete the electrification of schools where computer package delivery was not met, and the country has low computer and internet access rates. Establishing an enabling environment for ICT-led growth necessitates not just ICT-specific considerations but also macro-level reforms. These levels were strengthening the enabling environment that focuses on improving access to ICT tools and e-development apps (Guermazi and Satola, 2005).

Table 8 shows the level of ICT integration. It further reveals that the local school was seen to rarely practiced ICT integration in school operations. This rare practice contributed to, described as rarely practiced, infrastructure. This findings contradicts the 2009 Philippine Education Technology Master Plan that provides all public secondary schools with an appropriate educational technology package. 75 percent of public schools have a computer laboratory room with basic multimedia equipment and have an electronic library system. As supported on the study of Hani (2022), the DepEd Computerization Program provide ICT packages and IT infrastructure in public schools was allocated 11.3 billion for the 2022 National Expenditure Program, As per the undersecretary for the finance sector, DepEd will receive 629.8 billion from proposed 17.02 trillion estimated budget for the incoming year.

Table 8: Level of ICT integration

Description	Standard Deviation	Mean	Remarks
1. Leadership	0.38	2.10	rarely practiced
2. Curriculum	0.32	1.81	rarely practiced
3. Infrastructure	0.23	1.78	rarely practiced
4. Faculty	0.44	2.19	rarely practiced
5. Environment	0.30	2.03	rarely practiced
Overall	0.24	1.98	rarely practiced

However, the result also shows that faculty, described as rarely practiced least, contributed to the rare practice of ICT integration. This finding contradicts the study of Oduor (2018), that majority of teachers in public schools had a serious challenge in using ICT in their teaching that there were 84.2% of the teachers struggled in using technology in the classroom because they lacked ICT skills and other ICT services. In the country (Eramus Learning Academy, 2021), there's a growing trend toward integrating ICT into teaching and training in local schools. It allows the faculty teachers to participate in the ICT training courses, where participants develop concrete ICT skills and best practices.

Moreover, results have shown that the majority of the variables of the study were described as rarely practiced. This finding is supported by the study by Tomaro (2018). There was a successful integration of ICT in education due to local schools implementing policies to add ICT training, provision of computer infrastructures, integration of ICT in the curriculum in a strategized manner, strong leadership, and the available ICT resources in the school environment. As supported by Moreno (2015), the implementation of ICT in teaching depends upon sufficient access to ICT tools, ICT open-minded teachers, and the government and stakeholders' facilitation in the integration of ICT in school. Integrating ICT in school practices involves a radical shift from the traditional instruction model of knowledge transmission to autonomous, active, and collaborative learning through students' engagement in ICT-based learning environments and shared learning resources (International Gemological Institute Global 2022).

4.3 Differences of ICT Integration

Table 9 shows that ICT integration differs significantly when sex becomes the basis for grouping the respondents. It further reveals the practice of ICT integration significantly differs between males and females. This difference contributed much when ICT integration between males and females differ significantly in terms of faculty.

Table 9: Significant difference of ICT integration in sex

Factors	t-value	p-value	Interpretation
A. Leadership	-2.424	0.017	There is a significant difference between males and females in their ICT integration in terms of leadership.
B. Curriculum	-0.698	0.490	There is no significant difference between males and females in their ICT integration in terms of curriculum.
C. Infrastructure	-0.262	0.794	There is no significant difference between males and females in their ICT integration in terms of infrastructure.
D. Faculty	-3.994	0.000	There is a significant difference between males and females in their ICT integration in terms of faculty.
E. Environment	1.952	0.054	There is a significant difference between males and females in their ICT integration in terms of environment.
ICT Integration	-1.966	0.052	There is a significant difference between males and females in their ICT integration.

Gebhardt et al. (2019) emphasized that female teachers effectively provide role models for young women in using technology at school. However, previous studies have shown that female teachers are less likely to be using computers personally than their male counterparts. It was considered that teachers were unaware of their occasionally gender-based instruction since there were not enough computer-literate female teachers who could serve as role models for girls (Volman & Eck, 2001). Volman (1994) discovered that school teachers were frequently eager to assist girls by demonstrating how to accomplish computer activities. Boys, on the other hand, were frequently encouraged to find out themselves, resulting in increased self-confidence.

However, the result shows no significant difference between males and females in terms of curriculum. This least contributed to the differences in ICT integration in terms of sex. This finding contradicts the study of Punter et al. (2016). Males' students possess better skills on computers compared to females. Boys are more motivated to explore diverse uses of computers as a result of the perceived masculinity of computers, improving their knowledge and confidence (Ertl and Helling, 2011). Girls' computer use is often practiced limited to schooling, according to research, but boys use computers far more frequently for leisure activities (BECTA, 2008)

Moreover, the majority of the result shows that ICT integration significantly differs between males and females. This finding is supported by the Australian National Assessment Program for ICT literacy (Gebhardt et al., 2019; ACARA, 2015). It founds that the measures of ICT self-literacy were not equivalent for males and females: males were shown to be more confident than females about using ICT. As supported by the study of Computer in Education (Janssen, Reinen, & Plomp, 1993; COMPED, 1992), most students in the primary, secondary, and higher schools in the country outperformed girls in functional knowledge and skills in ICT. According to Meelissen (2008), the disadvantage of girls in terms of computing attitudes had grown less obvious. Where gender differences were found, girls were more likely to have a less favorable attitude towards computers than boys.

Table 10 shows a significant difference in ICT integration in terms of grade level. The result of the study further reveals that the ICT integration between grade 5 and grade 6 shows no significant difference. This is because the ICT integration in leadership did not differ significantly between grade 5 and grade 6. This finding is contradicted by the study by Gerick, Eickelmann, and Bos (2017) that teachers and students differ significantly in terms of using ICT as a tool in teaching and learning. Compared to teachers from lower grades, teachers from higher grade levels in ICT leadership reported higher levels of perceived usefulness of computers, perceived learning outcomes for students, and more frequent use of computers (Hatlevik & Arnseth, 2012). As added by Gerick Eickelmann and Boss (2017), teachers and students on higher grade levels are perceived to have higher confidence in using the computer for teaching and learning in a more oriented and thoughtful way compared to the lower grade.

Table 10: Significant difference of ICT integration in grade level

Factors	t-value	p-value	Interpretation
A. Leadership	1.124	0.264	There is no significant difference between grade 5 and grade 6 in their ICT integration in terms of leadership.
B. Curriculum	0.566	0.572	There is no significant difference between grade 5 and grade 6 in their ICT integration in terms of curriculum.
C. Infrastructure	0.033	0.973	There is no significant difference between grade 5 and grade 6 in their ICT integration in terms of infrastructure.
D. Faculty	-1.121	0.265	There is no significant difference between grade 5 and grade 6 in their ICT integration in terms of faculty.
E. Environment	0.065	0.948	There is no significant difference between grade 5 and grade 6 in their ICT integration in terms of the environment.
ICT Integration	0.118	0.906	There is no significant difference between grade 5 and grade 6 in their ICT integration.

However, the result of ICT integration in terms of infrastructure shows no significant difference between the two grade levels. These findings also contradicted the study that the access to ICT equipment in school also differs significantly between grade levels. There was less favorable for students to access computers in lower grades than those in the higher grade are provided with great ICT equipment (Gerick, Eickelmann, & Bos, 2017). Favorable ICT equipment situation plays an important role in the use of ICT in education by the teachers and the students. Many students and teachers in higher grades are more equipped with ICT-related skills than those in lower grades. Definitely, students and teachers who lack the potential, experience, and skills to access ICT equipment indicate that they will not be given priority in the issuance to own or access ICT equipment (Gerick, Eickelmann, & Bos, 2017).

Moreover, the majority of the results further reveal that there is no significant difference between grade 5 and grade 6 in their ICT integration. This finding contradicts the study of Borgonovi and Pokropek (2021). ICT use differs significantly in their grade level by which a lower grade level is found to have low access to ICT than the usage of higher grades. As cited by the Organization for Economic Cooperation and Development (OECD, 2015), moderately, those who use computers in school have a higher level of attainment than the students who use computers only sometimes. The report shows that there were 72% of students aged 15 and above have their own computer at home, which indicates that students that belong to higher grades are considerably required to use computers and the internet for they were already expected to be aware and properly use computers (OECD, 2015).

Table 11 shows that ICT integration differs significantly when role in school becomes the basis of grouping the respondents. It further reveals that ICT practice in local school operations significantly differs between students and teachers. This is highly contributed to the ICT practices or integration that shows a significant difference between the students and teachers in all indicators, namely leadership, curriculum, infrastructure, faculty, and environment.

Table 11: Significant difference of ICT integration in role in school

Factors	t-value	p-value	Interpretation
A. Leadership	11.293	0.000	There is a significant difference between students and teachers in their ICT integration in terms of leadership.
B. Curriculum	7.714	0.000	There is a significant difference between students and teachers in their ICT integration in terms of curriculum.
C. Infrastructure	8.142	0.000	There is a significant difference between students and teachers in their ICT integration in terms of infrastructure.
D. Faculty	7.715	0.000	There is a significant difference between students and teachers in their ICT integration in terms of faculty.
E. Environment	4.539	0.000	There is a significant difference between students and teachers in their ICT integration in terms of the environment.
ICT Integration	15.874	0.000	There is a significant difference between students and teachers in their ICT integration.

These findings are supported by the study of Ghavifekr et al. (2013) that teachers and students differ in ICT integration. Teachers are known to be normal users and frequently use ICT more in their classroom by doing their work and in the teaching and learning process than students, who are more likely to have limited access to

ICT tools and devices. Students in elementary grades primarily had minimal knowledge about computers. Many studies have found that children often practiced use computers for watching videos and game playing (Wu, 2003). As for teachers, they were found to have minimum knowledge about computers. They often practiced use computer technology to prepare instructional materials, improve instruction quality, and integrate computer use in teaching and learning. It is the teacher's job to guide the students, whereas the computer will serve as a supplement to instruction (Wu, 2003).

4.4 Implication to Education

The use of ICT in the classroom is very important in providing opportunities for students to learn to operate a piece of information (Habibu, Mamun, & Clement, 2012). As indicated in the study by Wang & Dostal (2017), ICT is integral to implementing quality education. ICT can improve the outcomes in education, manifested by the changes related to the teaching form, and teaching environment, which significantly helps facilitate creative and interactive teaching and learning. However, on the other side, this study implied that the local school is very problematic in ICT integration. As indicated in the discussions and tabulations of this study, the local school of San Rafael Integrated School is poor in the level of ICT integration in terms of leadership, curriculum, infrastructure, faculty, and environment. This study further implied that students were unaware and informed about the local school practices on ICT integration. ICT integration was seen not transparent to the student where the local school teacher, faculty, and staff seem to be using computers, the internet, and other technologies in the school.

Factors that greatly affect the poor ICT integration in the local schools were the lack of genuine software, inadequate computer in the classroom, low speed internet, lack of motivation from both teacher and student side to use ICT, lack of proper training skills, unavailability of latest ICT equipment, lack of expert technical staff, poor administrative support, and poor curriculum (Bingimlas, 2009). As added by Usluel, Askar, & Bas (2008), the insufficiency or absence of ICT facilities appears to be a great challenge in adopting ICT integration in education. It is therefore suggested that there is a need to strengthen ICT integration through teachers' ongoing professional development to new pedagogy and ICT-related tools to enhance the teaching-learning process (Flecknoe, 2010). Moreover, it is also important for teacher trainers and policymakers to understand the problems, barriers, and cost-effectiveness of diverse approaches to ICT use to appropriately and successfully integrate ICT in the teaching-learning process (Habibu, Mamun, & Clement, 2012).

5. CONCLUSION

Based from the research findings throughout the study, it concluded that:

1. Majority of the respondents were male, and most of them were students. The respondents were equally distributed to Grade 5 and Grade 6.
2. The level of ICT integration is seen to be rarely practiced specifically in terms of leadership, curriculum, infrastructure, faculty, and environment.
3. The ICT levels of integration seem to be significantly different when respondents were categorized in terms of sex and role in school. However, grade level did not significantly affect how they assess ICT integration.

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