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TEACHERS' ICT INTEGRATION AND LEARNERS' 21ST CENTURY SKILLS: BASIS FOR AN INTERVENTION PLAN

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Abstract : Information Communication Technology is transforming education, necessitating teachers' competence and understanding of technical, curricular, administrative, and social dimensions to effectively integrate ICT programs in education. The study aimed to assess teachers' ICT integration and learners' 21st-century skills in the selected districts of the Division of Misamis Oriental during the School Year 2023-2024. The study sought to describe the respondents' characteristics; assess the level of teachers' ICT integration; examine the level of learners' 21st-century skills; and determine the significant relationship between teachers' ICT integration and learners' 21st-century skills; test the significant difference in the respondent's ICT integration and 21st-century skills when grouped according to their characteristics; and develop an intervention plan on ICT integration based on the findings of the study. It involved two hundred three (203) teachers and four hundred six (406) learners in public secondary schools of the aforesaid division employing a universal sampling procedure with a patterned and modified questionnaire from a Merillo and Domingo (2019) study. The descriptive-correlational method was used to evaluate the sample, with multiple correlation analyses and F-tests used to test the relationship between teachers' ICT integration and learners' 21st-century skills.

The study found that teachers can create dynamic learning environments by incorporating relevant content and tools, but limited digital media exposure may affect 21st-century skills. Further, ICT integration enhances learning by making it interactive, promoting active learning, teamwork, and exploration. However, geographical location, limited ICT tools, and lack of exposure to different tools pose significant barriers for some learners. Moreover, it is recommended that teachers should utilize the intervention plan to enhance ICT integration and learners can develop basic multimodal literacy skills.

Keywords: **ICT integration, 21st-century skills**

I. INTRODUCTION

Information and Communication Technologies are manipulating all parts of life including education and the role of ICTs in education is habitual and unavoidable. To make ICT integration programs useful and valuable to the schools, teachers must be knowledgeable when using technology, as well as having an in-depth awareness of the technical and social aspects of ICT use in the educational system.

Learners who acquire 21st-century skills appear to be more equipped to handle issues in the future. Using ICT in the classroom setting, learners are guided in acquiring digital and literacy skills necessary for the present globalization. Thus, ICT can support learners in expanding their knowledge and information, refining their capabilities, and increasing their enthusiasm. Since technology is dynamic, integrating it into their learning is a challenging undertaking. Planning for the integration of ICT in education is therefore seen as a vital component for the advancement and development of information, creating knowledge, sharing resources, and participating as a creative member in the worldwide economy.

Advances in science and technology have influenced every element of human life. Education, teaching, and learning have all been significantly impacted by them. In the realm of education, as a consequence of the most recent research, discoveries, and investigations, such strategies have been established that aid in the achievement of all educational goals. These competencies and skills, which are especially based on science, are given the name of educational technology (Dixit, 2022).

In the Philippines, the integration of ICT in teaching is also strengthened. With the birth of its K to 12 program, the use of ICT is highly promoted in teaching almost all learning areas, including language teaching. ICT curriculum standards for K to

12 schools in the Philippines will serve as the framework for technology integration in various academic content area instructions from kindergarten to senior high school, serve as a guide for curriculum decisions by providing the students' performance expectations in the areas of knowledge, skills, and attitudes, and provide examples of classroom activities and instructional strategies utilizing ICT that will guide teachers as they design instruction to help their students meet learning expectations (Merillo & Domingo, 2019).

Information and Communication Technology in education allows for new education for both teachers and. It not only allows schools to ensure that students have access to educational materials within the classroom, it also allows them to ensure students in non-classroom contexts, such as their homes. When ICT is integrated into lessons, both teachers and students become more involved in their work. It's because technology makes it easier to teach the same subjects in a variety of ways. Because of this enhanced engagement, students remember knowledge more efficiently and effectively. One of the skills for the 21st century includes evaluating, planning, monitoring, and reflecting (Nabos & Orivida, 2024).

Rana and Rana (2020) believed that the teachers' low level of ICT knowledge and skills seemed to be barriers to effective use of the available ICT resources in teacher education. Nevertheless, their lack of sufficient technology skills was found to be causing the teachers' low level of ICT use in the classroom. It indicates that ICT training was a fundamental need, particularly for teachers who were mainly responsible for changing traditional teaching strategies to modern learning way

Most of the challenges in the sector that the country is currently facing are lack of ICT infrastructure, high cost of internet connectivity, cybersecurity threats, digital gap, lack of ICT adoption in agricultural extension, and insufficient demand for connectivity in accessing online content and platforms, especially in rural areas and unserved regions (ECCP, 2022).

Nowadays, there is a profound influence of Information and Communication Technology on the educational landscape. In an era characterized by extraordinary technological advances, this study explores the teachers' ICT integration and learners' 21st-century skills. It aims to reveal the multifaceted consequences, both positive and difficult, that arise when ICT becomes increasingly intertwined with learning.

1.1 **Theoretical Framework**

This study made use of the Perceptual Control Theory (PCT) of William T. Power (1950). This theory uses a non-behavioristic approach to describe how people act. Instead of mindlessly and reflexively reacting to stimuli, PCT defines behavior by controlling perception. Each action that individuals perform is meant to improve the actor's current perspective to better match their preferred reference level. According to Mansell (2021), in this theory, behavior is the 'control of perception'. At any moment, it varies outputs to keep the inputs (sense and experience) the way it wants them to be getting just right. To do this, one has to utilize what is in the environment and act against any disturbances that one wants. It is a Goldilocks theory of life. One can make an effort to keep whatever memory is important in a favored state, whether it be the humidity of the breakfast cereal, the pitch of one's speech, or what level of stress one can bear.

The role of the nervous system in controlling complex environmental aspects through negative feedback mechanisms. It follows objective visual information from the retina to facial perceptions, transforming into subjective social contingencies and cultural norms. The article integrates Powers's PCT levels of control into a developmental model for examining organism-environment interactions (Osei & Bjorklund, 2024).

Moreover, according to the idea, perceptual inputs are modulated by systematic negative feedback, as shown through human tracking investigations. A rigorous literature search discovered proof that humans trace various reference states and respond to disturbances and hierarchical PCT may emulate complicated tracking. However, limitations exist in tracking conditions. Future research should focus on real-world tasks and goal-oriented robotics architectures (Parker et al., 2020).

According to the study of Eder (2023), emotional feelings are crucial for action control, as they are interoceptive signals integrated with perceptual contents from simulated events. A conative emotion signal represents a desire for a certain perceptual alteration, increasing its activation of cognitive and motor structures, leading to a tendency for action.

In this, this theory is a framework used to understand behavior, cognitive behavior therapy, and the basis of complex tasks. It asserts that behavior is the control of perception and is directed by goals and the aim to align experiences with these goals. PCT suggests that if a gap is perceived between a goal and current experience, behavior change occurs through reorganization. However, without feedback, prescribers may perceive their prescribing behaviors as appropriate, as they are controlling a perception rather than an action (Ferguson et al., 2018).

1.2 **Conceptual Framework**

The issuance of DepEd Order 78, s. 2010, with the legal mandate of promoting the right of all citizens to take appropriate steps in making education accessible to all, the Department of Education (DepEd) is geared towards the transformation of education through the DepEd Computerization Program (DCP). It seeks to offer public schools appropriate technology that will improve the way students learn and deal with the difficulties of the 21st century. This initiative will address the computer backlog in public schools by offering hardware and software, as well as instruction in simple troubleshooting. This program, together with the work of various government departments and the private sector, has delivered at least one computer laboratory to each of 5,409 public secondary schools. This covers 10 to 20 computer facilities, including peripherals, depending on the organization that provides the equipment.

Murugesan (2021) states that 21st-century learners are empowered by self-directed learning by taking control of learning at his or her place, pace, and time. The teachers use technologies for life-long learning such as research, update and enhance "Deep Learning" by the use of digital technology-based teaching/learning resources. Digital technology can be used by teachers or online academic interaction through seminars, workshops, and video conferencing. It suggests that the learner will learn better when he or she constructs their knowledge. Therefore, there is a need for active participation in the teaching and learning processes.

The researcher used the framework provided by Merillo and Dominggo's (2019) study to determine and adapt the independent variable for this research project. It provides a structured approach to analyze the teachers' ICT integration and learners' 21st-century skills, ensuring that variables are considered in the research design and analysis.

Moreover, the researcher adapted the dependent variable using Murugesan's (2021) study as inspiration and a guide. The 21st-century learners must use ICT to build higher-order thinking skills. These are essential for addressing challenging real-world issues. Everyone must use interactive teaching methods, and when 21st-century digital trends emerge and a generation of tech-savvy young people is born, the function of education will undoubtedly change.

To apply general concepts that are integral to the study, Figure 1 shows the schematic presentation of the interplay between independent, dependent, and moderating variables in the study. The 1st part is the teacher respondents' characteristics, which include age, sex, civil status, position, highest educational attainment, teaching experience, preference of teaching style, availability of ICT tools at home, ICT utilization across subject areas, and frequency of ICT usage. The learner respondents' characteristics include sex and parents' civil status.

The 2nd part is the teachers' ICT integration in 21st-century learning in terms of integration in teaching, integration for learners' learning, and integration in teaching and learning. The 3rd part is the learners' 21st-century skills such as multimodal literacy, communication and collaboration, questioning, creative thinking, reflection, critical thinking, and problem-solving.

Teachers can effectively use ICT integration in 21st-century learning and put this Intervention Plan into practice. The standards for research will continue to offer the needed framework and ethical guidelines simultaneously. With the support of this comprehensive approach, teachers will be able to actively contribute to the advancement of ICT integration in the classroom setting. Ultimately, the collaboration would help learners to be skillful, the schools, and society at large by creating an innovative, evidence-based, and excellence-focused learning environment.

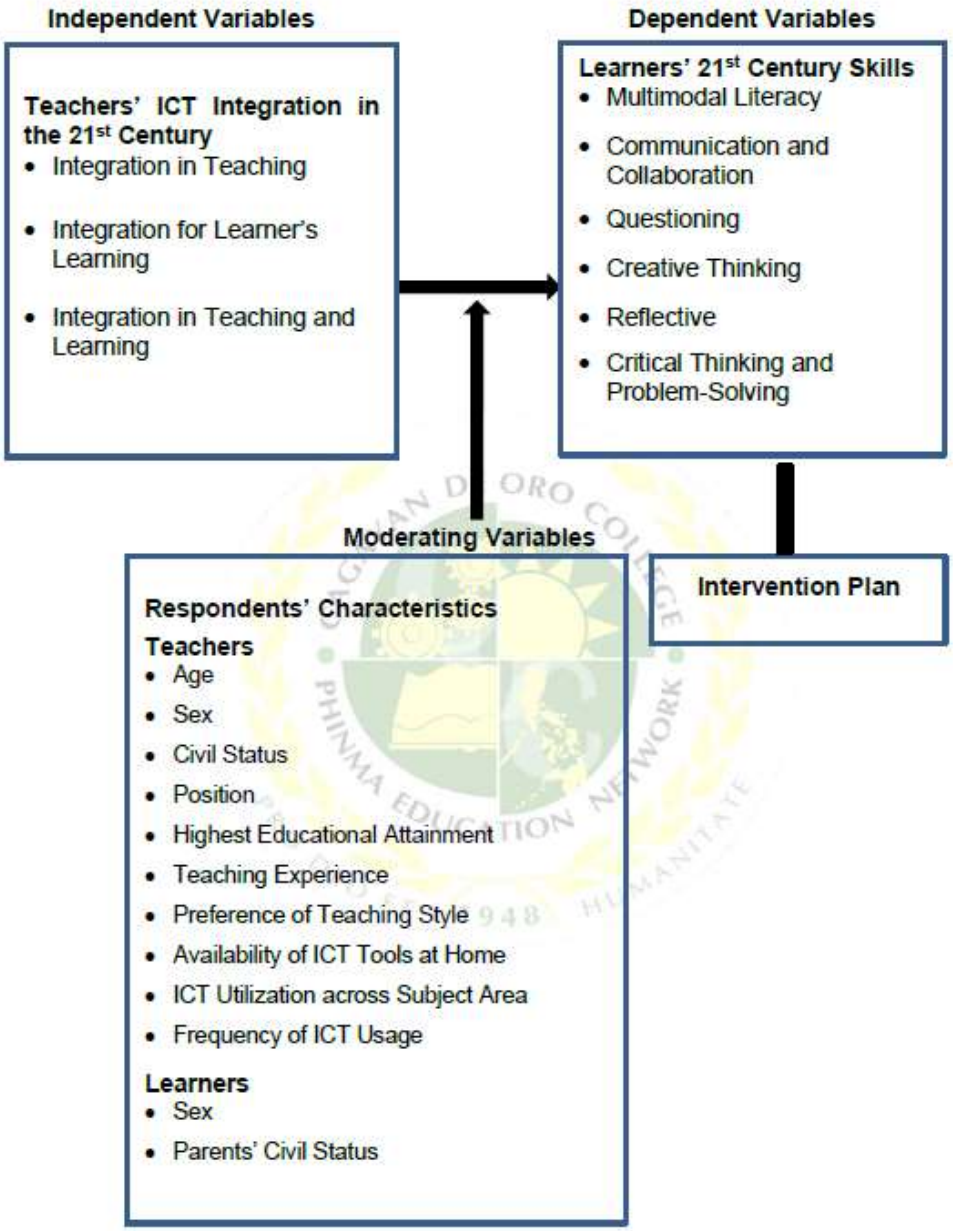

Figure 1. *A Schematic Presentation on the Relationship Between Independent, Dependent, and Moderating Variables of the Study*

1.3 Statement of the Problem

This study aimed to determine the level of teachers' ICT integration and learners' 21st-century skills in selected districts, Division of Misamis Oriental, during the School Year 2023-2024.

Specifically, this paper sought to answer the following questions.

1. What are the characteristics of the teacher-respondents in terms of age, sex, civil status, position, highest educational attainment, teaching experience, preference of teaching style, availability of ICT tools at home, ICT utilization across subject areas, and frequency of ICT usage and learner respondents in terms of sex and parents' civil status?
2. What is the level of teachers' ICT integration in the 21st century in terms of integration in teaching, integration for learner's learning, and integration in teaching and learning?
3. What is the level of the learners' 21st-century skills based on multimodal literacy, communication, collaboration, questioning, creative thinking, reflective and critical thinking, and problem-solving?
4. Is there a significant relationship between the teachers' ICT integration and learners' 21st-century skills?
5. How do the respondents compare their ICT integration and 21st-century skills when grouped according to their characteristics?
6. Based on the findings of the study, what intervention plan can be designed?

Hypothesis

Problems 1, 2, 3, and 6 were hypotheses–free. Based on Problems 4 and 5, the following null hypotheses were tested at a 0.05 level of significance:

HO_1: There is no significant relationship between the teachers' ICT integration and learners' 21st-century skills.

HO_2: There is no significant difference in the respondents' ICT Integration and 21st-century skills when grouped according to their characteristics.

2. METHODOLOGY

This part discusses the methods and procedures used in the study. This includes the discussion of the research design, study setting, research respondents, sampling technique, research instrument, categorization of variables and system of scoring, data gathering procedure, and statistical technique used in analyzing the data gathered in the study.

2.1 Research Design

This study made use of descriptive-correlational methods of research evaluating a sample at a specific time point without attempting to make inferences or causal claims. A descriptive study design is a useful instrument utilized by scientists and researchers to collect data on a specific group or topic. This form of research presents a comprehensive and precise representation of the attributes and behaviors of an individual or subject. By observing and collecting data on a given topic, descriptive research helps researchers gain a deeper understanding of a specific issue and provides valuable insights that can inform future studies (Sirisilla, 2023).

To achieve the goals set out in this study, data was collected using a questionnaire and in-depth interviews. This study used a quantitative research approach, which involves gathering and examining numerical data to analyze and explain events. This research design is rated suitable for the teachers' ICT integration in 21st-century learning.

2.2 Study Setting

This study was conducted in the select District of Misamis Oriental Division. This school is from Alubijid, Laguindingan and Gitagum. The schools namely: Laguindingan National High School, Kibaghot National High School, Mauswagon Integrated School, and Tubajon Integrated School. One (1) school in Alubijid East District namely; Alubijid National Comprehensive High School. Two (2) schools in Alubijid West District namely; Sampatulog Integrated School and Lourdes-Alubijid National High. Libertad District namely; Libertad National High School. These Districts are located in the 2nd Congressional District in the Province of Misamis Oriental. The researcher chose this district for expediency.

Laguindingan is a fourth-class municipality in Misamis Oriental, Philippines. It is presently the new entry point to Northern Mindanao. According to the 2020 census, the population is 26,363. Its primary landmark is the Laguindingan Airport, which is located between Cagayan de Oro City and Iligan City. The common agricultural produce aside from corn, cassava, and copra is the "Finest Tobacco." This has driven the town to progress and its neighboring towns for decades. The tobacco industry before the Airport is also an attraction for Businessmen.

Alubijid is a fourth-class municipality in the Province of Misamis Oriental, Philippines. According to the 2020 census, its population is 32, 163 people. When El Salvador and Alubijid petitioned to become municipalities in 1933, they were both part of Cagayan de Misamis (now Cagayan de Oro). Alubijid was established as a distinct town in 1940, and El Salvador followed in 1949. It is home to an impressive selection of attractions and experiences, making it well worth a visit. Today, Alubijid is home to scenic attractions, rich cultural heritage, and natural beauty.

Libertad is a coastal area, a municipality in the province of Misamis Oriental. According to the 2020 census, it is a 5th-class municipality having a population of 12,948. It is famous for its Barungoy Festival and is home to the Initao-Libertad Protected Landscape and Seascape, which it borders with the nearby Initao Municipality. It is politically subdivided into nine barangays. The main jobs of the people of Libertad are fishing, farming, construction workers and housekeeping.

2.3 Research Respondents

The respondents of the study were the two hundred three (203) Public Junior High School teachers and the four hundred six (406) learners from the select districts of the Division of Misamis Oriental during the School Year 2023-2024. They have the same characteristics as those of the actual respondents in terms of age, sex, position, highest educational attainment for teachers and learners in terms of sex, and parents' civil status. The distribution of respondents by district and by school is shown in Table A.

Table A

Distribution of Respondents

District	Name of School	Teacher-Respondents	Learner-Respondents
Laguindingan	Laguindingan National High School	58	116
	Kibaghot National High School	7	14
	Mauswagon Integrated School	6	12
	Tubajon Integrated School	6	12
Alubijid East	Alubijid National Comprehensive High School	70	140
	Sampatulog Integrated School	8	16
Alubijid West	Lourdes-Alubijid National High School	14	28
Libertad	Libertad National High School	34	68
	Total	**203**	**406**

2.4 Sampling Technique

In this study, a universal sampling procedure was employed in which all Junior High School teachers in that population were included. However, for the learner-respondents, the suggestion of the panel members was considered that for every teacher, there were two (2) learners representing each teacher. In this process, A simple method of random sampling was used to choose learner-respondents, giving each component of the sample an equal chance of being chosen. In this case, the lottery method was used.

2.5 Research Instrument

The research questionnaire for teachers was patterned and modified from the original questionnaire designed by Merillo and Domingo (2019) from the study entitled: Technology In Pedagogy: Teachers' Perception Towards the Effectiveness of ICT Integration In Language Teaching.

The 1st part of the questionnaire asks about the teacher-respondents' characteristics which include age, sex, civil status, position, highest educational attainment, teaching experience, type of school, preference of teaching style, availability of ICT tools at home, ICT utilization across subject area and frequency of ICT usage. The learner respondents' characteristics include sex and parents' civil status.

The 2nd part of the questionnaire examines the teachers' ICT integration in the 21st century. It is composed of ten (10) items that ask the respondents about ICT integration in teaching, ten (10) items about ICT Integration for learners' learning, and ten (10) items about the elements of ICT integration in teaching and learning.

The 3rd part of the questionnaire was for the learner's 21st-century skills. The questionnaire was developed by the researcher to provide precise answers needed for the study and generate standardized, quantifiable, and empirical data. It is composed of six (6) items on each skill namely multimodal literacy, communication and collaboration, questioning, creative thinking, reflective and critical thinking, and problem-solving.

2.6 Data Gathering Procedure

A recommendation letter from the Dean of the School of Graduates and Professional Studies of PHINMA-Cagayan De Oro College was secured by the researcher.

A letter signed by the researcher and her adviser asking permission to conduct the study in the selected public schools in the Division of Misamis Oriental for the School Year 2023-2-24 was sent to the Schools Division Superintendent of Misamis Oriental.

As the permission was granted, the researcher submitted a letter request asking permission from the School Heads to allow the teachers and learners of their respective schools to become participants in the study. The researcher highlighted and reassured the respondents' discretion. The survey questionnaire was personally administered by the researcher. The teachers and learners answered the questionnaire for 5-10 minutes. The questionnaires were retrieved after they completed the survey.

To gather the respondents' opinions, in-depth interviews from the selected public secondary school teachers and learners in the Division of Misamis Oriental were conducted. The teacher-respondents comprised ten (10) teachers from different teaching positions with Teacher I to Master Teacher I to provide diverse perspectives in integrating ICT into the class. For the learner-respondents, ten (10) learners were interviewed from different levels. Five learners were low-performing and the other five (5) were high-performing in the class. There were five (5) guide questions asked to the learner-respondents. Each interview took about 10 to 15 minutes, giving the respondents an adequate chance to share their thoughts and experiences. The results of the discussion were presented in a table.

2.7 Categorization of Variables and System of Scoring

Part I. Respondents' Characteristics

A. Teacher-Respondents

Age

50 years old and above
41-50 years old
31- 40 years old
30 years old and below

Sex

Male
Female

Civil Status

Single
Married
Separated
Widowed

Position

Master Teacher II
Master Teacher I
Teacher III
Teacher II
Teacher I

Highest Educational Attainment

Doctorate Degree
With Doctorate Degree Units
Master's Degree
With Master's Degree Units
Bachelor's Degree

Teaching Experience

25 years and above
20-25 years
16-20 years
11-15 years
6-10 years
5 years and below

Preference of Teaching Style

Traditional
Modern (Use of ICT)

Availability of ICT tools at Home

Smartphone	Tablet	Laptop
Personal Computer	Internet Connection	Printer
Smart TV	Projector	Scanner
Radio	Others, please specify	

ICT Utilization across Subject Area

Mathematics	Filipino	Araling Panlipunan
Science	MAPEH	Edukasyon sa Pagpapakatao
English	TLE	

Frequency of ICT Usage

5-8 hours daily	Once a week	During Exam only
1-4 hours daily	Once a month	Others, please specify

B. Learner-Respondents

Sex

Male
Female

Parents' Civil Status

Solo Parent
Married
Widow/Widower

Part II. Teachers' ICT Integration in the 21st Century and Learners' 21st Century Skills

Scale	Range	Description	Interpretation
4	3.26 – 4.00	Strongly Agree	Very High
3	2.51 – 3.25	Agree	High
2	1.76 – 2.50	Disagree	Low
1	1.00 – 1.75	Strongly Disagree	Very Low

2.8 Statistical Treatment of Data

After collecting and recording the data gathered in this study, the researcher used the following statistical treatment tools: Descriptive statistics, such as frequency and percentage distribution, used to describe the relative frequency of the respondents' characteristics, and the mean and standard deviation identified the average of a group of scores such as teachers' ICT integration in the 21st century in terms of integration in teaching, integration for learners' learning, integration in teaching and learning and learners' 21st-century skills based on multimodal literacy, communication and collaboration, questioning, creative thinking, reflective and critical thinking and problem-solving.

Multiple Correlation Analyses were used to test the significant relationship between the teachers' ICT integration and learners' 21st-century skills. Further, F-test and P-test were used to determine the significant difference in the respondents' ICT integration and 21st-century skills when grouped according to the characteristics.

3. RESULTS AND DISCUSSION

This chapter discusses the results and discussions of the data gathered from the survey questionnaires given to the respondents to determine the level of teachers' ICT integration and learners' 21st-century skills in selected districts, Division of Misamis Oriental for the School Year 2023-2024.

3.1 Results

Problem 1. What are the characteristics of the teacher-respondents in terms of age, sex, civil status, position, highest educational attainment, teaching experience, preference of teaching style, availability of ICT tools at home, ICT utilization across the subject area, and frequency of ICT usage and learner-respondents in terms of sex and parents' civil status?

Table 1
Distribution of Teacher-Respondents' Age

Category	Frequency	Percentage
51 years old and above	27	13.30
41-50 years old	63	31.00
31- 40 years old	80	39.40
30 years old and below	33	16.30
Total	**203**	**100.00**

Table 1 shows the teacher-respondents' characteristics in terms of **age**. Results show that out of 203 respondents, **80 (39.4%) are 31-40 years old.** This means that many of the teacher-respondents belonged to the 31-40-year-old age bracket. The

phrase there is no one best age to be a teacher means that each age has its exceptional advantages and disadvantages when it comes to teaching. Hence, these teacher-respondents have possibly established a systematic grasp of their learning areas, advanced their teaching methodologies, and accumulated numerous years of teaching experience. This age group often reveals an exceptional blend of vigor, innovation, and experience, making valuable contributions to the teaching profession. According to the study by Ekici et al. (2024), teachers between the ages of 31-40 had higher creative leadership perceptions. In other words, with a 100% unit increase in school principals' creative leadership dimension, the teachers' professional motivation perceptions will also increase.

Meanwhile, the **lowest frequency** of **27 (13.3%)** of the teacher-respondents are **51 years old and above**. This means that they have been in the department for so long and are of the desirable age. These desirable teachers frequently have an abundance of experience, knowledge, and wisdom. It is possible that they made substantial contributions to their schools and communities and shaped the lives of many learners. Mettillo and Pasco (2023) found that about-to-retire teachers often struggle in their early years, seeking help from co-teachers and the School Principal. They often face idealistic goals, but reality sets in, including discouragement, personal illness, and struggling with planning and grading.

Table 2
Distribution of Teacher-Respondents' Sex

Category	Frequency	Percentage
Male	46	22.70
Female	157	77.30
Total	**203**	**100.00**

Table 2 shows the teacher-respondents' characteristics in terms of **sex**. Results show that out of 203 respondents, **157 (77.3%)** are **female**. This means that the majority of the teacher-respondents are female. In the educational system in the Philippines, teaching is a woman-dominated profession. Female educators are essential, offering their expertise, experience, and enthusiasm to help learners advance especially in this 21st century learning. They offer a variety of viewpoints and nurturing behaviors and frequently act as role models for their learners. They exhibit an exceptional commitment to their field, putting endless effort into establishing friendly and heartening learning environments where every learner can thrive. Bongco and Abenes (2019) stated that the Philippine Commission on Women's data from 2008-2009 shows that 89.58% of public elementary and 77.06% of public secondary teachers are female, highlighting the global issue of feminization in the teaching profession. This issue promotes social exclusion and gender inequality, rather than women's empowerment.

On the other hand, the **lowest frequency** of **46 (22.7%)** of the teacher-respondents are **Male**. It means that female teachers outnumbered male teachers, predominantly in certain levels of education and learning areas. Since there are not enough male educators, boys and young men may see fewer male educators as realistic career possibilities, which could perpetuate the cycle. Men may be discouraged from pursuing careers in teaching by social conventions and prejudices because they believe that teaching is not a masculine vocation. Singer (2023) found that according to the National Center for Education Statistics, 77% of public school teachers were female in 2020-21, with only 11% male at elementary and 36% at secondary levels. The stereotype of male teachers as disciplinarians is based on gender stereotypes, rather than reality.

Table 3
Distribution of Teacher-Respondents' Civil Status

Category	Frequency	Percentage
Single	58	28.60
Married	143	70.40
Widow/Widower	1	0.50
Separated	1	0.50
Total	**203**	**100.00**

Table 3 shows the teacher-respondents' characteristics in terms of **civil status.** Results show that out of 203, **143 (70.4%)** are **married**. This means that the majority of the teacher-respondents are married. It implies that it is not unusual for teachers in the Philippines to be married. Getting married is a remarkable milestone and a shared goal for individuals. It is highly valued in Filipino culture, and many individuals aspire to build relationships with partners and start families. Teachers can help build connections and relationships that lead to marriage because they frequently have similar beliefs and aspirations for education, community involvement, and family life. The study of Mili (2021) revealed the significant role of women in society, with urbanization, industrialization, and transport and communication requiring them to work in various sectors while also fulfilling family roles, often leading to conflicts and responsibilities outside the home.

Meanwhile, the **lowest frequency** of **1 (0.5%)** of the teacher-respondents are either **widows/widowers or separated**. The results mean that as they navigate bereavement, widowed or separated educators may find it difficult to stay focused on their professional growth and advancement. They can maintain their professional engagement with the support of groups that provide chances for professional development and progress. The Department has also privileged widowed, widower, or separated teachers so they may feel valued, respected, and understood.

According to the study of Afan and Tariga (2022), the respondents who are widows or separated, having experienced adversities in life, have a high level of coping appraisal. Lecturers who utilize more adaptive coping techniques (such as depending

on social support and exerting self-control) have a greater favorable impact. According to study, adaptive coping among lecturers adds to increased endurance, leading to improved levels of happiness and mental health. Self-control, for example, appears to buffer the harmful impacts of negative emotions. Self-control is described as the ability to stop from engaging in undesirable actions that may increase stress.

Table 4
Distribution of Teacher-Respondents' Position

Category	Frequency	Percentage
Master Teacher II	0	0.00
Master Teacher I	11	5.40
Teacher III	49	24.10
Teacher II	27	13.30
Teacher I	116	57.10
Total	**203**	**100.00**

Table 4 shows the teacher-respondents' characteristics in terms of **position**. Results show that out of 203 respondents, **116 (57.10%)** hold a **Teacher I** position. This means that the majority of the teacher-respondents are Teacher I. This shows that most teachers working in schools are recently hired, yet some long-time educators are unable to progress because they do not meet the standards for higher positions in the educational system. This further implies that they need to improve their leadership and teaching abilities. These inexperienced educators require support, particularly in enhancing instructional strategies like inquiry-based learning and problem-based learning in instruction. Dimitroff & Dimitroff (2018) suggest that newly hired teachers face challenges in adapting to new workplaces. They suggest learning school routines, students' expectations, and co-workers' expectations to facilitate integration. Teachers should also apply theoretical training to specific practices, developing themselves as theoretical practitioners and refining accepted ideas about language teaching and learning.

On the other hand, the **lowest frequency** of **11 (5.4%)** of teacher-respondents hold a **Master Teacher I** position. This means that only a few of them are ranked in the MT I position. This may be because there are only a few qualified teachers for the position or because there are only a few MT plantillas in each district or school. These teachers collaborate with the administration of the school to deliver focused instruction leadership in the classroom and the school. By showcasing their mastery of the material and their coaching abilities, these educators assist colleagues in refining their methods in the classroom to match academic requirements and student needs. They design, oversee, and assess the efficacy of professional development initiatives at the building level that are in line with the most important educational objectives. In a study by Clariño (2020), Master Teachers are highly proficient individuals in their schools, working with school heads to supervise teachers. Implementing the Philippine Professional Standards for Teachers (PPST), they observe classes, rate teachers, and provide mentoring, coaching, and technical assistance.

Table 5
Distribution of Teacher-Respondents' Highest Educational Attainment

Category	Frequency	Percentage
Doctor's Degree Holder	4	2.00
With Units in Doctoral Studies	13	6.40
Master's Degree Holder	23	11.30
With Units in Master Studies	125	61.60
Baccalaureate Degree	38	18.70
Total	**203**	**100.00**

Table 5 shows the teacher-respondents' characteristics in terms of **highest educational attainment**. Results show that out of 203 teacher-respondents, **125 (61.6%)** of them have **units in Master's studies**. This means that the majority of the teacher-respondents have units in their Master's studies. It suggests that studying for a master's degree is a personally fulfilling task for a lot of teachers. It allows individuals to challenge themselves academically and pursue their academic interests. It can be a fulfilling experience that enhances one's sense of self-fulfillment and achievement. Others chase master's degrees apparently to grow in their designated position and take advantage of new opportunities in the Department of Education. Figuera-Gazo et al. (2020) highlight that Master's degrees offer specialized training in specific topics, with two types: academic master's for general scientific knowledge preparation for PhD research and professionally oriented master's for professional skills.

Meanwhile, the **lowest frequency** of **4 (2%)** is **Doctor's Degree Holder**. This means that a doctorate program usually takes an extensive amount of time to graduate, requiring several years to finish study. It may be challenging for numerous teachers to balance their doctoral studies with their day-to-day teaching, assessment, and lesson-planning duties. A doctoral degree can be costly to pursue since during the program, tuition, fees, and other costs can build up. Teachers could be reluctant to take on more debt, particularly if they already have other financial commitments. According to Connor (2019), a PhD in Education is a terminal degree ideal for those aspiring to pursue a career in academia or research at the university level. Students in these programs focus on theoretical learning, mastering a specific subject, and conducting original research to drive change in their field.

Table 6
Distribution of Teacher-Respondents' Teaching Experience

Category	Frequency	Percentage
26 years and above	11	5.40
21-25 years	7	3.40
16-20 years	13	6.40
11-15 years	39	19.20
6-10 years	78	38.40
Less than 5 years	55	27.10
Total	**203**	**100.00**

Table 6 shows the teacher-respondents' characteristics in terms of **teaching experience**. Results show that out of 203 teacher-respondents, **78 (38.4%)** have **6-10 years** of teaching experience. The results suggest that many of the teacher-respondents have 6-10 years of teaching experience. Educators with these years of experience may have already created a learner-centered learning environment where learners are actively engaged and encouraged to explore, ask questions, and cooperate. Teachers integrate hands-on activities, cooperative learning, and ICT tools to make learning meaningful and relevant to learners' lives. Podolsky et al. (2019) stated that teaching experience is positively associated with student achievement gains throughout much of a teacher's career; as teachers gain experience, their students are more likely to do better on measures of success beyond test scores; teachers make greater gains in their effectiveness when they teach in a supportive, collegial environment, or accumulate experience in the same grade, subject or district; and more experienced teachers confer benefits to their colleagues.

On the other hand, the **lowest frequency** of **7 (3.4%)** of the teacher-respondents have **21-25 years** of teaching experience. This means that there are already expert teachers in their fields. Supervised and assisted newly recruited teachers and prospective teachers in their professional development while acting as a mentor and counselor. They received awards for excellence in teaching and educational leadership. They are passionate teachers who genuinely love teaching and are eager to share their knowledge and enthusiasm with their learners. They support their learners' exploration, questioning, and discovery of new ideas by believing that education is a lifetime adventure and working to develop a passion for learning in them. The study by Ismail et al. (2018) revealed the importance of education in economic growth, emphasizing the need to equip students with High-Tech Skills (HOTS) like problem-solving, decision-making, and life-long learning. Teachers with more years of experience are more effective in implementing HOTS in classrooms.

Table 7
Distribution of Teacher-Respondents' Preference of Teaching Style

Category	Frequency	Percentage
Traditional	27	13.30
Modern (Use of ICT)	176	86.70
Total	**203**	**100.00**

Table 7 shows the teacher-respondents' characteristics in terms of **preference of teaching style**. Results show that out of 203 teacher-respondents, **176 (86.7%)** preferred to use **modern (use of ICT)**. This means that the majority of the teacher-respondents preferred modern methods of teaching style. It indicates that teachers use ICT tools to improve teaching and learning. Integrating the ICT tools in the classroom setting gives teachers a great chance to make teaching and learning better. Teachers who efficiently use ICT tools play a vital role in preparing and making learners achieve their goals in the digital age, equipping them with essential 21st-century skills and empowering them to thrive in a technology-rich society. Ngao et al. (2022) emphasize the importance of teacher competence in utilizing technology effectively to achieve goals, enhance higher-order thinking, and promote collaboration, teamwork, knowledge sharing, and independent research.

Meanwhile, the **lowest frequency** of **27 (13.3%)** of the teacher-respondents still preferred the **traditional method** of teaching style. It suggests that certain teachers may be more comfortable using techniques like lectures, textbooks, and paper-based homework since they have been familiar with more traditional educational methodologies. Some teachers may believe that traditional way of teaching methods is more effective for delivering the lesson and imparting deep learning to learners. Instead of learning new digital tools and incorporating them into their teaching practices, they may opt to remain with what they already know and are comfortable with. Barbuceanu (2020) emphasizes that teachers must learn to communicate in the language and style of their students, re-thinking old-style teaching in education in the digital age, where educators often find themselves as immigrants trying to cope with the digital natives that are no longer engaged with chalk and blackboard and one educational flow from the teacher to the student. Teachers must understand that their students are into digital technologies and have mastered the necessary abilities for exploring digital cloud libraries and informative resources via their own devices. Phones no longer fulfill the goal of communicating. They are digital instruments from which users can instantly connect to the rest of the globe.

Table 8
Distribution of Teacher-Respondents' Availability of ICT Tools at Home

Category	Frequency	Percentage
Smartphone	174	85.71
Personal Computer	55	27.09
Smart TV	88	43.35
Radio	35	17.24
Tablet	35	17.24
Internet Connection	142	69.95
Projector	11	5.42
Laptop	183	90.15
Printer	110	54.19
Scanner	37	18.23

Table 8 shows the teacher-respondents' characteristics in terms of the availability of ICT **tools at home**. Results show that out of 203 teacher-respondents, **183 (90.15%)** have **laptops**. This means that it is gradually common for teachers to have laptops. They plan their daily lesson log (DLL), make instructional materials, and do presentations. They find sources online like DLL, educational software, and digital books. Oftentimes, they communicate with their learners and parents. Teachers use laptops for announcements, information sharing, grading, online learning, and accessing educational resources, enabling them to stay updated on the latest teaching methods. Helpline PH (2024) emphasizes the importance of laptops in teaching, as they enhance learning through videos, online activities, and software, making lessons more engaging and accessible to all students and making difficult topics easier to understand.

On the other hand**, the lowest frequency** of **11 (5.42%)** has a **projector** at home. It indicates that projectors are not as common in the classroom setting nowadays. This tool can show pictures but it cannot be interactive. ICT tools can aid individual learning with educational software and tests online. These can change to fit each learner and how they learn. The tools let teachers teach in different ways, follow how learners do, and give them support better than traditional projectors. BenQ (2023) suggests that projectors can display larger screens by moving them farther back. However, this is not practical for interactive learning, leading to a decline in interactive projector sales.

Table 9
Distribution of Teacher-Respondents' ICT Utilization across Subject Areas

Category	Frequency	Percentage
Mathematics	30	14.80
Science	34	16.70
English	27	13.30
Filipino	20	9.90
MAPEH	18	8.90
TLE	40	19.70
Araling Panlipunan	22	10.80
Edukasyon sa Pagpapakatao	12	5.90
Total	**203**	**100.00**

Table 9 shows the teacher-respondents' characteristics in terms of **ICT utilization across the subject area**. Results show that out of 203 teacher-respondents, **40 (19.7%)** utilized ICT in the **TLE subject**. This means that many of the teacher-respondents utilized ICT in the TLE subject. This implies that TLE teachers equip learners with hands-on skills in the fields of technology, vocational careers, and entrepreneurship. They incorporate ICT tools in learning to provide learners with experiences in the relevant fields since today calls for a digital-oriented workforce. These new teaching methods make learners explore the recent trends and devices used in the relevant sectors. The skills are in high demand in the job industry since they are used in various industries. According to Dalangin (2023), the K to 12 Curriculum, implemented under Republic Act No.10533, aims to produce globally competitive students by enhancing their basic skills, workplace familiarity, and future employment readiness. It consolidates knowledge in Technical Vocational and related disciplines, including Information and Communications Technology , preparing students for technology-related careers, especially in the Philippines due to rapid industrialization and technological advancements.

Meanwhile, the **lowest frequency** of **12 (5.9%)** of the teacher-respondents used ICT in the **Edukasyon sa Pagpapakatao (EsP)** subject. This means that EsP teachers focus on topics like moral growth, character building, storytelling, real-life situations and experiences, personal reflections, and values education. Thus, ICT may not be essential to its teaching. It also implies that in some schools, the emphasis on standardized testing and academic performance in subjects like Mathematics, Science, and English may overshadow the importance of integrating ICT in EsP. As a result, teachers may prioritize teaching methods that align more directly with assessment requirements. Group dynamics, or even a physical conversation can readily ignite such activities. High levels of moral reasoning and empathy are necessary for several of the EsP teaching approaches. ICT enhances the learning process, but it is not always necessary because it does not always specify how the learning objectives in EsP are met. Kakoulli-Constantino and Papadima-Sophocleous (2020) argue that information and communication technology advancements have significantly impacted communication, interaction, and learning in language teaching and learning, particularly in ESP. However, more research is needed to understand the widespread use of technology tools in ESP.

Table 10
Distribution of Teacher-Respondents' Frequency of ICT Usage

Category	Frequency	Percentage
Once a month	14	6.90
Once a week	30	14.80
5-8 hours daily	86	42.40
1-4 hours daily	65	32.00
During Exam only	2	1.00
Others	6	3.00
Total	**203**	**100.00**

Table 10 shows the teacher-respondents' characteristics in terms of **frequency of ICT usage**. Results show that out of 203 teacher-respondents, **86 (42.40%)** use **5-8 hours daily**. This means that many of the teacher-respondents use ICT for 5-8 hours daily. This implies that teachers who frequently utilize ICT exhibit the commitment they have to use technology to enhance teaching and learning. Furthermore, they encourage learners' accomplishment and get them ready for life in an increasingly digital world. Teachers who embrace ICT technologies and use them in their lessons help learners develop into critical thinkers, lifelong learners, and responsible digital citizens. Research by Modi (2022) highlighted the role of ICT tools in facilitating active learning and higher-order thinking, revitalizing teachers and students, and improving education quality. Teachers can create engaging learning experiences, while students can practice ICT skills. Currently, teachers are referred to as teaching technicians, making learning and teaching processes easier and more effective.

However, the **lowest frequency** of only **2 (1.00%)** used ICT **during exams** only. This means that ICT tools such as an online assessment platform or grading software can streamline the grading process, saving teachers time and effort. These tools can automatically score multiple-choice questions, short answers, or even essays, providing instant feedback to students and allowing teachers to focus on analyzing the results. Teachers may examine the learners purely through the use of ICT and may not meet the learning objectives or evaluation requirements of the specified subject areas. The study of Shukla (2023) highlights the importance of assessment and evaluation in the teaching-learning process, highlighting their interconnectedness. It emphasizes the integration of ICT into these processes, highlighting its intrinsic role in supporting children's learning and ensuring effective communication and evaluation.

Table 11
Distribution of Learner-Respondents' Sex

Category	Frequency	Percentage
Male	159	39.20
Female	247	60.80
Total	**406**	**100.00**

Table 11 shows the learner-respondents' characteristics in terms of **sex**. Results show that out of 406 learner-respondents, **247 (60.8%)** are **females**. This means that the majority of the learner-respondents are female which is indicative of the advancement of gender equality in both society and education. In some schools, females may outperform males academically, leading to higher enrollment rates in schools. This could be attributed to the modifications in learning styles, study habits, or societal expectations that prioritize academic attainment for female learners. The findings from Reysio-Cruz's (2019) study revealed that Filipino women are enrolled in high school and college at significantly higher rates than men, according to an annual report that measures gender equality in 153 countries. According to the World Economic Forum's (WEF) 2020 Global Gender Gap Report, 71.3% of women attend school in secondary education and 40.4% in higher education, while men only represent 60.2 % and 40.4 %, respectively. It also found that elementary school enrollment figures were nearly comparable, with 93.7 % of females and 93.9 % of males enrolled.

Meanwhile, the **lowest frequency** of **159 (39.2%)** of learner-respondents are **males**. This means that in some cases, especially in rural areas, male may have a greater tendency to enter the labor force at a young age to support their families, particularly in the informal or agricultural sectors. Their capacity to regularly attend school or pursue higher education may be hampered by their early entry into the workforce. Males may experience emotional and social challenges that restrict their participation in school. Bullying, mental health conditions, and family dynamics are just a few instances of factors that can affect the males' motivation to participate and attend school. According to Jackman and Morrain-Webb (2019), the superior performance of females over males at high school and other levels appears to be a growing international phenomenon. This is despite the fact that a recent and substantial extensive worldwide meta-analysis of male and female performance at all levels indicated that females have always surpassed males in school.

Table 12
Distribution of Learner-Respondents' Parent's Civil Status

Category	Frequency	Percentage
Solo Parent	34	8.40
Married	306	75.40
Widow/Widower	66	16.30
Total	**406**	**100.00**

Table 12 shows the learner-respondents' characteristics in terms of **parent's civil status**. Results show that out of 406 learner-respondents, **306 (75.4%)** are **married** parents. This means that the majority of the learner-respondents' parent's civil status is married. It indicates that in Filipino society, marriage is valued as a sacred covenant and is often marked by grand ceremonies and festivities. The high regard for marriage and family in Filipino culture, religion, and social norms drives many individuals to seek matrimony and establish their own families.

According to PSA (2023), in 2022, a total of 449,428 marriages were registered in the country, marking a 25.9 percent increase from the total registered marriages of 356,839 in 2021. Of the total number of registered marriages in the country, about one in every five involved males and females aged 25 to 29 (94,240 or 21.0% share). Around one in three men (159,988 or 35.6% share) married at these ages, and about the same proportion was observed for women (172,530 or 38.4% share). In 2022, the median age of marriage was 28 years old for women and 30 years old for men, which was one year older than last year (29 for males and 27 for females).

On the other hand, the **lowest frequency** of **34 (8.4%)** of the learner-respondent's parents are **solo parents**. This means that in certain situations, couples may face differing cultural or religious traditions that hold various opinions on marriage. Religious or cultural beliefs and customs might disapprove of or limit marriage, causing some couples to choose alternative living arrangements like cohabitation. Furthermore, certain individuals value self-reliance and independence, believing that marriage could hamper their freedom. They may prefer to preserve distinct lives or relationships without the legal or societal bonds that come with marriage. The study of Gumban (2023) shows that Filipinos are increasingly adopting cohabitation, with live-in arrangements making up nearly 15% of the population. In 2020, five million more unmarried couples moved in together, indicating a preference for common-law partnerships. Despite being legally recognized as common law marriages, live-in partners still hold fewer rights than couples with licenses.

Problem 2. What is the level of teachers' ICT integration in the 21st century in terms of integration in teaching, integration for learner's learning, and integration in teaching and learning?

This study focuses on the teachers' Information and Communication Technology integration in the 21st Century by analyzing three essential variables: integration in teaching that evaluates the different types of Information and Communication Technology tools in the classroom setting being used by the teachers and to boost teachers' integration of ICT involvement in their teaching and measures the level to which this was integrated into daily lesson log, classroom presentations, learners' activities and methods of assessing learners' education.

The integration for learner's learning that evaluates the ICT tools' impact on improving learners' engagement and active participation and the integration in teaching and learning explores how tools and resources that the school provides and can be used to teach strategies and support learners throughout their educational journey and it also enhances learning outcomes by integrating ICT into the classroom setting, fostering learner participation, practice collaboration with classmates, and keeping them engaged in the learning process. Every variable offers a distinct viewpoint that drives teachers to integrate ICT into 21st-century learners.

Table 13
Distribution of Teachers' ICT Integration in the 21st Century in terms of Integration in Teaching

Indicators	Mean	SD	Description
As a teacher,			
I am confident in learning new computer skills.	3.65	0.54	Strongly Agree
I find it easier to teach by integrating ICT.	3.67	0.53	Strongly Agree
I am aware of the great opportunities that ICT offers for effective teaching.	3.71	0.48	Strongly Agree
I integrate ICT in teaching to make learning more effective.	3.63	0.52	Strongly Agree
I integrate ICT to improve teaching with more updated materials.	3.66	0.52	Strongly Agree
I integrate ICT to improve the quality of teaching.	3.70	0.50	Strongly Agree
I integrate ICT to aid the teaching resources and materials.	3.70	0.51	Strongly Agree
I integrate ICT to enable the learners to be more active and engage in the lesson.	3.67	0.51	Strongly Agree
I have more time to cater to learners' needs if ICT is integrated into teaching.	3.59	0.56	Strongly Agree
I have effective teaching without the integration of ICT.	2.66	0.97	Agree
Overall	**3.56**	**0.56**	**Strongly Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 13 shows the distribution of the teachers' level of ICT Integration in the 21st Century in terms of **integration in teaching** with an overall mean of 3.56 (SD=0.56), described as **Strongly Agree** and interpreted as **Very High.** This means the respondents have a very high level of ICT Integration in teaching. This suggests that the respondents may be investing in technology-based teaching for them to keep up with the rapidly evolving world. By using ICT tools in teaching, teachers can make learning environments more engaging and dynamic. This aids learners develops the skills they need to succeed in the digital age, where technology is a major factor. According to Asianoa et al. (2022), the provision of education to citizens is a requirement for economic and social development, and globalization and the transition to a knowledge-based economy require that existing educational institutions produce individuals who can convert information into knowledge and apply that knowledge in a dynamic, cross-cultural setting. To effectively incorporate ICT into the classroom, teachers must be competent to conceptualize learning in innovative ways,

successfully combine technology and education, create socially engaged learning environments, and foster collaborative participation.

The indicator **As a teacher, I am aware of the great opportunities that ICT offers for effective teaching** obtained the highest mean rating of 3.71 (SD=0.48), described as **Strongly Agree** and interpreted as **Very High**. This means that teachers have a very high level of ICT integration in the 21st century in terms of the great opportunities ICT can offer. The results infer that teachers recognize the superiority of ICT tools in education today. These tools empower teachers to design engaging learning environments where learners will be motivated. By incorporating ICT into classroom settings, teachers can enhance their educational skills and equip their learners with essential skills for navigating a technology-driven world. Mishra and Sahoo (2023) stipulated that Information and Communication Technology has emerged as a transformative tool in education, revolutionizing the way teachers teach and students learn. Teachers can use ICT to have access to an abundance of information and assets, participate in ongoing professional development, interact with colleagues, improve their methods of instruction, and adapt to a changing educational landscape. ICT enables teachers to become more successful, imaginative, and adaptive educators, allowing them to provide interesting learning experiences and fulfill the different requirements of their pupils. Teachers who embrace ICT can expand their knowledge and abilities, promote continuous education, and bring value to their students' development and achievement.

However, The indicator **As a teacher, I have effective teaching without the integration of ICT** obtained the lowest mean rating of 2.66 (SD=0.97) described as **Agree** and interpreted as **High**. This means that teachers have a high level of ICT integration in the 21st century in terms of teaching without ICT integration. This further implies that not all teachers depend on ICT tools in their teaching vocation. Establishing specific learning objectives that specify what is expected of learners at the end of a class is the most vital thing to have effective teaching. Teachers can concentrate their teaching efforts on assisting learners in reaching those goals by establishing defined goals even if it is not integrated with the ICT tools. The utilization of ICT does not guarantee that learners will engage in the class. In the end, how the teacher motivates and inspires the learner to participate in the class is the most important thing. The study by Mena et al. (2018) revealed that the technical mastery of technological resources does not guarantee effective learning. Learning methods and skills are required to successfully utilize ICT in the learning environment. However, using digital media in the classroom does not require modifications in the curriculum. Hence, teacher training courses should include robust empirical findings and theoretical frameworks for deeper comprehension of modern learning.

Table 14
Distribution of Teachers' ICT Integration in the 21st Century in terms of Integration for Learner's Learning

Indicators	Mean	SD	Description
As a teacher,			
I allow learners to be more creative and imaginative using ICT.	3.61	0.53	Strongly Agree
I use ICT to help learners to find related knowledge and information for learning.	3.67	0.51	Strongly Agree
I integrate ICT to encourage learners to communicate more with their classmates.	3.60	0.54	Strongly Agree
I integrate ICT to increase learners' confidence to participate actively in the class	3.62	0.54	Strongly Agree
I learn more effectively with the use of ICT.	3.62	0.54	Strongly Agree
I integrate ICT to help broaden learners' knowledge paradigm.	3.62	0.55	Strongly Agree
I integrate ICT to help to improve learners' ability specifically in reading, and writing.	3.57	0.58	Strongly Agree
I observe that learners are more behaved and under control with the integration of ICT.	3.51	0.60	Strongly Agree
I integrate ICT to enable learners to express their ideas and thoughts better.	3.53	0.58	Strongly Agree
I integrate ICT to promote active and engaging lessons for learners' best learning experience.	3.63	0.57	Strongly Agree
Overall	**3.60**	**0.55**	**Strongly Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 14 shows the teachers' level of ICT integration in the 21st Century in terms of **integration for learner learning** with an overall mean of 3.60 (SD=0.55) described as **Strongly Agree** and interpreted as **Very High**. It means that a lot of ICT resources and tools were used to enhance the educational experiences of the learners. Teachers were able to track learners' progress, evaluate learning objectives, and give prompt feedback since ICT enabled formative and summative assessment procedures. Learners' enthusiasm, engagement, and readiness for the digital age may enhanced when teachers effectively incorporate ICT tools into their lessons, which ultimately benefits learners' academic performance and lifetime learning. Saha (2023) highlights the significant role of Information and Communication Technology in all aspects of human life, including education. ICTs have transformed the education system into a knowledge and information society, enhancing teaching and learning processes and fostering 21st-century skills application.

The indicator **As a teacher, I use ICT to help learners find related knowledge and information for learning** obtained the highest mean rating of 3.67 (SD=0.512), described as **Strongly Agree** and interpreted as **Very High**. This means that teachers have a very high level of ICT integration in the 21st century in terms of using ICT to help learners in their learning. This infers that

teachers assist the learners in locating pertinent knowledge and information for learning. They enable the learners to take charge of their education, hone their information literacy abilities, and thoroughly investigate subjects of interest.

Furthermore to promote a deeper grasp of the subject matter, they encourage the learners to assess sources, synthesize information, and apply their discoveries to real-world scenarios. Teachers may create dynamic and engaging learning environments that stimulate curiosity and ignite a passion for learning by carefully integrating ICT tools and resources. The study by Ratnadewi (2019) revealed that ICT brings changes in the role of educators in teaching and the role of learners in learning; provides open access to material and interactive information through the network; eliminates time and space constraints in the learning environment; support learning and education organizations and management; and open opportunities for collaboration.

However,the indicator **As a teacher, I observe that learners are more behaved and under control with the integration of ICT** got the lowest mean of 3.51 (SD=0.60),described as **Strongly Agree** and interpreted as **Very High**. This means that teachers have a very high level of ICT integration in the 21st century which means that learners are more behaved and under control. This implies that ICT tools can capture learners' attention and encourage active participation in learning activities even if the result got the lowest mean rating, but still is as described as strongly agree. It suggests that learners are more likely to remain focused and on task, which promotes better behavior when they are involved and interested in the subject matter. When learners exhibit improved conduct and self-control before using ICT, it is evident that technology has a good effect on the classroom. The findings of Ullah and Anwar (2020) revealed that technology and collaborative activities in groups positively impact learner engagement, with participants expressing increased satisfaction with their learning experience.

Table 15
Distribution of Teachers' ICT Integration in the 21st Century in terms of Integration in Teaching and Learning

Indicators	Mean	SD	Description
As a teacher,			
I use ICT facilities in my school that are well-functioning and can be used.	3.39	0.68	Strongly Agree
I use technical support if I am faced with difficulties.	3.31	0.74	Strongly Agree
I have little access to ICT which prevents me from integrating it into teaching.	2.55	0.85	Agree
I have a lack of support from the school's top management which discourages me from integrating ICT.	2.36	0.87	Disagree
I do not have enough time to integrate ICT for teaching and learning purposes.	2.38	0.89	Disagree
I do not have enough training and professional development in ICT integration in teaching.	2.52	0.89	Agree
I notice that ICT tools in my school go to waste and are less integrated by teachers.	2.12	0.94	Disagree
I have given more time to learn and be comfortable with the integration of ICT in teaching.	3.20	0.66	Agree
I use a computer laboratory in my school in which I can bring students there to watch educational videos.	2.79	0.91	Agree
I have been given the freedom to design my teaching with the help of ICT.	3.39	0.62	Strongly Agree
Overall	**2.80**	**0.81**	**Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 15 shows the teachers' level of ICT Integration in the 21st Century in terms of **integration in teaching and learning** with an overall mean of 2.80 (SD=0.81) ,described as **Agree** and interpreted as **High**. This means that ICT tools bring adaptability and easy access to education was high. Teachers may build learning environments that enable learners to thrive and equip learners for success in the 21st century by utilizing the ICT tools that the school provides for the variety of teaching techniques, methodologies, and resources. It enables the teachers to deliver and integrate lessons in different ways and meet the diverse learning styles of learners. It can make educational resources available at any time, from any location.

The study of Tayaban (2022) examines the effectiveness of Information and Communication Technology integration in supporting teaching and learning in classrooms. A survey questionnaire was administered to education students and faculty members at Ifugao State University. Results showed that ICT integration improves teaching quality, enhances learning materials, and encourages creativity. The study recommends a digital literacy assessment for teachers and action research for students to maximize the benefits of ICT integration in teaching and learning.

The indicator **As a teacher, I use ICT facilities in my school that are well-functioning and can be used** to obtain the highest mean rating of 3.39 (SD=0.68) described as **Strongly Agree** and interpreted as **Very High**. This means that teachers have a very high level of ICT integration in the 21st century in terms of using ICT facilities at school. This implies that the teachers maximize the use of available ICT tools in the school. These tools are functioning and well-maintained by the computer laboratory in charge and those tools that are available in every classroom are well-kept by the class advisers. With this, teachers will have a valuable opportunity to improve their teaching practice and enrich learners' learning experiences. The study by Olokooba et al. (2018) revealed that Information and Communication Technology has contributed immensely to human learning and teaching by simplifying difficult concepts and enhancing accessibility to contemporary data and developments in human societies in all fields and forms of knowledge, especially social sciences which study human interaction in time and space.

On the other hand, the indicator **As a teacher, I notice that ICT tools in my school go to waste and are less integrated by teachers** got the lowest mean rating of 2.12 (SD=0.94), described as **Disagree** and interpreted as **Low**. This means that teachers have a low level of ICT integration in the 21st century in terms of ICT tools at school that go to waste. This implies that the schools provide teachers with various ICT tools. The school places priority on teacher assistance to maximize ICT integration and improve learners' learning. Additionally, it guarantees that ICT is applied efficiently to enhance instruction and learning for the learners. The study of Rababah (2019) believed that it was evident from the observation that teachers integrate several media and technologies in their classroom instruction. All of the teachers were shown integrating one of the technological resources into their writing classes. In terms of ICT integration adoption, the results suggest that the word processor is the most commonly used ICT tool among teachers, following e-mail and e-content, among others. To improve their writing abilities, teachers use a variety of media and technologies. They employ English-language technology such as e-mail, word processing programs, and e-content, with the word processor being the most popular, followed by e-mail and e-content.

Table 16
Summary of Teachers' ICT Integration in the 21st Century

Variables	Mean	SD	Interpretation
Integration in Teaching	3.56	0.56	Very High
Integration for Learner's Learning	3.60	0.55	Very High
Integration in Teaching and Learning	2.80	0.81	High
Overall	**3.32**	**0.64**	**Very High**

Legend: 3.26 – 4.00 Strongly Agree / Very High; 2.51 – 3.25 Agree / High; 1.76 – 2.50 Disagree / Low; 1.00 – 1.75 Strongly Disagree / Very Low

Table 16 shows the summary of the teachers' level of **ICT Integration in the 21st Century** with an overall mean of 3.32 (SD=0.64), interpreted as **Very High**. This means that teachers have a very high in terms of enhancing teaching, increasing learner motivation, and accomplishments, and preparing learners for a world dominated by technology. Teachers in the modern era must incorporate ICT into their daily lessons. Teachers can give learners a chance to perceive the significance of their learning across the subject areas and to develop meaningful connections by including a variety of concepts and views in their daily lessons. Beyond the boundaries of the traditional classroom setting, ICT integration gives learners access to a multitude of tools and information.

The study of Kumar (2020) revealed the significant impact of Information and Communication Technologies on human life, including generation, storage, transmission, retrieval, and processing of information. ICT breaks time and speed barriers in education, providing learners with more control over their learning. It enhances education quality by increasing motivation, facilitating skill acquisition, and improving teacher training.

The variable **Integration for Learner's Learning** obtained the highest overall mean rating of 3.60 (SD=0.55), interpreted as **Very High**. This means that teachers have a very high level of ICT integration in the 21st century in terms of integration for learners' learning. This indicates that ICT tools that stimulate the curiosity of learners in the classroom improve learner excitement and involvement. Learners' enthusiasm to study is stimulated by immersive experiences produced by multimedia presentations, entertaining learning games, lifelike virtual reality simulations, and instructional games. ICT integration can broaden learners' access to a wide range of information and assets across conventional textbooks and classrooms. Kimmons (2020) believed that technology integration in education refers to the meaningful use of technology to achieve learning goals. Offering a summary of some typical integration of technology strategies to assist teachers in better comprehending the technological integration procedure and objectives. In the case of using technology in learning, seasoned teachers may have an in-depth knowledge of how their students acquire and how to teach in efficient manners, while new teachers may be determined to try new things and embrace technologies that they believe will help them be more effective in class.

On the other hand, the variable **Integration in Teaching and Learning** obtained the lowest overall mean rating of 2.80 (SD=0.81), interpreted as **High**. This means that teachers have a high level of ICT integration in the 21st century in terms of integration in teaching and learning. This suggests that by engaging the learners and encouraging learning objectives that are in line with the demands of the modern world, ICT must be integrated into teaching methods through a comprehensive approach. With this integration, teachers may develop vibrant and creative learning settings that equip learners to thrive in today's interconnected and digital world. Teachers may incorporate relevant content, tools, and examples into their classes, resulting in inclusive learning environments in which every learner is appreciated, acknowledged, and reflected. Vijayalakshmi (2021), suggests that teachers will shift from knowledge transmitters to learning facilitators, collaborators, guides, and mentors. Students will take greater responsibility in learning, using ICT-integrated teaching methods to effectively inculcate necessary skills and knowledge.

Problem 3. What is the level of the learners' 21st-century skills based on multimodal literacy, communication and collaboration; questioning and creative thinking; reflective and critical thinking, and problem-solving?

The learners' 21st-century skills based on multimodal literacy, communication and collaboration, questioning, creative thinking, reflective and critical thinking, and problem-solving are interconnected and equally strengthening, empowering the learners to adapt and navigate complex to changing environments and thrive in the digital age. By nurturing the progress of multimodal literacy, communication and collaboration, questioning, creative thinking, reflective and critical thinking, and problem-solving skills, teachers can empower learners to become lifelong learners, innovative problem-solvers, responsible global citizens, and a competitive individual.

Table 17

Distribution of the Level of the Learners' 21st Century Skills based on Multimodal Literacy

Indicators	Mean	SD	Description
As a learner,			
I can produce and edit videos that combine audio and visual components to send a message or tell a narrative.	2.94	0.71	Agree
I demonstrate the ability to use presentation software, logically incorporating visuals and text.	2.81	0.72	Agree
I create interactive digital projects, showcasing the ability to incorporate interactive features such as hyperlinks or multimedia fundamentals.	2.64	0.85	Agree
I utilize ICT tools to craft and share digital stories, integrating text, images, audio, and possibly video components.	2.90	0.73	Agree
I interpret visual content effectively and understand the impact of visuals on communication.	2.87	0.77	Agree
I practice ICT tools to solve problems creatively, integrating multimedia elements to present solutions.	2.91	0.79	Agree
I adopt ICT platforms showing flexibility in using different tools and applications for diverse multimodal projects.	2.80	0.78	Agree
Overall	**2.84**	**0.76**	**Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 17 shows the level of the learners' 21st-century skills based on **multimodal literacy** with an overall mean of 2.84 (SD=0.76), described as **Agree** and interpreted as **High**. This means that giving learners the chance to produce their multimodal texts through multimedia projects, videos, and digital presentations was high. Teachers can assist learners in selecting appropriate modes, integrating them in a way that makes sense, and matching them to the audience and message they want to reach. Multimodal literacy can allow learners to express themselves creatively using various forms of communication. The study of Liang and Yao (2023) stated that the global proliferation of technology is rapidly changing the form of instruction and the way content is delivered, inspiring educators to innovate their teaching methods to meet the diverse needs of students. Today's pupils are becoming more involved with multiple formats via social media and can study from a variety of resources on the World Wide Web. Learning can only be achieved through a reciprocal cycle of input and output, suggesting that students need to understand content delivered through various media and create an integrated multimedia product with technology tools, using them to promote language skills.

The indicator **As a learner, I can produce and edit videos that combine audio and visual components to send a message or tell a narrative** obtained the highest mean rating of 2.94 (SD=0.71), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is high based on producing and editing videos that combine audio and visual components. This implies that many of the learners have smartphones and given the abundance of applications available online for free now for editing and adding audio to videos, they are adept at exploring. Learners who can create and edit videos demonstrate a high level of creativity and artistic expression. It allows learners to take complex ideas, feelings, and stories through a combination of audio and visual elements.

The study of Kauppinen and Guseva (2018) revealed that educational videos can support moving from traditional teacher-centered settings to learner-centered settings. Flipped classroom methods, for instance, imply that students have checked the theory via online materials before entering the face-to-face sessions coached by the teacher in a classroom. However, making videos to support learning remains a challenge: videos are simply a completely different medium than lecturing to an audience from a podium.

However, the indicator **As a learner, I create interactive digital projects, showcasing the ability to incorporate interactive features such as hyperlinks or multimedia fundamentals** obtained the lowest mean rating of 2.64 (SD=0.85), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is high based on creating interactive digital projects. This implies that teachers teach digital projects that combine multimedia and links to help learners develop important skills in designing interactive experiences. However, it is not easy for learners to create interactive digital projects because of some issues with gadgets. These skills are vital for numerous careers, including e-learning design, creating digital media, building websites, and designing user experiences. Rao et al. (2021) revealed that in online and blended learning environments, students may experience learning barriers that are more pronounced than in the traditional classroom. Teachers may eradicate those barriers by using technological resources and methods of instruction in their online classroom designs. Digital resources include a variety of educational and assistive elements that can benefit both students with difficulties and other learners.

Table 18
Distribution of the Level of the Learners' 21st Century Skills based on Communication and Collaboration

Indicators	Mean	SD	Description
As a learner,			
I engage in collaborative projects using online platforms, demonstrating effective communication skills in a digital environment.	2.96	0.74	Agree
I exhibit proficient communication abilities within a digital setting through collaborative work and efforts.	2.82	0.72	Agree
I showcase skills in communicating and collaborating asynchronous classes and resolving conflicts online.	2.79	0.77	Agree
I collaborate with classmates to create digital presentations in content creation and delivery.	3.06	0.76	Agree
I use synchronous communication tools for real-time collaboration such as video conferencing or instant messaging that contribute to group activities.	2.91	0.74	Agree
I demonstrate awareness of digital etiquette and professional communication standards when working together online.	2.78	0.77	Agree
I cooperate and communicate on documents and presentations in real-time using online platforms such as Google Drive.	2.87	0.77	Agree
Overall	**2.89**	**0.75**	**AGREE**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 18 shows the level of the learners' 21st-century skills based on **communication and collaboration** with an overall mean of 2.89 (SD=0.75), described as **Agree** and interpreted as **High**. This means that learners have clear communication with their classmates, collaborate in groups, and accomplish shared objectives. Learners learn how to communicate verbally vibrantly and confidently. Learners' 21st-century skills based on communication and collaboration address a wide variety of competencies needed for success in educational settings. Learners may demonstrate adaptability, versatility, and empathy in the way they communicate with their classmates, which boosts the success of their collaborative efforts. According to Copeland (2023), communication and collaboration are vital and are foundational to student learning and achievement. It enables students to receive constant feedback that promotes involvement, boosts academic confidence, and guides the intended accomplishment of tasks. Students value teamwork and can reap the advantages of working with classmates and educators, resulting in potential leaders with competitive skills.

Further, the indicator **As a learner, I collaborate with classmates to create digital presentations in content creation and delivery** obtained the highest mean rating of 3.06 (SD=0.76), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on collaboration with classmates. This implies that collaboration with classmates with the help of ICT tools is a valuable skill. The learners can develop these skills to enhance their academic performance, social skills, and overall learning experience in this digital age. By working together to create captivating and informative presentations, these learners may gain teamwork, digital literacy, and effective communication.

Zinveliu (2021) stated that whether online or face-to-face, teachers are always looking for ways to create engaging learning experiences. Integrating presentations into education is an easy approach to introducing technologies into learning environments and using the greatest digital tools available. A slideshow lesson efficiently conveys knowledge and promotes learning because the majority of it is presented visually. Presentations can be used by teachers and students to promote learning while also developing creativity, communication, teamwork, and critical thinking. However, the ultimate objective is to provide information obvious and simple to recall, as pictures enhance words. For that reason, presentations should be kept basic and concentrate on visuals and ideas. To accomplish this, you will need more complex equipment.

On the other hand, the indicator **As a learner, I demonstrate awareness of digital etiquette and professional communication standards when working together online** obtained the lowest mean rating of 2.78 (SD=0.77), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on demonstrating awareness of digital etiquette. This implies that learners tend to oversee responsible online behavior, which includes defending their data, being careful of scams, and avoiding cyberbullying or harassment. These learners may contribute to a positive and supportive online community by practicing respectful communication, adhering to online norms, promoting digital citizenship, and fostering effective online collaboration. They also develop critical skills for academic, professional, and personal success in the digital age.

UOTP Marketing (2021) stated that from a young age, to behave properly and have good manners was taught. With many aspects of people's lives shifting online, including schooling, there is a need for a set of specialized online etiquette norms for cyber behavior. Netiquette standards define what constitutes acceptable and respectful online behavior; one of the primary reasons for the need for netiquette guidelines is to teach people how to talk respectfully without engaging in contempt or bullying.

Table 19
Distribution of the Level of the Learners' 21st Century Skills based on Questioning

Indicators *As a learner,*	Mean	SD	Description
I formulate questions that guide online research, promoting the effective use of ICT tools to gather information.	2.99	0.74	Agree
I put questions that prompt the exploration of innovative solutions to real-world scenarios.	2.83	0.67	Agree
I formulate questions and critically analyze digital media content, considering sources, biases, and credibility.	2.94	0.71	Agree
I develop questions that involve collecting and analyzing data using digital tools, fostering data literacy skills.	2.91	0.71	Agree
I explore questions related to coding and computational thinking in a digital context.	2.81	0.78	Agree
I formulate questions that promote effective communication and collaboration using digital platforms and tools.	2.92	0.73	Agree
I make questions that explore how different technologies can be integrated into their learning process and daily lives.	3.00	1.68	Agree
Overall	**2.91**	**0.86**	**Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High; 2.51 – 3.25 Agree / High; 1.76 – 2.50 Disagree / Low; 1.00 – 1.75 Strongly Disagree / Very Low

Table 19 shows the level of the learners' 21st-century skills based on **questioning** with an overall mean of 2.91 (SD=0.86), described as **Agree** and interpreted as **High**. This means that teachers have insightful questions to help learners think critically, develop their learning, and become more involved in the class. Educating the learners to pose open-ended questions that call for a response that goes beyond a simple affirmative or negative. These inquiries may promote in-depth research and conversation on the subject. Edwards and Bowman (2024) revealed that because questioning is widely acknowledged as a valuable instructional strategy, knowing more about the effective uses of questioning is important. Teachers' inquiries have been investigated rather frequently, but students' queries have not. The findings imply that both the questions posed by teachers and the educational manner in which they are asked have an impact on the frequency and intensity of learner questioning. The researchers believe that better classroom inquiry tactics may help students develop higher cognitive-thinking skills.

The indicator **As a learner, I make questions that explore how different technologies can be integrated into their learning process and daily lives,** obtained the highest mean rating of 3.00 (SD=1.68) described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on exploring the different technologies. This implies that teachers give questions to learners that can serve as starting points for discussions, projects, or brainstorming sessions. These learners are naturally curious to study various potential uses of technology in their learning experience and daily activities. The learners can explore the potential applications of ICT tools in their learning journey and apply them in their daily lives. Pillai (2023) revealed that developing questioning skills is a game-changer for teachers and students. Use inquiry techniques to uncover areas in which learners may be suffering. This gives students extra help to improve their comprehension. Use inquiry skills to connect directly with pupils and understand their individual needs and viewpoints. This not only builds rapport but also establishes a foundation for a positive and supportive teacher-student relationship.

On the other hand, the indicator **As a learner, I explored questions related to coding and computational thinking in a digital context**, obtained the lowest mean rating of 2.81 (SD=0.78), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on coding and computational skills. This implies that learners explore their ability to solve problems, reason logically, and gain a deeper understanding of technology by studying questions about coding and computational thinking in a digital setting. Learners who explore topics about coding and computational thinking suggest a desire to acquire crucial skills and competencies for success in the age of technology. This further suggests that respondents have a possibility that learners need to understand more about coding since it is one of the most difficult topics.

The study of Taylor et al. (2020) revealed that educational technology skills and practices are becoming increasingly prominent in schools around the world as the integration of computer science strands, such as computational thinking and coding, are being introduced into curricula. Educational leaders and teachers should integrate computational thinking and digital skills into activities in all disciplines spanning. Learners who study coding and computational thinking capabilities are better able to apply problem- solving skills to analyze information, identify trends, and relate what they already comprehend to the difficulties they encounter.

Table 20
Distribution of the Level of the Learners' 21st Century Skills based on Creative Thinking

Indicators	Mean	SD	Description
As a learner,			
I engage in coding and programming projects that involve creative and innovative use of technology.	2.95	0.77	Agree
I create interactive multimedia projects, incorporating elements such as images and videos using ICT tools to enhance creativity.	3.00	1.64	Agree
I craft digital stories using multimedia elements, fostering creative expression through writing, audio, and visual components.	2.86	0.75	Agree
I explore digital art and animation tools, fostering creativity in visual expression through drawings, animations, or digital paintings.	2.88	0.74	Agree
I formulate and implement class projects that integrate emerging technologies creatively to address real-world challenges.	2.85	0.76	Agree
I learn to participate in collaborative creative challenges using online platforms, promoting teamwork and shared ideation.	2.88	0.74	Agree
I learn to engage in digital design challenges, using graphic design software or online platforms to express creative ideas visually.	2.86	0.76	Agree
Overall	**2.90**	**0.88**	**Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 20 shows the level of the learners' 21st-century skills based on creative thinking with an overall mean of 2.90 (SD=0.88), described as **Agree** and interpreted as **High**. This means that teachers teach their learners to think creatively to generate innovative ideas, solve problems, and adapt to new situations effectively. As learners improve that particular skill, teachers inspire them to embrace ambiguity, welcome failure, and allow experimenting. ICT integration based on creative thinking can enable learners to use technology to unleash creativity, encourage innovation, and resolve difficult problems. Musayevna (2022) revealed that creativity skills are among the foremost sought-after life and work skills within the 21st century as an innovative way of approaching and analyzing ideas, problem-solving, or critical thinking, and this skill could be developed and improved using various techniques and practices.

Further, the indicator **As a learner, I create interactive multimedia projects, incorporating elements such as images and videos using ICT tools to enhance creativity**, obtained the highest mean rating of 3.00 (SD=1.64), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on creating interactive multimedia projects. This implies that teachers offer dynamic and engaging ways to present, give ideas, and inspire interaction with the learners for a better understanding. The learners can also create immersive and unforgettable experiences that efficiently communicate their message and achieve their objectives. These technologies may allow learners to communicate in a variety of ways to support different learning preferences and styles. Ashikuzzaman (2021) highlights the transformative role of multimedia in our digital world, combining text, audio, images, videos, and interactive features for a rich, immersive experience.

The indicator **As a learner, I formulate and implement class projects that integrate emerging technologies creatively to address real-world challenges and** got the lowest mean rating of 2.85 (SD=0.76) described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on formulating and implementing projects with the use of ICT. This implies that learners adjust and still practice how to formulate and implement projects that integrate ICT tools towards real-world scenarios. This may include the availability of the ICT tools and how advanced the technology they are using to assess their work or innovations. The learners need to prepare themselves to be more engaged in emerging technologies so that they can compete and be more ready for the future.

Furthermore, the study by Waring (2021) stated that the operational elements of a project implementation are naturally important, and without careful planning, a project can easily be derailed. ICT is becoming important in classrooms. Many aspects of pastoral and academic instruction would be impossible to carry out without the use of information and communication technology (ICT). In the past year, ICT among educational institutions has grown even more prominent as schools have had to find ways to conduct classes and communicate with students and parents remotely.

Smith (2021) suggests that in the 21st century, we view ICT as a given rather than a luxury, however, the quality and efficacy of that ICT is significantly influenced by its implementation. ICT in schools has been even more evident in the last year, as schools have had to find ways to provide classes and communicate with students and parents remotely. In nature, your ICT may become fractured and incapable of sustaining long-term operations. This will most likely have a negative influence on educational delivery and learning results.

Table 21
Distribution of the Level of the Learners' 21st Century Skills based on Reflective

Indicators *As a learner,*	Mean	SD	Description
I develop and maintain a comprehensive digital portfolio, showcasing academic achievements, reflections, and growth over time using ICT tools.	3.02	1.70	Agree
I demonstrate the ability to engage in reflective writing through online journals or blogs utilizing ICT platforms.	2.81	0.76	Agree
I incorporate images, audio, or video into reflective projects, enhancing the depth and expressiveness of personal reflections using ICT tools.	2.87	0.73	Agree
I effectively utilize digital self-assessment tools to reflect on strengths, weaknesses, and areas for improvement across different subject areas.	2.78	0.80	Agree
I maintain a consistent and thoughtful online learning journal, using digital platforms to reflect on understanding, challenges, and personal growth.	2.87	0.79	Agree
I integrate feedback received on assignments or projects into reflective exercises.	2.89	0.73	Agree
I actively participate in reflective surveys or questionnaires to provide valuable insights.	2.84	0.79	Agree
Overall	**2.87**	**0.90**	**Agree**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 21 shows the level of the learners' 21st-century skills based on **reflective skills** with an overall mean of 2.87 (SD=0.90)**,** described as **Agree** and interpreted as **High**. This means that learners have leverage of digital tools in enhancing their reflective processes and deepening their understanding when integrated with the ICT tools. Learners with reflective skills engage in intellectual activities and can track, evaluate, and regulate their academic performance in school. They can reflect on their ideas, emotions, and behaviors to get an improved grasp of their learning processes and strategies and extend them to real-world applications and life experiences. Baporikar (2021) believed that reflective practice supports critical thinking and assessment skills by analyzing one's own life experiences, and the role of reflection in learning is well-toned. Reflective practice, or the practice of reflecting on and assessing the events in one's life, is a method that promotes learning and fosters analytical abilities. The importance of reflecting in learning has been acknowledged for decades, and the reflective observation of learning styles may be a significant technique for improving learner knowledge and involvement, particularly with improved utilization of technology.

Further, the indicator **As a learner, I develop and maintain a comprehensive digital portfolio, showcasing academic achievements, reflections, and growth over time using ICT tools** obtained the highest mean rating of 3.02 (SD=1.70), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on developing digital portfolios. This implies that learners create e-portfolios that effectively showcase their skills, experiences, and accomplishments while fostering reflective exercises, proficient growth, and career readiness in the future using the ICT tools. This cognitive understanding enables learners to make informed choices, set their significant objectives, and modify their learning styles to enhance their school performance. By leveraging digital portfolios as a tool for self-reflection, learners' personal development and readiness for future endeavors may be enhanced. The study of Namaziandost et al. (2020) revealed that e-portfolios were used for documenting many educational activities as diverse as a travel log, storytelling, written compositions, movie reviews, and diaries. The majority of learners preferred e-portfolios because they gave a snapshot of every aspect of their learning development in a more versatile environment where they were able to rapidly reflect on how they were doing by discussing thoughts and offering input.

The indicator **As a learner, I effectively utilize digital self-assessment tools to reflect on strengths, weaknesses, and areas for improvement across different subject areas,** obtained the lowest mean rating of 2.78 (SD=0.80), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on digital self-assessment tools. This indicates that the use of ICT tools empowers the learners to reflect on their assets, weaknesses, and areas for improvement. Learners may have the opportunity to meditate at the same time. They are also willing to receive constructive criticism and insights from their teachers and classmates to improve their performance. The results of the study of Swart and Meda (2021) tend to suggest that online self-assessments should include multiple attempts with some form of feedback to foster student engagement and academic success. Evaluation is an important part of learning for students. It must be delivered regularly and contain the feature of reflective thought to be efficient.

Table 22
Distribution of the Level of the Learners' 21st Century Skills based on Critical Thinking and Problem-Solving

Indicators *As a learner,*	Mean	SD	Description
I engage in problem-solving projects that leverage ICT tools and apply critical thinking skills to address real-world challenges.	2.98	0.74	Agree
I utilize ICT tools to make informed decisions, showcasing the integration of critical thinking into problem-solving processes.	2.88	0.68	Agree
I participate in research projects that involve the use of technology, showcasing critical thinking in formulating research questions, analyzing data, and drawing conclusions.	2.87	0.71	Agree
I demonstrate creativity in using a variety of ICT tools to develop innovative solutions to problems, showcasing a holistic approach to critical thinking.	2.84	0.72	Agree
I articulate problems in online discussions demonstrating the ability to communicate complex issues and engage in critical discourse using ICT tools.	2.77	0.77	Agree
I engage in coding and algorithmic exercises to demonstrate the application of critical thinking in digital problem-solving scenarios.	2.76	0.75	Agree
I use educational applications or games to think critically and improve problem-solving skills.	2.94	0.78	Agree
Overall	**2.86**	**0.74**	**AGREE**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 22 shows the level of the learners' 21st-century skills based on **critical thinking and problem-solving**, with an overall mean of 2.86 (SD=0.74)**,** described as **Agree** and interpreted as **High**. This means that critical thinking and problem-solving are essential to learners since they can develop and refine across various subject areas and contexts. The learners may enhance their skills to gather relevant information and evidence from numerous sources to increase their comprehensive understanding of the problem. The teachers may empower the use of ICT to enhance their critical and problem-solving skills so that learners may analyze complex problems and draw informed conclusions.

According to Tabek and Abduqodirovna (2023), in a world filled with complexity and uncertainty, the ability to think critically and solve problems effectively is a superpower. Whether you're aiming to excel in your career, enhance your personal life, or simply make better decisions, these skills will be your guiding light. Start by understanding the principles of critical thinking and problem-solving, practice them in your daily life, and watch as they transform your world into a realm of endless possibilities.

The indicator **As a learner, I engage in problem-solving projects that leverage ICT tools and apply critical thinking skills to address real-world challenges**, obtained the highest mean rating of 2.98 (SD=0.74), described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on problem-solving projects. This indicates that engaging in problem-solving projects that leverage ICT tools may apply critical thinking skills to address real-world challenges. This can be rewarding and has an impact on the learning experience by utilizing ICT tools such as online databases, websites, academic journals, and digital libraries to gather diverse perspectives and insights. By improving these skills, learners become savvy about their digital content, which is vital for effective problem-solving in the digital age. Hunsaker (2022) revealed that Computational Thinking is essentially a framework to describe a set of critical thinking and problem-solving skills, and it has gained significant traction as a viable and useful way of thinking about how to teach these skills in formal educational settings. While ICT is not the sole option to developing these skills, it does offer an approach to investigating challenges to build a computerized or semi-automatic answer that takes advantage of the specific capabilities of computer technologies. It can also help teachers focus, coordinate, and strengthen their efforts to aid future generations of children in developing problem-solving abilities by providing a shared vocabulary, a plethora of materials, and a thriving community of practice.

However,the indicator **As a learner, I engage in coding and algorithmic exercises to demonstrate the application of critical thinking in digital problem-solving scenarios,** got the lowest mean rating of 2.76 (SD=0.75) described as **Agree** and interpreted as **High**. This means that the level of the learners' 21st-century skills is based on coding and algorithmic exercises. This implies that learners need to improve their problem-solving skills, sharpen their programming skills, and be more competent. They need to utilize online tutorials, coding platforms, and other online resources that offer coding tasks, exercises, and projects. Teachers must set aside time to practice the learners in solving coding and algorithm problems. The study of Bosova (2020) reveals the development of thinking, the formation of new values in the digital society, understanding of the rules of behavior in the digital environment. Coding is a powerful tool for developing computational (algorithmic) thinking.

Table 23
Summary of the Level of the Learners' 21st Century Skills

Variables	Mean	SD	Interpretation
Multimodal Literacy	2.84	0.76	High
Communication and Collaboration	2.89	0.75	High
Questioning	2.91	0.86	High
Creative Thinking	2.90	0.88	High
Reflective	2.87	0.90	High
Critical Thinking and Problem-Solving	2.86	0.74	High
Overall	**2.88**	**0.82**	**High**

Legend: 3.26 – 4.00 Strongly Agree / Very High 1.76 – 2.50 Disagree / Low
2.51 – 3.25 Agree / High 1.00 – 1.75 Strongly Disagree / Very Low

Table 23 shows the summary of **the level of the learners' 21st-century skills** with an overall mean of 2.88 (SD=0.82), interpreted **High.** This means that the integration of ICT tools for the learners was high and has greatly improved the development and application of essential skills known as 21st-century skills. These abilities are vital for success in the rapidly evolving digital environment of today. These skills will enable learners to achieve success in a constantly changing environment, deal with complex problems, and make significant contributions to society.

The study of Gonzalez-Salamanca et al. (2020) supports that the skills needed to be successful in the world have changed, and there is a gap between those learned at school and those required to function at work and in society. Learning, communicating, collaborating, and problem-solving in digital environments require a broader set of abilities. UNESCO, the OECD, and others have highlighted 21st-century skills as abilities essential for the long-term sustainability of the knowledge society. The aim was to learn the design principles involved in the incorporation of these skills into the curriculum, find out possible ways to teach and assess them and examine how this process could be personalized using Information and Communications Technology (ICT).

The variable **Questioning** obtained the highest mean rating of 2.91 (SD=0.86) and was interpreted as **High**. This means that learners' curiosity about ICT integration has inspired them to explore, innovate, and thrive in a digital world. Furthermore, ICT proficiency can lead to a wide range of job prospects for learners in the future, as ICT skills are in great demand across numerous industries. The questioning method in the classroom is significant since it keeps all learners involved and more curious in this digital age. It can also increase critical thinking and make learning fair.

According to Stevens (2023), teachers can gauge whether or not students understand a concept based on what they answer. Questioning in the educational environment also promotes diversity. The teacher can tailor their questions to each student's ability level. If a student is doing well in a subject but seems to be uninterested, teachers employ the questioning method to offer a higher-order inquiry. Some questions may be brief and particular, while others may be designed to guide students through a classroom discussion. Questioning in the classroom entails asking deliberate questions of varying difficulty to encourage critical thinking and engage all learners.

The variable **Multimodal Literacy** got the lowest overall mean rating o**f** 2.84 (SD=0.76)**,** interpreted as **High**. This means that learners' exposure to digital media and multimodal texts in the classroom may be limited. They might not be familiar with how diverse multimedia communication modalities combine to express meaning if they have not had the chance to interact with a variety of forms. They may also have limited access to ICT tools which can hinder them from being technology savvy in school. Fedorenko (2019) emphasized the importance of fluency in various literacies for success in a multimodal world. Pedagogic techniques like multimodal essays and digital mapping projects help develop multicultural literacy in undergraduate students, enhancing critical thinking, audio-visual rhetoric, writing, oral communication, and self-expression.

Furthermore, the study of Tan et al. (2020) revealed that while recent literacy research shows an increasing uptake in multimodal literacies, there remains a disjunction between multimodal literacy teaching and assessment. According to researchers, multimodal literacy activities are often less regarded for assessing literacy in these circumstances.

Problem 4. Is there a significant relationship between the teachers' ICT integration and learners' 21st-century skills?

This research examines the indicative relationship between the teachers' ICT integration and learners' 21st-century skills specifically investigating how the teachers effectively integrate ICT into their teaching techniques, creating more dynamic and interesting learning environments. The development of the learners' 21st-century skills must include multimodal literacy, communication and collaboration, questioning, creative thinking, reflective and critical, and problem-solving all of which can be supported by ICT tools and resources.

Table 24

Test of Relationship between Teachers' ICT Integration and Learner's 21st Century Skills

Teachers' ICT Integration	Learner's 21st Century Skills Indicators						OVERALL
	Multimodal Literacy *r-value* *p-value*	**Communication and Collaboration** *r-value* *p-value*	**Questioning** *r-value* *p-value*	**Creative Thinking** *r-value* *p-value*	**Reflective** *r-value* *p-value*	**Critical Thinking and Problem-Solving** *r-value* *p-value*	*r-value* *p-value*
Integration in Teaching	0.017 (NLR)	0.00 (NLR)	0.05 (NLR)	0.04 (NLR)	0.00 (NLR)	0.60 (NLR)	0.01 (NLR)
	0.81 NS	0.10 NS	0.51 NS	0.60 NS	0.98 NS	0.40 NS	0.86 NS
Integration for Learner's Learning	0.02 (NLR)	0.07 (NLR)	0.05 (NLR)	0.07 (NLR)	0.03 (NLR)	0.08 (NLR)	0.04 (NLR)
	0.81 NS	0.30 NS	0.46 NS	0.36 NS	0.69 NS	0.25 NS	0.56 NS
Integration in Teaching and Learning	0.03 (NLR)	0.05 (NLR)	0.01 (NLR)	0.01 (NLR)	0.01 (NLR)	0.01 (NLR)	0.02 (NLR)
	0.73 NS	0.45 NS	0.93 NS	0.92 NS	0.85 NS	0.87 NS	0.80 NS

Legend: *significant at p<0.05 alpha level S – significant NS – not significant

Table 24 shows the relationship between teachers' ICT integration and learner's 21st-century skills. Overall, there exists **No Significant** relationship between teachers' ICT integration and learner's 21st-century skills as indicated by the correlation r-value and probability value greater than 0.05 alpha level which led to the acceptance of the null hypothesis. This implies that teachers' ICT integration and learners' 21st-century skills have no direct association with each other. There is evidence to suggest that ICT integration can generate favorable conditions for the development of these skills, even though the relationship between teachers' ICT integration and learners' 21st-century skills may not be related. There might be wide variations in the efficacy of integrating ICT into educational techniques. Learners' skill development may not be greatly impacted if teachers are only employing technology to replace traditional methods of instruction without improving the learning process.

During the in-depth interview with the learners, they expressed that their attendance in class is more important than their grades and that their family pressures may take precedence over academic concerns. Financial support from parents may motivate them to attend class, while others rely on borrowing ICT tools from classmates. These factors contribute to their motivation to attend class. Nagashibaevna (2019) postulated that passive learners usually do not have the kind of instrumental motivation and determination to learn. Passive learners quietly absorb new information and knowledge, but they rarely participate in what they learn. This conduct can have a detrimental effect on the learning process. Passive learners are extremely dissatisfied when compelled to engage in independent and proactive learning.

Further, the learners who get an adequate allowance from their parents could feel more pressure to prove why they should be supported. Being present regularly can be interpreted as a way for learners to show their parents how much they value their education. Having a consistent attendance pattern facilitates rapport-building among learners and their teachers. A more encouraging learning atmosphere where learners feel at ease asking for assistance and exchanging ideas can result from this interaction. Learning experiences can be improved by these kinds of interactions in ways that go beyond grades. Although grades are an essential measure of academic success, focusing only on them might overshadow the other advantages that consistent attendance in class provides. In the end, a well-rounded strategy that prioritizes academic achievement and attendance can result in a more thorough and fulfilling educational experience.

Furthermore, using ICT in teaching and learning involves using technology to make the content more engaging and simple for learners and may aid learners to be more participative in the classroom not just for attendance. It makes use of multimedia, projectors, the internet, and audio-visual assistance. Both learners and teachers will profit from this transformation of education. Teachers can use new ideas, elegantly deliver content, and participate in the educational process. Through information and communication technologies, learners acquire knowledge, seek knowledge on their own, and share knowledge with others.

The findings of the study of Pasaribu et al. (2023) revealed that English instructors utilize various technological tools in their lessons, including LCD monitors, laptops, speakers, and internet access. These tools keep students motivated and assist in material display, assignment sending, and notifications, making the integration of ICT into education easier.

To guarantee that technology complements meaningful learning experiences rather than replaces them, effective ICT integration necessitates careful preparation and integration into curriculum design. Consequently, there is a substantial interaction between teachers' ICT integration and learners' 21st-century skills in educational contexts, even though there may not be a clear fundamental relationship between the two. Khanday (2019) highlights the significant impact of ICT on education, transforming

classrooms and curriculums. It offers real-world problems, projects, learning tools, and feedback opportunities. Therefore, knowledge of ICT is crucial for both prospective and in-service.

Problem 5. How do the respondents compare their ICT integration and 21st-century skills when grouped according to their characteristics?

This research explores the investigation of teachers' ICT integration and 21st-century skills based on their characteristics. It is essential to deliberate several aspects that may affect their proficiency in these areas. Teachers can learn more about the elements that lead to successful ICT integration and skill development in educational settings by examining the characteristics of respondents concerning their ICT integration and 21st-century skills. Targeted interventions, professional development programs, and policy choices that support the development of 21st-century skills in teachers and learners as well as improve ICT integration can all benefit from this information. The researcher can gain insights into how distinct factors impact individuals' capacities to effectively use technology and acquire indispensable skills for succeeding in the 21st century by segmenting respondents based on these traits and then examining their ICT integration and 21st-century skills. Such understanding will help in coming up with personalized interventions, training programs, or policy interventions targeted at promoting ICT literacy as well as the development of 21st-century skills.

Table 25
Comparison of Teachers' ICT Integration When Grouped According to their Characteristics

Respondents' Characteristics	**Teacher's ICT Integration Indicators**			**OVERALL** *F-value* *p-value*
	Integration in Teaching *F-value* *p-value*	**Integration for Learner's Learning** *F-value* *p-value*	**Integration in Teaching and Learning** *F-value* *p-value*	
Age	**3.65** **0.014*** **S**	1.62 0.186 NS	0.54 0.658 NS	**2.60** **0.045*** **S**
Sex	0.06 0.81 NS	1.76 0.187 NS	0.85 0.36 NS	0.87 0.35 NS
Civil Status	0.71 0.55 NS	0.76 0.52 NS	1.64 0.18 NS	1.08 0.36 NS
Position	0.96 0.41 NS	0.53 0.66 NS	1.02 0.38 NS	0.70 0.56 NS
Highest Educational Attainment	1.45 0.22 NS	0.77 0.54 NS	0.01 1.00 NS	0.63 0.64 NS
Teaching Experience	0.96 0.45 NS	0.86 0.51 NS	1.76 0.12 NS	1.91 0.10 NS
Preference of Teaching Style	**12.64** **0.00*** **S**	**5.39** **0.02*** **S**	1.66 0.20 NS	**9.17** **0.00*** **S**
Availability of ICT Tools at Home	**3.69** **0.00*** **S**	**4.38** **0.03*** **S**	**3.66** **0.02*** **S**	**5.55** **0.04*** **S**
ICT Utilization across Subject Area	0.58 0.77 NS	0.59 0.76 NS	1.61 0.13 NS	0.99 0.44 NS
Frequency of ICT Usage	2.06 0.07 NS	**3.80** **0.00*** **S**	1.23 0.30 NS	**2.30** **0.05*** **S**

Legend: *significant at p<0.05 alpha level S – significant NS – not significant

Table 25 shows the comparison of teachers' ICT integration when grouped according to their characteristics. Overall, the teachers' ICT integration was **Significant** when grouped according to their **age, preference of teaching style, availability of ICT tools at home, and frequency of ICT usage** as indicated by the F-value and probability value less than 0.05 alpha level, which led to the rejection of the null hypothesis. This implies that teachers' ICT integration varied according to their age, preference of teaching style, availability of ICT tools at home, and frequency of ICT usage.

Considering the characteristics in terms of **age** for teachers may bring to light how different generations perceive technology integration in education. Newly hired teachers may be acquainted with digital technologies and more willing to try new teaching approaches, whereas experienced teachers may need more help and training in ICT integration. Compared to older teachers, younger teachers may exhibit greater degrees of comfort and competency with technology because they grew up in the digital era. Young teachers might be more likely to experiment with cutting-edge ICT technologies and skillfully incorporate them into their instructional strategies. Topchyan and Woehler (2021) revealed that 21st-century skills have shown that digital skills evolve sequentially, building on digital information skills, making them the key to future skills that teachers should acquire and be able to pass on to future generations.

Preferences of teaching styles can have an impact on how they are inclined to include ICT tools in their teaching. Teachers who prefer interactive and hands-on approaches may be more likely to employ ICT technologies to engage learners and improve learning outcomes. The motivation and capacity of teachers to incorporate ICT into their teaching methods might be influenced by their inclination toward distinct methods of teaching, such as traditional versus learners-centered approaches. Teachers who favor inquiry-based, learner-centered teaching methods may be more inclined to employ ICT resources to encourage student participation and active learning. De Souza et al. (2021) stipulated that as to students' level of language learning motivation and engagement, it was found that male and female students have high levels of language learning engagement.

Further, the **availability of ICT tools at home** can influence teachers' confidence in teaching. Teachers who have access to computers, the internet, and other digital devices at home may be more adept at using ICT for the teaching and learning process. Teachers' knowledge and competence with technology can be impacted by the availability of ICT devices at home. Teachers who have easy access to a wide range of ICT resources at home might be more willing to try out new technologies and find creative ways to incorporate them into their lessons. For those who have limited access to these tools, they may experience challenges with properly incorporating technology in the classroom. According to the study of Sanchez et al. (2023), the findings revealed that faculty had physical access to ICT, evidenced by their acquisition of laptop computers, smartphones, Internet connections, and office suite software. Furthermore, teachers were driven to use ICT and adept at operating, searching, and strategizing online. They also made extensive use of ICT in their everyday and educational endeavors. Also, enthusiasm, skill, and utilization access were all substantially related.

In addition, the **frequency of ICT usage** in class illustrates their proficiency and ease with digital tools. Teachers who use technology in their personal and professional lives may have higher degrees of ICT integration in the classroom. Those who are new to utilizing ICT, on the other hand, may require additional help and training to properly incorporate technology into their teaching. Regular exposure to ICT tools can enhance teachers' proficiency and effectiveness in integrating technology into their teaching and learning process. According to the research of Chama (2023), there is a shortage of digital devices among teachers in Zambia. The majority of respondents (88.6%) claimed to have a laptop or desktop computer, whereas a sizable percentage (94.3%) possessed a smartphone. This suggests that teachers own a reasonably large number of digital devices, which is critical for introducing technologies into the learning environment.

Meanwhile, sex, civil status, position, highest educational attainment, teaching experience, and ICT utilization across subject areas were found to be not significant to teachers' ICT integration which led to the acceptance of the null hypothesis of this study. This suggests that both male and female teachers demonstrate similar levels of ICT integration, regardless of their sex. Whether teachers are single, married, widowed, or separated does not appear to influence their ICT integration practices. Civil status does not seem to be a determining factor in teachers' use of technology for educational reasons. Saripudin et al. (2020) revealed in their study that there was no significant difference in the level of ICT capacity of teachers based on demographic factors of teachers in terms of sex, length of service, academic qualification, and certification status of vocational teachers in West Java. Meanwhile, if in view the average ability of ICT vocational teachers has the diversity level of their ICT capabilities either gender, age, years of academic qualification, and certification status of teachers.

Further, the position of the teachers does not appear to correlate with their level of ICT integration based on the results of the study. Teachers' levels of education, whether they have units in master's or doctoral, do not appear to have a substantial impact on their ICT integration. Teachers with varied degrees of educational attainment exhibit comparable levels of ICT integration in the classroom. Also, the number of years of teaching experience does not appear to have a major impact on teacher ICT integration. Both newly hired teachers and expert teachers use technology in their classrooms at comparable rates. Lastly, teachers across subject areas exhibit similar levels of technology utilization, implying that ICT integration is not particular.

In particular, the highest F-value of 9.17 and p-value of 0.00 belonged to teachers' preference of teaching style labeled as **Significant.** This means that teachers' inclinations toward certain approaches to learning, such as traditional against creative methods, may have an impact on how they integrate ICT. ICT may be used more frequently by teachers who support inquiry-based, hands-on, or learner-centered learning strategies to create interactive and engaging learning environments. On the other hand, teachers who favor traditional, lecture-based methods of learning may seem less inclined to integrate ICT into their lessons, specifically if they lack technological comfort or do not think it matches well with their pedagogical approach. According to Kennedy (2023), innovation in education does not simply change teaching yet, in addition, the learning structures. The preparedness of students now mandates that teachers include ICTs in academic pursuits, putting learners in a position to succeed in the 21st century. It motivates learners to participate and helps them learn. It is vital to incorporate ICT in teacher training programs since it improves the program and stimulates teachers in preparation to use it.

Moreover, the indicator Frequency of ICT Usage obtained the lowest F-value of 2.30 and p-value of 0.048 described as **Significant.** This means that teachers' ICT integration may be affected by how frequently they use ICT in their professional as well as their personal lives. Teachers may be skilled at using ICT tools and more inclined to include them in their lessons if they frequently utilize technology for productivity, research, communication, and teamwork. Meanwhile, teachers with lower levels of digital literacy and who seldom use ICT in their personal or professional lives may need further assistance and training to effectively integrate technology into their lessons.

The findings of the study of Mr et al. (2021) highlight challenges in integrating ICT into classroom instruction, including lack of experience, curriculum, government policy, inadequate resources, obsolete hardware, intensive teaching programs, overcrowded classrooms, heavy workload, slow internet connectivity, intermittent electricity supply, and attitudinal barriers from older lecturers.

Boonmoh et al. (2021) also revealed that most of the teachers knew technological tools and integrated technologies in their classes. Some resources had been utilized by all teachers, whereas interconnected technology resources for education were only being implemented in a few classes. The study also identified characteristics that influence technology use and not being used. Based on these results, educational consequences are presented.

Table 26

Comparison of Learner's 21st Century Skills When Grouped According to their Characteristics

Learner-Respondents Characteristics	Learner's 21st Century Skills Indicators						
	Multimodal Literacy *F-value* *p-value*	**Communication and Collaboration** *F-value* *p-value*	**Questioning** *F-value* *p-value*	**Creative Thinking** *F-value* *p-value*	**Reflective** *F-value* *p-value*	**Critical Thinking and Problem-Solving** *F-value* *p-value*	**OVERALL** *F-value* *p-value*
Sex	3.55 0.06 NS	2.07 0.29 NS	0.09 0.77 NS	1.72 0.19 NS	1.32 0.25 NS	0.78 0.38 NS	2.73 0.10 NS
Parents' Civil Status	0.65 0.52 NS	0.72 0.49 NS	1.15 0.32 NS	1.40 0.25 NS	0.73 0.48 NS	0.81 0.45 NS	1.02 0.36 NS

Legend: *significant at p<0.05 alpha level S – significant NS – not significant

Table 26 shows the comparison of learners' 21st-century skills when grouped according to their characteristics. Overall, the learner's 21st-century skills were not significantly different when grouped according to their characteristics as indicated by the F-value and probability value greater than 0.05 alpha level which led to the acceptance of the null hypothesis. This means that learners' 21st-century skills were not different from each other regardless of their characteristics. It indicates that all learners' holistic development is being supported by the schools, which is also effectively encouraging fair access to chances for skill development.

Every learner is different, with a range of interests, strengths, and learning styles. However, there may be some influence from demographic factors like parents' marital status and sex, individual variances within groups can often outweigh any broad trends or relationships. Sex can have an impact on educational prospects and experiences in many nations.

However, sex differences exist when it comes to the value placed on 21st-century skills like communication, creativity, teamwork, and critical thinking. Therefore, any sex-based variations can be negligible or unimportant. The socioeconomic level and family dynamics of the learner can be influenced by their parents' civil status, although there may not always be a clear correlation between it and the development of 21st-century skills. Parents from different backgrounds may support and promote their children's education, which can lead to similar results in terms of skill development.

Preconceptions and presumptions regarding particular learners' innate advantages or disadvantages in learning skills are common. If there are no apparent differences, it clarifies the misunderstandings and places a greater value on the potential of the learner than the traits of the group. It supports the idea that every learner, regardless of background or ethnicity, should have equal access to learning resources and chances to acquire 21st-century skills. It is possible to create and implement educational interventions that improve 21st-century abilities without having to significantly modify them based on a learner's sex or parent's civil status. Educational policies and programs can be simplified and made more inclusive and successful for all learners.

To help all learners develop 21st-century skills, it emphasizes the meaning of inclusive strategies, comprehensive design of curriculum, effective instructional methodologies, equitable resources, and teacher effectiveness. Although sex and parents' civil status are characteristics of the learners, they do not necessarily influence learners' intellectual abilities, socio-emotional skills, or adaptability to 21st-century learning environments. Learners are unique individuals with varying backgrounds, experiences, and aptitudes, and the acquisition of 21st-century skills is influenced by a complex interaction of factors other than demographic features. Over time, societal perceptions of sex roles and parents' civil status have resulted in more equal opportunities and expectations for learners of all sexes and backgrounds.

Oral and Yayla (2023) indicated that the 21st-century skills (21CSs) such as digital age literacy, inventive thinking, high productivity, and effective, and spiritual values encompass various abilities that are essential for adapting to the demands of the modern era and ensuring future success. According to the results of the statistical analysis, it was determined that most of the

demographic characteristics of high school students did not have a significant impact on the 21CSs of the high school students. On the other hand, it has been determined that there is a statistically significant difference in the development levels of students' digital age literacy and high productivity skills based on the mother's educational status.

3.2 Discussions

In this discussion, explored the relationship between teachers' ICT integration and learners' 21st-century skills. Teachers' highest educational attainment was very low. Balancing doctoral studies with daily teaching duties can be challenging due to high tuition and fees, and teachers may be hesitant to take on additional debt. Edukasyon sa Pagpapakatao (ESP) was the least integrated with ICT. Teachers handling this subject emphasize more on moral growth, and the development of characters, and value education over ICT. Standardized assessment and academic performance might prevail over ICT integration.

Teachers' ICT integration in teaching and learning got the lowest mean. Teachers integrate ICT into their teaching practices so that learners develop skills but some teachers do not have enough professional development opportunities or training. There are also situations where schools do not have enough access to ICT resources, such as computers, tablets, or dependable internet connections. Teachers struggle with technology integration due to lack of access, outdated technology, and inconsistent internet connectivity despite their willingness to incorporate ICT into their lessons.

The level of the learners' 21st-century skills based on Multimodal literacy got the lowest mean rating due to limited exposure to digital media and diverse texts, potentially hindering their understanding of how different communication modalities combine to express meaning.

Subsequently, the relationship between teachers' ICT integration and learners' 21st-century skills is not significant. The effectiveness of ICT integration varies, and learners' skill development may not be significantly impacted. Although teachers include ICT in their lessons, the level of this integration differs. The mere utilization of technology in the classroom does not ensure that learners' 21st-century skills will be improved. Important factors include how technology is incorporated, how the teaching methods are used, and how relevant the technology is to the learning objectives.

The teachers' ICT integration was Significant when grouped according to their age, preference of teaching style, availability of ICT tools at home, and frequency of ICT usage. Younger teachers who are more familiar with technology, are more willing to include ICT in their lessons and are skilled at using digital tools. Preference of teaching style of teachers impacts ICT integration in the classroom setting. While some teachers prefer the traditional lecture approach over interactive or project-driven methods, requiring strategies adapted to these scenarios. If the teachers have access to ICT tools in their own homes, they are more likely to begin using them within their teaching practice and develop confidence in their use and possible benefits. How frequently teachers use ICT in their life as teachers affects their potential to accept its integration into their teaching practice.

Moreover, during the interview of the selected teachers in selected Districts in Laguindingan, Alubijid East and West, and Libertad, Division of Misamis Oriental, it was clearly stated that despite the potential benefits of ICT in enhancing the teaching and learning process, the availability and reliability of internet connection remain significant barriers for teachers in many educational settings. All of the teachers who were part of the interview stated that integration of ICT changes the way they teach. It gives them more time to integrate supplementary information into a lesson for learners to easily grasp a concept. Learners become more interested in the lesson because they can see how things work and the application of the subject matter to real-life situations. ICT has indeed revolutionized the way teaching is conducted. It has emerged as a transformational force in education. ICT tools and educational software have made it more interactive and engaging. There is no substitute for the expertise of a teacher in teaching but ICT has been a breakthrough because ICT integration has eased the burden of preparation of the lesson. It has made teaching easier and more comfortable.

Throughout the interview of the selected learners from different levels, it was found out that many of the teachers use PowerPoint presentations, video lessons, and visual aids in their classes, while a few teachers continue to utilize manila papers or cartolinas as visual aids in their lessons. Some of the learners found technology in lessons engaging and interactive, while others found it fascinating but preferred hands-on activities. Some learners found it challenging due to glitches, slow internet, or traditional teaching methods, although only a few learners preferred traditional methods. Some learners believe that ICT integration prepares them for future digital demands in higher education. Even though others have digital literacy skills, limited of them have online communication expertise, and few learners lack familiarity with ICT tools. Most of them face disruptions from non-academic websites and social media during online learning sessions.

Problem 6. Based on the findings of the study, what intervention plan can be designed?

Teachers who integrate ICT into their classroom teaching can have a significant effect on how effectively learners gain 21st-century skills. Teachers will be equipped with the technologies and prepare the learners for the future's opportunities and challenges. This also entails expanding learning opportunities given to learners who are motivated to create ideas and use their skills for their studies and forthcoming endeavors.

INTERVENTION PLAN

Introduction

Integrating information and communication technology is beneficial and key to performing this task not only in the fast-moving pedagogical landscape today but also in educating learners about 21st-century hindrances. This intervention plan attempts to deal with the important need for strengthening teachers' competencies in ICT tools and practices to enable them to effectively develop 21st-century skills in learners. Extraordinary innovations in technology and interconnecting the world at large have been the hallmark of the present day. This can only be achieved by shifting educational paradigms from the use of traditional methods to new approaches that employ digital resources for the nurturing of crucial skills among learners.

Rationale

Diverse teachers give an advantage to learners' learning and improve how well learners comprehend by educating their minds about a variety of ideas, practices, and communities from all around the world. Learners establish global awareness and interpersonal skills through involvement in worldwide interaction, digital changes, and online studies. They acquire a better understanding of diversity, acknowledge diverse behaviors, and strengthen their capacities to connect efficiently with people from all walks of life. These qualities are essential aspects of technological capabilities.

Based on the findings of the study, the teachers' ICT integration in teaching and learning got the lowest overall mean while in the learners' level of 21st-century skills, multimodal literacy got the lowest overall mean.

Objectives

1. Provide comprehensive training sessions and workshops for teachers' development that focus on efficient ICT integration techniques. Expand the ability of teachers to use ICT tools and resources for teaching and gain confidence and expertise in using ICT tools and platforms effectively.
2. Empower teachers to generate learning experiences that promote ICT integration in teaching and learning to deliver teachers with chances to investigate and test out new technologies that are pertinent to their subject areas.
3. Strengthen teamwork, interpersonal skills, and task allocation skills in multimodal literacy among learners so that they will be more equipped to understand and evaluate multimodal structures that integrate text, pictures, videos, and audio to effectively communicate ideas.
4. Encourage learners to integrate multimodal literacy skills across multiple subject areas and classroom activities.

Areas of Concern	**Specific Objectives**	**Strategies/ Activities**	**Persons Involve**	**Time Frame**	**Estimated Budge**	**Source**	**Expected Output**
Teachers' ICT Integration in Teaching and Learning	Conduct a comprehensive assessment of teachers to better understand teachers' existing knowledge of ICT and perspectives.	Provide workshops on essential ICT skills such as learning management systems (LMS), productivity tools like Microsoft Office, and other basic digital literacy.	School Head Department Heads Teachers ICT Coordinator	July-September 2024	Php 5, 000.00	GPTA Funds	To better address the needs of learners and teachers, use evaluation data to pinpoint areas that need improvement and to hone the intervention plan.
	Determine specific areas where teachers want training and support.	Train teachers to teach strategies for integrating ICT into their classroom instruction.	Trainers with expertise in ICT integration and educational technology School Head Department Heads ICT Coordinator Teachers	October 2024-January 2025	Php 20, 000.00	MOOE	Utilize information to enhance professional development opportunities and promote initiatives.
	Offer advanced training in specialized ICT tools and applications that apply to several subject matters.	Examine academic requirements to identify opportunities for integrating ICT skills and digital literacy across subject matter.	Trainers with expertise in ICT integration and educational technology School Head Department Heads	September 2025-December 2025	Php 20, 000.00	Canteen Funds	Integrate ICT tools for formative and summative assessment purposes.

			Teachers ICT Coordinator				
	Propose workshops on designing engaging multimedia lessons and assessments for advanced professional development	Facilitate peer mentoring and coaching among teachers.	School Head Department Heads Teachers ICT Coordinator	January 2026	Php 10, 000.00	SEF Funds	Create interrelated programs that use ICT to foster interdisciplinary learning.
	Cultivate an environment of continual development and innovation in ICT integration, with a focus on sustainability.	Plan a long-term strategy for pursuing ICT integration efforts beyond the primary intervention period.	PSDS School Head Department Heads Teachers ICT Coordinator	July-September 2026	Php 20, 000.00	MOOE GPTA Funds	Conduct action/basic/innovation research to assess how ICT integration influences teaching methods and outcomes for learners.
		Educate parents and other stakeholders in discussions about the advantages of ICT in education.	PSDS School Head ICT Coordinator Department Heads Teachers Stakeholders	October 2026	Php 8, 000.00	GPTA Funds	Spread innovations through meetings, posts on social media platforms, SGC and GPTA meetings.
Learners' Multimodal Literacy Skills	Measure learners' current proficiency and understanding of multimodal literacy skills	Give organized classes on specific components of multimodal literacy abilities, like the fundamentals of video production, audio editing methods, and visual design concepts.	School Head Department Heads ICT Coordinator Teachers Learners	July-August 2024	Php 5, 000.00	MOOE	Use formative assessment strategies to assess student development and make necessary changes to the methods you use to teach. These methods include peer and self-evaluation, tests, and reflections.
	Introduce learners to the fundamentals of multimodal literacy and develop fundamental skills.	Develop introductory lessons that introduce learners to different approaches to communication (text, image, audio, video).	School Head Department Heads ICT Coordinator Teachers Learners	October 2024-January 2025	Php 5, 000.00	SEF Funds	Guarantee all sufficient ICT tools are available to facilitate multimodal production.

		Organize field trips to technology centers to motivate learners.	School Heads Department Heads ICT Coordinator Teachers Learners Stakeholders	February	Php 20, 000.00	MOOE GPTA Funds	Stimulate innovations in multimodal literacy project creation and implementation.
	Foster responsible utilization of multimodal texts and online communities.	Each learner should be educated on fair use policies, intellectual property laws, and suitable attribution techniques while utilizing multimedia resources in their works.	School Heads Department Heads ICT Coordinator Teachers Learners	March2025	Php 10, 000.00	MOOE	Learners will be responsible for using multimodal literacy in the online world.
	Establish specific multimodal literacy learning objectives	Create rubrics that are in line with the learning objectives to evaluate learners' multimodal literacy skills.	School Heads Department Heads ICT Coordinator Teachers Learners	March 2025	Php 10, 000.00	MOOE	Conduct a summative evaluation at the end of the intervention to assess learners' mastery of multimodal literacy skills.
	Enhance learners' multimodal literacy skills through methodical application and modification.	Collaborate with teachers to incorporate multimodal activities into various subject areas	School Head Department Heads ICT Coordinator Teachers Learners	June 2025-September 2025	Php 10, 000.00	Canteen Funds	At the end of the school year, learners are now advanced in the fundamental procedures of multimodal literacy.
		Implement discussions in which learners evaluate their multimodal work and identify possibilities for growth and development.	School Head Department Heads ICT Coordinator Teachers Learners	October 2025-March 2026	Php 10, 000.00	GPTA Funds	Organize competitions or showcases to recognize outstanding multimodal work.

	Stimulate long-term multimodal literacy development and innovation in projects for learners.	Empower learners to propose and launch unique multimodal projects that address real-world problems or examine modern technologies.	School Head Department Heads ICT Coordinator Teachers Learners	June-August 2026	Php 10, 000.00	GPTA Funds	Recognize learners who have outstanding achievements in multimodal literacy skills through giving awards.
		Implement regular feedback sessions with learners to discuss project experiences	School Head Department Heads ICT Coordinator Teachers Learners	September-October 2026	Php 10, 000.00	Canteen Funds	Conduct a comprehensive assessment of the intervention's impact on multimodal literacy skills development.
		Collaborate with stakeholders to exhibit the work of the learners in public places or post on social media platforms.	PSDS School Head Department Heads ICT Coordinator Teachers Learners Stakeholders	December 2026	Php 10, 000.00	GPTA Funds	Feature achievements and feedback from learners, teachers, and stakeholders to encourage greater involvement and participation.

3.3 Conclusions

The study found that when teachers incorporate ICT into their teaching, they make learning more interesting and interactive. ICT helps promote active learning, teamwork, and exploration, which are crucial for learners to develop important skills. The more ICT tools are integrated into the class and the more learning strategies are applied, the more learners develop their 21st-century learning skills.

However, on the part of the learners, some of them have insufficient internet connection due to the geographical location of the schools, few ICT tools available in their laboratories and lack of exposure to different ICT tools are significant barriers for teachers to integrate ICT into their classroom activities.

3.4 Recommendations

Based on the above conclusions, the following recommendations are presented:

1. Encourage post-graduate studies among teachers because it is more advantageous for their professional development, specialized knowledge, and educational impact. The department should provide financial aid in the form of grants, scholarships, tuition waivers, or stipends to help defray expenses such as books, tuition, and other expenses related to pursuing a doctorate.

2. Introduce to teachers the enhancement of ICT integration in teaching and learning to implement creative approaches and allocate resources for comprehensive training and professional development. Maintaining and updating ICT infrastructure is crucial for teachers to keep pace with technological advancements.

3. For the learners to improve their multimodal literacy skills by utilizing the variety of learning resources accessible through the internet, such as interactive YouTube tutorials, e-books, educational websites, and online activities. Discover multimodal literacy skills and take part in self-directed learning exercises to be more equipped and advanced in the future.

4. In evaluating and promoting 21st-century skills, educators and policymakers may need to take into account elements of the educational environment that go beyond ICT. This covers elements that aid in skill development, such as instructional strategies, educational environments, and support organizations.

5. Organizations and educational programs stand to gain from implementing a comprehensive professional development strategy that incorporates pedagogical creative thinking, curriculum design, and continuous improvement techniques in addition to ICT skill development.

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REFERENCES

Adamu, O. B., Bukar, K. W., & Gazali, K. A. Y. (2024). Effect of Information and Communication Technology (ICT) on Teacher Education in Dutse Local Government Area, Jigawa State of Nigeria. *African Journal of Humanities and Contemporary Education Research*, *14*(1), 129-134. https://doi.org/10.62154/q7abtm95.

Adelakun, Najeem O, Olanipekun, Banji A., & Bakinde, Suliat A. (2020). Easy Approach to A Responsive Website Design Using Artisteer Application Software. International Research Journal of Modernization in Engineering Technology and Science Modernization in Engineering, *2*(3), 1–6. https://doi.org/http://doi.org/10.5281/zenodo.3930473.

Adeoye, M. A., Prastikawati, E. F., & Abimbowo, Y. O. (2024). Empowering Learning: Pedagogical Strategies for Advancing 21st Century Skills and Quality Education. *Journal of Nonformal Education*, *10*(1).

Afan, R. & Tariga, J. (2022). Lockdown fatigue, personal resilience and coping appraisal of faculty in a state university.

Aguboshim, F.C., (2019). Parent Marital Status Influence on Academic Performance in IT Subjects of in-School Adolescents in Nigeria. International Journal of Engineering Management and Economics. DOI:10.35629/5252-0302494500.

Albert, J. R., Quimba, F. M., Rosellon, M.A., & Muñoz, M. (2021). Promoting a more innovative and inclusive society through ICT development. Philippine Institute for Development Studies.

Ali, W. (2018). Teachers' perceptions of ICT integration as a pedagogic reform in classroom instruction. IOSR Journal Of Humanities And Social Science (IOSR-JHSS), 23(10), 14–31. https://doi.org/10.9790/0837-2310091431.

Akram, H., Abdelrady, A. H., Al-Adwan, A. S., Ramzan, M. (2022). Teachers' Perceptions of Technology Integration in Teaching-Learning Practices: A Systematic Review. Sec. Educational Psychology Volume 13 – 2022. https://doi.org/10.3389/fpsyg.2022.920317.

Alkaromah, A. H., Fauziati, E., Asib, A. (2020). Students' Perception of the Information and Communication Technology (ICT) Tools in English Language Teaching. https://doi.org/10.34050/ELS-JISH.V3I1.9522.

Amponsah, B., & Stonier, F. (2020). Effects of ICT on Teaching and Learning: A Review of Related Literature. https://www.ijscia.com/wp-content/uploads/2020/10/Volume1-Isuue-2-Sep-Oct-2020-No.20-119-123.pdf.

Anzari, P. P., Al Shiddiq, I. H., Pratiwi, S. S., Fatanti, M. N., & Silvallana, D. F. (2021). Teachers Technological Capability as Digital Immigrants in Learning from Home Activities. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(07), pp. 146–159. https://doi.org/10.3991/ijet.v16i07.21229.

Armin, D. S. (2023). EFL Teachers' Preference Teaching Styles: An Interpretative Study. Biormatika: Jurnal Ilmiah Fakultas Keguruan Dan Pendidikan. https://doi.org/10.35569/biormatika.v9i1.1378.

Asianoa, R., Kuupille, F., Segbefia, S.K., & Asenso, J.A. (2022). Examining the Integration of ICT into Teaching and Learning: A Study of Colleges of Education in the Volta Region. *Integrated Journal for Research in Arts and Humanities*

Ashikuzzaman, M., D. (December 6, 2021). Multimedia: Its Components and Applications. LIS Education network.

Awatefe, K. J. & Umudi, Q. E. (2020). The role of e-service technology education for national development and economic survival in Nigeria. *2nd annual science conference in College of Physical Education* (pp. 125 - 139). Mosogar.

Ayup, S. N., Awang, M., Ahmad, A. (2019). ICT (Information and Communications Technology, or Technologies) Use in Historical Learning. https://doi.org/10.32698/gcs.0182.

Bansal, M. (2023). Use of information and communication technology (ICT) in education system. *International Journal of Multidisciplinary Trends*, *5*(3), 04-06.

Barbuceanu, C. D. (2020). Teaching the digital natives. *Revista de Ştiinţe Politice. Revue des Sciences Politiques*, (65), 136-145.

Baporikar, N. (2021). Reflective Teaching and Technology Integration in Management Education. *Research Anthology on Business and Technical Education in the Information Era*.

BenQ, (2023). Projector vs. Interactive Display. https://www.benq.com/en-me/education/edtech-blog/projector-vs-interactive-display.html

Bhat, S. & Bashir, M. (2018). Measuring ICT orientation: Scale development & validation. Education and Information Technologies. 23. https://doi.org/10.1007/s10639-017-9656-4.

Bongco, R.T., Abenes, R. D. (2019). Clash of Spheres - The Paradox of Being a Female Teacher in the Philippines. Beijing International Review of Education. https://doi.org/10.1163/25902539-00102012.

Boonmoh, A., Jumpakate, T., & Karpklon, S. (2021). Teachers' perceptions and experience in using technology in the classroom. *Computer-Assisted Language Learning Electronic Journal*, *22*(1), 1-24.

Bosova, L.L. (2020). Coding as a tool for forming the Computational thinking of students. *Informatics in school*. https://doi.org/10.32517/2221-1993-2020-19-10-4-10.

Buque, J. (2022) Online Learning Strategies of Senior High School in Reading 21st Century Short Stories. *Asian Journal on Perspectives in Education*, *3*(1), 1-30.

Boyraz, S. (2021). A Scale Development Study for One Of The 21st Century Skills: Collaboration at Secondary Schools. African Educational Research Journal. https://doi.org/ 10.30918/AERJ.94.21.129.

Cabahug, I., Osias, N., Ongcachuy, B. & Corpuz, G. (2024). 21st Century Skills and Teachers' Performance: Basis for Instructional Development Plan. American Journal of Arts and Human Science. 3. 10.54536/ajahs.v3i2.2860.

Carroll, M., Lindsey, S., Chaparro, M., & Winslow, B. (2019). An applied model of learner engagement and strategies for increasing learner engagement in the modern educational environment. *Interactive Learning Environments*, *29*(5), 757–771. https://doi.org/10.1080/10494820.2019.1636083

Chama, A. (2023). Digital literacy skills of teachers: A study on ICT use and purposes.

Cherono, M. (2023). Importance of Integrating ICT in Education. https://www.linkedin.com/pulse/importance-integrating-ict-education-value-chain-factory.

Clariño, J.L. (2020). Organizational Support, Instructional and Professional Competencies of Master Teachers: A Theory. *International Journal of Trend in Scientific Research and Development*.

Clipa, O., Delibas C., Mata, L. (2023). Teachers' Self-Efficacy and Attitudes towards the Use of Information Technology in Classrooms. Advances in Technology-Enhanced Teaching and Learning. https://doi.org/10.3390/educsci13101001.

Connor, S. (2019). EdD vs PhD in Education. What's the Difference? Northern University Graduate Program.

Copeland, M. (2023). How can communication and collaboration skills be integrated into the curriculum and assessment of students? Linkedin https://www.linkedin.com/advice/1/how-can-communication-collaboration-skills.

Dalangin, M. (2023). How are ICT tools used in teaching TLE? https://www.pressreader.com/philippines/sunstarpampanga/20230127/281694028912109.

Darbha, B., Raghu, T., & Tulasi, K. N. (2024, June). Competence of ICT tools to enrich LSRW skills in English language classroom. In *AIP Conference Proceedings* (Vol. 2971, No. 1). AIP Publishing.

Dela Fuente, J. A., Biñas, L. C. (2020). Teachers' Competence in Information and Communications Technology (ICT) as an Educational Tool in Teaching: An Empirical Analysis for Program Intervention. https://www.researchgate.net/publication/350466721.

Department of Education, Philippines. (2010). DepEd Order 78 series of 2010 – Guidelines on the Implementation of the DepEd Computerization Program (DCP).

De Souza, R., Parveen, R., Chupradit, S., Velasco, L. G., Arcinas, M., Tabuena, A. C., ... & Ventayen, R. J. M. (2021). Language teachers' pedagogical orientations in integrating technology in the online classroom: Its effect on students motivation and engagement. *Turkish Journal of Computer and Mathematics Education*, *12*.

Dimitroff, A.J. & Dimtroff, A. R. (2018). New Beginnings: Trials and Triumphs of Newly Hired Teachers. https://doi.org/10.32601/EJAL.464090.

Dixit, R. (2022). How Important Is Technology In Education? eLearning Industry. https://elearningindustry.com/benefits-technology-integration-education-sphere.

ECCP (2022). ICT Outlook for 2022: A Fuel for Economic Progress. https://www.eccp.com/events/1105.

Eder, A. B. (2023). A perceptual control theory of emotional action. Cognition and Emotion. https://doi.org/10.1080/02699931.2023.2265234.

Edwards, S., & Bowman, M. A. (2024). Promoting student learning through questioning: A study of classroom questions.

Ekici, Omer, Ekici, Y., Konakci, G., Buyukbahcivan, E., & Kunt, A. (2024). Investigating the Effect of Creative Leadership Characteristics of School Principals on Professional Motivation of Teachers: Okul Mudurlerinin Yaratici liderlik Ozelliklerinin Ogretmenlerin Mesleki Motivasyonlarına Etkisinin İncelenmesi. *Journal of Management and Educational Sciences*, *3*(2), 128–136. https://doi.org/10.5281/zenodo.11639591.

Faruk, S.M. (2018). Role of ICT in the Universalization of Elementary Education. *Journal of emerging technologies and innovative research*. https://www.jetir.org/papers/JETIR180Z005.pdf.

Fedorenko, S. (2019). Experience Of Developing Students' Multimodal Literacy In The Digital Learning Environment Of Higher Education Institutions. *Information Technologies and Learning Tools*. https://doi.org/10.33407/ITLT.V69I1.2405.

Ferguson, J., Keyworth, C., Tully, M. P. (2018). If no one stops me, I'll make the mistake again': Changing prescribing behaviors through feedback; A Perceptual Control Theory perspective. Research in Social and Administrative Pharmacy. https://doi.org/10.1016/j.sapharm.2017.03.001.

Figuera-Gazo, P., Llanes Ordóñez, J., Torrado Fonseca, M., Valls Figuera, R., & Buxarrais Estrada, M.R. (2020). Reasons for Course Selection and Academic Satisfaction among Master's Degree Students. *Journal of Hispanic Higher Education*, *21*, 261 - 281. https://doi.org/10.1177/1538192720954573.

Fung, T. H., Maat, S. M. (2021). A Systematic Review of Teachers' Perception Towards ICT Integrations in Mathematics Classroom. International Journal of Academic Research in Progressive Education and Development, 10(3), 1349–1363.

Gaboy, R., Mabalay, M., Mananghaya, M., G., Mercado, M. G., & Romblon, B. (2020). Coping with the new norm: ICT-pedagogy integration awareness and competencies of TEI faculty. Teaching and Teacher Education. https://doi.org/10.37134/jrpptte.vol10.2.4.2020.

Gelacio, M., & Comighud, S. M. (2020). Utilization of Information and Communication Technology (ICT) Resources. 5. 1-20. 10.5281/zenodo.3865911.

Gonzalez-Salamanca, J.C., Agudelo, O.L., & Salinas, J. (2020). Key Competences, Education for Sustainable Development and Strategies for the Development of 21st Century Skills. A Systematic Literature Review. *Sustainability, 12*, 10366.

Grimus, Margarete. (2020). Emerging Technologies: Impacting Learning, Pedagogy and Curriculum Development. 10.1007/978-981-15-0618-5_8.

Guemide, B. (2019). ICT integration in education. https://www.slideshare.net/BoutkhilGuemide1/ict-integration-in-education-200358633.

Gumban, E. (2023). Census: More Filipino couples are now in live-in arrangements. Philstar. https://www.philstar.com/headlines/2023/02/17/2245649/census-more-filipino-couples-now-live-arrangements.

Haetami, Z. A. (2023). Gadget Usage Intensity on Students' Concentration in English Language Learning. In *Proceeding of Annual International Conference on Islamic Education and Language (AICIEL)* (pp. 239-257).

Hafifah, G., Sulistyo, G. H. (2020). Teachers' Ict Literacy And Ict Integration In Elt In The Indonesian Higher Education Setting. Turkish Online Journal of Distance Education-TOJDE July 2020 ISSN 1302-6488 Volume: 21 Number: 3 Article 13. https://dergipark.org.tr/en/download/article-file/1181894.

Hashmi, Z. F., Dahar, M.A., Sharif, A. (2019). Role of Information and Communication Technology in Motivating University Undergraduate Students towards a Learning Task in Public Sector Universities of Rawalpindi City. social Criminol 7: 196. doi:10.35248/2375-4435.19.7.196.

Helpline PH,. (2024). Why DepEd Should Provide Laptops to Teachers https://helplineph.com/technology/provide-laptops-to-teachers/.

Hero, J.L. (2019). The Impact of Technology Integration in Teaching Performance. Journal Articles; Reports – Research. https://eric.ed.gov/?id=ED606392.

Ho, T.M.L. & To, M. T. (2022). Delegating Critical Thinking Skills in Learners through Effective Questioning Technique in the Class. International Journal of TESOL & Education. https://doi.org/10.54855/ijte.22232.

Hunsaker, E. (2022). Computational Thinking. https://edtechbooks.org/k12handbook/computational_thinking.

Infante-Moro, A., Infante-Moro, J.C., Gallardo-Perez, J. (2019). The Importance of ICTs for Students as a Competence for their Future Professional Performance: The Case of the Faculty of Business Studies and Tourism of the University of Huelva. Journal of New Approaches in Educational Research. https://doi.org/10.7821/naer.2019.7.434.

Ishaq, K., Mat Zin, N. A., Rosdi, F., Abid, A. & Ijaz, H. (2020). The Impact of ICT on Students' Academic Performance in Public Private Sector Universities of Pakistan. International Journal of Innovative Technology and Exploring Engineering. 9. 2278-3075. 10.35940/ijitee.C8093.019320.

Ismail, M., Rahida & Arshad, Rozita & Abas, Zakaria. (2018). Can Teachers' Age and Experience Influence Teacher Effectiveness in HOTS? International Journal of Advanced Studies in Social Science & Innovation. 2. 144-158. 10.30690/ijassi.21.11.

Jackman, M. W. & Morrain-Webb, J. (2019). Exploring gender differences in achievement through student's voice: Critical insights and analyses, Cogent Education, 6:1,. https://doi:/10.1080/2331186X.2019.1567895.

Jogezai, N. H., Ismail,S. A. , Baloch, A. (2018). School Teachers' Concerns about ICT Integration: Perspectives from a Developing Part of the Globe. EURASIA Journal of Mathematics, Science and Technology Education,14(12), em1620 ISSN:1305-8223.

Kakoulli-Constantino, *K., Papadima-Sophocleous, S., (2020).* The Use Of Digital Technology In Esp: Current Practices And Suggestions For ESP Teacher Education. The Journal of Teaching English for Specific and Academic Purposes 8(1) https://doi.org/10.22190/JTESAP2001017K.

Kauppinen, T., & Guseva, Y.E. (2018). Learning in the Era of Online Videos: How to Improve Teachers' Competencies of Producing Educational Videos. *Proceedings of the 4th International Conference on Higher Education Advances (HEAd'18)*.

Kennedy, G. M. (2023). Challenges of ICT integration in teachers' education: A case study of the College of Education, University of Liberia. *International Journal of Social Science and Education Research Studies*, *3*(5), 860-870.

Kerzic, D., Danko, M., Zorko, V., & Decman, M. (2021). The effect of age on higher education teachers' ICT use. Knowledge Management & ELearning, 13(2), 182–193. https://doi.org/10.34105/j.kmel.2021.13.010.

Kendaganna, S., Kopal, S.H., Sushmitha, N., Shruthi., P., & Dr.Uma, B. (2021). An Effective Practice of ICT Tools in Higher Education to Improve the Teaching Learning Process. *Journal of the University of Shanghai for Science and Technology*.

Khanday, K.A. (2019). Role of ICT (Information & Communication Technology) in 21st Century's Teacher Education. *Volume 2 Issue 1*. https://doi.org/10.31426/IJAMSR.2019.2.1.1112.

Khattri, N. (2021). Practice of ICT tools during Classroom Teaching in Private Universities of Jaipur, Rajasthan. Social Science Research Network. https://doi.org/10.2139/ssrn.3800146.

Kimmons, R. (2020). Effectively Integrating Technology in Educational Settings. Technology Integration.

Kumar, R.A., (2020). ICT In The 21st Century: Role, Importance And Challenges ICT in The 21st Century: Role, Importance And Challenges. International Journal of Creative Research Thoughts.

Kusuma, I.P.I. (2023). The role of gender in student teachers' technology integration in teaching English speaking skills during the Covid-19 pandemic. Knowledge Management & E- -Learning, 15(3), 487-505. https://doi.org/10.34105/j/kmel.2023.15.028.

Laabidi, Y. (2024). Enhancing Teaching through ICT Integration: Insights from Moroccan University English Language Professors. *TESOL and Technology Studies*, *5*(1), 7–19. https://doi.org/10.48185/tts.v5i1.903.

Lalitha, B. S. (2021). Impact of ICT Adoption on Students Learning. Journal of Advances in Education and Philosophy. 5. 90-97. 10.36348/jaep.2021.v05i04.001.

Liang, L. & Yao, Y. (2023). The Influence of Multimodality in the Digital Era for Teaching and Learning English as a Second Language. https://doi.org/10.2991/978-2-38476-126-5_43.

Majee, S. K. (2019). ICT in 21st Century's Teacher Education. https://elicit.com/?fbclid=IwAR1QBDCEukFTyZO3j3cbDq1l1HoaUuQBpdB0wE_Spi077y5jT6bINAtwFU&workflow=table-of-papers&run=154f791a-aa22-4085-9a09-826151c48089.

Mansell, W. (2021). Perceptual Control Theory (PCT). https://www.psychologytools.com/articles/profile-dr-warren-mansell-discusses-perceptual-control-theory/.

Mayol, P. A. (October 13, 2022). The Impact Of Technology On Education In The Philippines. https://cebufinest.com/the-impact-of-technology-on-education-in-the-philippines/.

Marczak, L. (2019). Using technology to teach critical thinking skills. Digital Learning Collaborative. https://www.digitallearningcollab.com/blog/2019/1/16/using-technology-to-teach-critical-thinking-skills.

Meher, V., Baral, R. & Suna, G.. (2020). The attitude of Teachers about the Use of Information and Communication Technology (ICTs) in the Teaching-Learning Process.

Mena, J., Singh, B. & Clarke, A. (2018). Teacher education for ICT integration in the classroom. *Technological Ecosystem for Enhancing Multiculturality*. https://doi.org/10.1145/3284179.3284279

Merillo, J. & Domingo, P. (August 25, 2019), Technology in Pedagogy: Teachers' Perception Towards the Effectiveness of ICT Integration in Language Teaching. Available at SSRN: https://ssrn.com/abstract=3442432 or http://dx.doi.org/10.2139/ssrn.3442432.

Mettillo, C. P., & Pasco, F. P. (2023). The Journey of Retirable Public School Teacher During the Covid-19 Pandemic. International Journal of Innovative Science and Research Technology. ISSN No:-2456-2165.

Mili, M. (2021). A Sociological Study of Married Female College Teacher: A Review Study Palarch's Journal Of Archaeology Of Egypt/Egyptology 18(7). ISSN 1567-214x.

Minga, C., & Ghosh, S. (2024). Teachers' perceptions of ICT use in promoting teaching-learning processes and its outcomes at senior secondary level in Mbeya region, Tanzania: A review. *Journal of Education, Society, and Behavioural Science*, *37*(1), 39-50.

Mishra, S., & Sahoo, S. (2023). ICT for Personal and Professional Development of Teacher. *International Journal For Multidisciplinary Research*.

Midtlund, A., Instefjord, E. J., and Lazareva, A. (2021). Digital communication and collaboration in lower secondary school. *Nordic J. Digital Literacy* 16, 65–76.

Mkhanyiswa, Z., Booi, K., Moyo, M. (2024) Improving The Standard Of Teaching And Learning Of Life Sciences At A South African Secondary School Through Integration Of Icts, *INTED2024 Proceedings*, pp. 8017-8022.

Modi, T. (2022). Innovative use of Information and Communications Technology tools in Education Innovation. *Techno Review Journal of Technology and Management*. https://doi.org/10.31305/trjtm2021.v01.n02.002.

Mr, Amimo, and Prof (2021). Challenges of Integrating Information and Communication Technology in Teaching among National Teachers' Colleges in Uganda. *East African Journal Of Education And Social Sciences*.

Muketha, G. M. (2022). Harnessing our ICT skill set and research efforts for sustainable development. African Journal of Science, Technology and Social Sciences. https://doi.org/10.58506/ajstss.v1i1.110.

Musayevna, O.O. (2022). Teaching Creative Thinking Skills And Habits In English Classroom. *International Journal Of Literature And Languages*.

Murugesan, V. (2021). ICT in 21st Century Teaching and Learning. ResearchGate. https://www.researchgate.net/publication/349713146_ICT_in_21st_century_Teaching_and_Learning.

Nabos, J. Q., & Orivida, A. M. (2024). Teachers'digital Literacy And Pedagogical Integration Of Information And Communication Technology In Teaching: Basis For A Training Program. *Ignatian International Journal for Multidisciplinary Research*, *2*(6), 478-514.

Nagaraja, N. (2021). Multimodal Literacy. https://www.linkedin.com/pulse/multimodal-literacy-aboutclle.

Nagashibaevna, Y. K. (2019). Students' Lack of Interest: How to Motivate Them?. *Universal Journal of Educational Research*, *7*(3), 797-802.

Namaziandost, E., Alekasir, S., Hassan Mohammed Sawalmeh, M., & Miftah, M. (2020). Investigating the Iranian EFL learners' attitudes towards the implementation of e-portfolios in English learning and assessment. *Cogent Education, 7*.

Narcise, J. L. (2024). Mentoring Styles of Master Teachers in Relation to Teachers' Individual Performance Commitment Rating. International Journal of Open-Access, Interdisciplinary & New Educational Discoveries of ETCOR Educational Research Center. https://etcor.org/storage/iJOINED/Vol.%20III(1),%20122-139.pdf.

Nath De, S. (2020). Connections Between Parental Marital Status, Parental Involvement And Literacy Achievement Of Kindergarten Children. St. John Scholar.https://scholar.stjohns.edu/cgi/viewcontent.cgi?Article=1070&context=theses_dissertations.

Ngao, A.I., Sang, G., & Kihwele, J.E. (2022). Understanding Teacher Educators' Perceptions and Practices about ICT Integration in Teacher Education Program. *Education Sciences*. https://doi.org/10.3390/educsci12080549.

Nur A., Harun J. P., Ratnasari D. T., & Dwi Y. S. (2021). Primary Teachers' Perspectives On Teaching Critical Reading Incorporating Multimodal Text. Journal of Physics: Conference Series. https://doi.org/10.1088/1742-6596/1842/1/012034.

Ogunjimi, B. E., Ntui, A. I., Enang, U. & Undie, F. A. (2022). Socio-Demographic Variables And Utilization Of Ict Among Members Of Staff Of University Libraries In Cross-River And Akwa-Ibom State Nigeria. Global Journal Of Educational Research VOL 21, 2022: 159-171. https://doi.org/10.4314/gjedr.v21i2.9.

Olokooba, I.N., Okunloye, R.W., Abdulsalam, A.A., & Balogun, I.N. (2018). Teachers' Perceived Challenges of Using ICT in Teaching Secondary School Social Science Subjects in Ilorin, Nigeria.

Oral, I. & Yayla, E. (2023). Demographic Characteristics and 21st Century Skills of High School Students: The Example of Konya. https://dergipark.org.tr/tr/download/article-file/3228597.

Ordaya-Gonzales, K., Cortez Restuccia J. C., Cossio Bolaños W. J., Arriola-Montenegro J. (2024). From Crisis to Connectivity: Exploring the Role of Information and Communication Technologies in Medical Education During the COVID-19 Pandemic. https://doi.org/10.7759/cureus.60302.

Osei, P. C., Bjorklund, D. F. (2024). Dynamical systems organization of the behavioral process in child development: Outlining ascending visual information from the retina to the frontal cortex in the context of face perceptions, Developmental Review. Volume 71. https://doi.org/10.1016/j.dr.2024.101118.

Ozturk, O.T. (2023). Examination of 21st-century skills and technological competencies of students of fine arts faculty. International Journal of Education in Mathematics, Science, and Technology (IJEMST), 11(1), 115-132. https://doi.org/10.46328/ijemst.2931.

O'Reilly, S., & Milner, J. (2020). Impact of Technology-based Reflective Practice Tools on Student Skill Development. International Journal of Technology and Human Interaction. https://doi.org/10.4018/IJTHI.2020010106.

Parker, M. G., Willett, B.S., Tyson, S.F., Weightman, A., Mansell, W. (2020). A systematic evaluation of the evidence for perceptual control theory in tracking studies. Neuroscience & Biobehavioral Reviews. https://doi.org/10.1016/j.neubiorev.2020.02.030.

Pasaribu, G. R., Daulay, S. H., & Saragih, Z. (2023). The implementation of ICT in teaching English by the teacher of MTS Swasta Al-Amin. *English Language and Education Spectrum*, *3*(2), 47-60.

Peng,R., Razak, R.A., & Halili, S.H. (2023). Factors influencing in-service teachers' technology integration model: Innovative strategies for educational technology. PLoS One. 2023; 18(8): e0286112. https://doi.org/10.1371/journal.pone.0286112.

Philippine Statistics Authority (2023). Registered Marriages in the Philippines: 2022. https://psa.gov.ph/statistics/vital-statistics/node/1684061650.

Pillai, A. (2023). All You Need to Know About Questioning Skills for Teachers. https://www.suraasa.com/blog/questioning-skills?var=as1.

Podolsky, A., Kini, T. & Darling-Hammond, L. (2019). Does teaching experience increase teacher effectiveness? A review of US research. Emerald Publishing Limited. https://doi.org/10.1108/JPCC-12-2018-0032.

Pui, Y. L. (2021). The 7Cs of 21st-Century Teaching and Learning. Europass Teacher Academy. https://www.teacheracademy.eu/blog/the-7cs/.

Quiño, J., & Corpuz, G. (2021). Self-efficacy and practices in teaching 21st-century skills. Academia Letters. 10.20935/AL1255.

Rababah, L.M. (2019). Teachers' Integration of Information and Communication Technology (ICT) Tools into Writing Classes: A Qualitative Study.

Rana, K. , Rana, K. (2020). ICT Integration in Teaching and Learning Activities in Higher Education: A Case Study of Nepal's Teacher Education. Malaysian Online Journal of Educational Technology, v8 n1 p36-47 2020. https://eric.ed.gov/?id=EJ1239982.

Rao, K. Torres, C. & Smith, S. (2021). Digital Tools and UDL-Based Instructional Strategies to Support Students With Disabilities Online. Journal of Special Education Technology. https://doi.org/10.1177/0162643421998327.

Ratnadewi, E. (2019). Use Of Information And Communication Technology In The Field Of Education: Case Study Of Electronic Learning (E-Learning). *Celebes Education Review*.

Reker, J. (2019). Utilizing Technology to Leverage the Improvement of 21st Century Skills [Master's thesis, Bethel University]. Spark Repository. https://spark.bethel.edu/etd/533.

Reysio-Cruz, M. (2019). More women in HS, and college than men in PH. https://newsinfo.inquirer.net/1206375/more-women-in-hs-college-than-men-in-ph-says-report#ixzz8W1XHsyBj.

Roschelle, J. (2021). Intelligence augmentation for collaborative learning. In *International Conference on Human-Computer Interaction* (pp. 254-264). Cham: Springer International Publishing.

Saha, T. (2023). The Role Of Ict In Education: Challenges And Issues. Journal for Emerging Technologies and Innovative Research. https://www.jetir.org/papers/JETIR2302586.pdf.

Saleh, E., & Mostafa, M. (2023). Using Information and Communication Technology and Developing the Creative Abilities of Social Work Students. IntechOpen. https://doi.org /10.5772/intechopen.110604.

Sanchez, J. M. P., Sumalinog, G. G., Mananay, J. A., Baguia, M. M., Goles, C. E., & Alejandro, I. M. V. (2023). Faculty's access to information and communication technologies in colleges and universities in Central Visayas, Philippines. *International Journal of Information and Education Technology*, *13*(3), 468-474.

Saripudin, S., Juanda, E. A., Abdullah, A. G., & Ana, A. (2020). Integration of ICT skill among vocational school teachers: A case in west Java, Indonesia. *International Journal of Innovative Technology and Exploring Engineering*, *9*(5), 251-260.

Sarkar, S. (2018). ICT Approach And Its Role In Professional Development For Teacher's Preparation Programme. https://elicit.com/?fbclid=IwAR1QBDCEukFTyZO3j3cbDq1l1HoaUuQBpdB0wE_Spi077y5jT6bINAtwFU&workflow=table-of-papers&run=d9516dd5-fac7-401a-b082-f84658627a9c.

Sasota, R.S., Cristobal, R.R., Sario, I.S. (2021), Will–skill–tool (WST) model of technology integration in teaching science and mathematics in the Philippines. J. Comput. Educ. 8, 443–464. https://doi.org/10.1007/s40692-021-00185-w.

Seifu, K., Wang, S. (Reviewing editor) (2020) Determinants of information and communication technology integration in teaching-learning process at Aksum University, Cogent Education, 7:1, DOI: 10.1080/2331186X.2020.1824577.

Sener, B., & Mede, E. (2023). Promoting learner autonomy and improving reflective thinking skills through reflective practice and collaborative learning. *Innovation in Language Learning and Teaching*, *17*(2), 364-379.

Shah, M.A., Ahmad, S., Khalid, M. N., (2021). Teachers Preferred Teaching Styles and Students' Learning Performance. Global Educational Studies Review. https://doi.org/10.31703/gesr.2021(vi-ii).20.

Shukla, U. (2023). ICT in Assessment and Evaluation. https://www.tutorialspoint.com/ict-in-assessment-and-evaluation.

Singer, S. (2023). Gadfly on the Wall: The Hidden Bias Against Male Teachers. National Education Policy Center. https://nepc.colorado.edu/blog/hidden-bias.

Sirisilla, S. (2023). Bridging the Gap: Overcome these 7 flaws in descriptive research design.https://www.enago.com/academy/descriptive-research-design/.

Smith, R.S. (2021). Successful ICT Project implementation – it all starts with an ICT Strategy.

Stevens, T. (2023). Questioning in the Classroom | Strategies & Techniques https://study.com/academy/lesson/questioning-techniques-in-the-classroom.html.

Strakova, Z., & Cimermanova, I., (2018). Developing Reflective Skills of Student Teachers in the Virtual Learning Environment. The Electronic Journal of e-Learning, 16(2), pp. 107-121. https://files.eric.ed.gov/fulltext/EJ1199905.pdf.

Suárez, Jesús M. & Almerich, Gonzalo & Orellana, Natividad & Díaz García, María. (2018). A basic model of integration of ICT by teachers: competence and use. Educational Technology Research and Development. 66. 10.1007/s11423-018-9591-0.

Swart, A.J., & Meda, L. (2021). Online self-assessments need to be regular and reflective to foster student engagement and success. *International Journal of Electrical Engineering Education*, 002072092199767.

Szyszka, M., Tomczyk L., Kochanowicz, M. (2022). Digitalization of Schools from the Perspective of Teachers' Opinions and Experiences: The Frequency of ICT Use in Education, Attitudes towards New Media, and Support from Management. Sustainability. https://doi.org/10.3390/su14148339.

Tabek, X.F., & Abduqodirovna, M.A. (2023). Critical Thinking and Problem Solving. *Teaching Foreign Languages In The Context Of Sustainable Development: Best Practices, Problems And Opportunities*.

Taghizadeh, M., & Hasani Yourdshahi, Z. (2019). Integrating technology into young learners' classes: language teachers' perceptions. *Computer Assisted Language Learning*, *33*(8), 982–1006. https://doi.org/10.1080/09588221.2019.1618876.

Tan, L., Zammit, K., D'warte, J., & Gearside, A. (2020). Assessing multimodal literacies in practice: a critical review of its implementations in educational settings. *Language and Education*, *34*(2), 97–114. https://doi.org/10.1080/09500782.2019.1708926.

Tayaban, A. D. (2022). Students And Teachers' Perspectives on ICT Integration in Learning Process During Pandemic. International Journal of Multidisciplinary: Applied Business and Education Research, 3(12), 2622-2630. https://doi.org/10.11594/ijmaber.03.12.15.

Taylor, S.V., Leung, C.B., (2020). Multimodal Literacy and Social Interaction: Young Children's Literacy Learning. E*arly Childhood Education Journal.* https://doi.org/10.1007/s10643-019-00974-0.

Taylor, V., Tilhou, R., & Crompton, H. (2020). Computational Thinking and Coding Across Content Areas to Develop Digital Skills.

Tindowen, D. J. C., Bassig, J. M., & Cagurangan, J.-A. (2018). Twenty-First-Century Skills of Alternative Learning System Learners. SAGE Open, 7(3). https://doi.org/10.1177/2158244017726116.

Topchyan, R., & Woehler, C. (2021). Do teacher status, gender, and years of teaching experience impact job satisfaction and work engagement?. *Education and Urban Society*, *53*(2), 119-145.

Ullah, A., & Anwar, S. (2020). The Effective Use of Information Technology and Interactive Activities to Improve Learner Engagement. *Education Sciences*.

UOTP Marketing. (2021). Online etiquette: 14 netiquette rules online students should know. https://potomac.edu/netiquette-rules-online-students/.

Yu, X., Wang, T. & Yuizono T. (2023). Creativity development through questioning activity in second language education. Frontiers in Education. https://doi.org/10.3389/feduc.2023.1178655.

Vijayalakshmi , M., (2021). ICT in 21st Century Teaching and Learning**.** https://www.researchgate.net/publication/349713146_ICT_in_21st_century_Teaching_and_Learning.

Waring, A. (2021). Implementing ICT Projects: How to enable successful ICT project implementation.https://www.lisedunetwork.com/multimedia-its-components-and-applications/.

Zeynalova, N. (2021). Exploring the Impact of ICT on Student Creativity. Education and Teaching Conferences. https://www.dpublication.com/wp-content/uploads/2021/10/T-707.pdf.

Zinveliu, D. (2021). Digital reflection tools your students can use in class. CYPHER Learning. https://www.cypherlearning.com/blog/k-20/digital-reflection-tools-your-students-can-use-in-class