

Quantifying the Impact of Teachers' Instructional Practice and ICT Technology Integration on Teachers' Readiness Level in the 21st Century

^aJamela D. Ainin, MAED, ^bMarleonie M. Bauyot, PhD

^ajamela.ainin001@deped.gov.ph, ^bmmbauyot@addu.edu.ph

^aFaculty, Mabini National High School

^b Faculty, Ateneo de Davao University, Davao City, Philippines

Abstract

As the landscape of education evolves rapidly in the 21st Century, the teachers' instructional practice and ICT technology integration emerge as crucial components in shaping teachers' readiness. Reports from the Basic Education Report (BER) 2023 underscored pervasive issues with technology access, integration, and teacher capacity, readiness in these areas which prompted the researchers to conduct a study to determine the influence level of indicators on future-ready teachers in elementary and secondary education. The study attempted to assess the influence of teachers' instructional practice and ICT technology integration on teachers' readiness in the 21st century with innovative plans for education using quantitative methodologies. A quantitative correlational design was employed with a total number of 200 elementary and secondary public school teachers through universal sampling. It utilized adapted instruments to assess the teachers' readiness in the 21st century. The gathered data was statistically analyzed through SPSS using mean, Pearson r and multiple regression. The study uncovered that the level of teachers' instructional practice, ICT technology integration and teachers' readiness in the 21st Century were very high. A significant relationship existed between teachers' instructional practice, ICT technology integration and teachers' readiness in the 21st century. It was found that the teachers' instructional practice, ICT technology integration positively influenced the teachers' readiness in the 21st century. Recommendations include professional development, teacher readiness assessment, practices for effective teaching and the integrated Project Integrated Learning for Engaging and Real-World Needs (iLearn) to develop teachers' readiness. This research is crucial in equipping teachers to be well-prepared on the demands of teaching skills in the 21st century.

Keywords: Teachers instructional practice; ICT technology integration; teachers readiness; 21st Century

I. Introduction

The role of the 21st-century teacher has changed due to significant technological advancements driving changes in education. These days, students expect educators to be more flexible, curious, and forward-thinking (Sulaiman & Ismail, 2020). However, the reality remains that many educators lack professional knowledge, leading to ineffective teaching; they have no necessary training and support, struggle to leverage technology effectively, implement innovative teaching strategies, and cater pedagogies to the diverse needs of students in today's digital age, as emphasized by Fletcher-Wood and Zuccollo (2020). The most common deficiency recorded is establishing a link with classroom activities.

According to Saro et al. (2022), these variables include student preparedness for class, confidence, fear, and classroom size. In today's diverse classrooms, adapting instruction to meet students' individual needs, interests, and learning styles of students is essential for fostering meaningful learning experiences. However, many educators need help with their capacity to modify instructional approaches or accommodate diverse

learners effectively. Almazroa and Alotaibi (2023) argued that this deficit in instructional flexibility hampers teaching readiness by constraining educators' ability to differentiate instruction, provide timely interventions, or create inclusive learning environments that promote student engagement and success. Başaran et al. (2021) stated that the traditional teacher-centered approach, passive learning, and time-based, textbook-driven, fragmented curriculum do not seem to cater to the learning needs of 21st-century students and serve as challenges in some schools that constitute a new educational reality that requires new educational and teaching adaptations in teaching and learning in the classroom.

Turner, K. & Garvis, S., in 2023, mentioned that teachers faced challenges in teaching 21st-century students, needing essential competence in digital capabilities. Some reluctance to participate in professional development opportunities is due to weak areas in managing disruptive behaviors, customizing learning, and self-regulating teaching emotions. Insufficient resources and limited access to technology can lead to frustration, disillusionment, stress, and burnout. According to Azzahro et al. (2021), educators may experience frustration, disillusionment, stress, and burnout when faced with a digital learning environment with insufficient resources.

Countries need to prepare their citizens to work and live in this era. Institutions play a significant role in handling this technological shift. They are responsible for updating the education process and preparing teachers and graduates. Fifty percent of educators worldwide need more skills and training to integrate technology into their instructional practices (Ghomi & Redecker, 2019).

The Philippines still needs to improve on its weakest pillars: technology, where it is ranked 84th, and governance, where it is ranked 85th. In the technology pillar, Malaysia, Thailand, Indonesia, and Vietnam all rank in the 40s, while in the governance pillar, all four fall within the 50s to 60s range. Singapore is not included in the comparisons as it holds the second rank in the NRI (Ibrahim, 2023). In Basic Education Report (BER) 2023, Duterte highlighted the challenges faced by the Department of Education in delivering basic education in the Philippines, highlighting weak teaching methods and a lack of school facilities and learning resources as the most pressing issues.

The pressing need to address this study brought up by the Basic Education Report (BER) 2023 reports underscored pervasive issues with technology access, integration, and teacher capacity in these areas. Many students and educators in Davao de Oro lack reliable internet connectivity and access to digital devices, and comprehensive reforms are needed to address technology access, integration, teacher capacity, curriculum modernization, and digital infrastructure deficiencies (Hernando-Malipot, 2023).

Therefore, in this context, this study quantifies the impact of teachers' instructional practice and ICT technology integration on teachers' readiness in the 21st century among teachers in public elementary and secondary schools. These strategies will help teachers become more efficient in performing their functions. Thus, making this undertaking a study that is socially relevant to school administrators, the Department of Education (DepEd) also gives insights into transforming the educational system.

1.1 Statement of the Problem

This study aims to determine the level of teachers' instructional practice, ICT technology integration and their influence on teachers' readiness in the 21st Century. It aims to address the following:

1. What is the level of teachers' instructional practice in terms of:
 - 1.1 flexible learning environment practices;

- 1.2 instructional/teaching practices; and
- 1.3 assessment practices?
2. What is the level of the ICT technology integration in terms of:
 - 2.1 knowledge of ICT;
 - 2.2 ICT activities; and
 - 2.3 internet frequency use?
3. What is the level of teachers readiness in the 21st Century in terms of:
 - 3.1 teachers knowledge;
 - 3.2 teachers skills; and
 - 3.3 teachers attitude?
4. Is there a significant relationship between teachers' instructional practice, ICT technology integration and teachers' readiness in the 21st Century?
5. Is there a significant influence of teachers' instructional practice and ICT technology integration on teachers' readiness in the 21st Century?

1.2 Hypotheses

Researchers tested the following at a significance level of 0.05.

H01: There is no significant relationship between the level of teachers' instructional practice, ICT technology integration and teachers' readiness in the 21st Century.

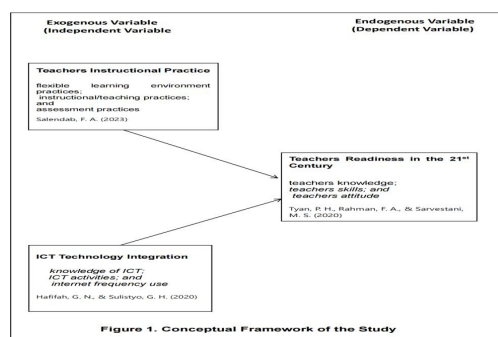
H02: There is no significant influence of teachers' instructional practice, ICT technology integration on teachers' readiness in the 21st Century.

1.3. Theoretical Framework

Jean Piaget's constructivism theory from 1936 and 1950 serves as the foundation for this investigation. According to this notion, learning is how people combine new information with what they already know to build new understandings. The teacher's responsibility to support this process is encouraging students to actively engage and draw connections between their existing and newly acquired information (Makewa, 2019).

Constructivism strongly emphasizes students creating their knowledge, with professors supporting rather than controlling the process. Learning is dynamic and necessitates active student participation in a productive learning environment that the instructor has established. Technology plays a critical role in education by serving as a tool for learning, improving students' cognitive capacities, and encouraging social connection, active participation, and real-world learning experiences. This strategy aligns with training educators to use technology (Chand, 2024).

1.4. Conceptual Framework



2. Review of Related Literature

Teachers Instructional Practice. Instructional practice is a component of effective instruction. Teachers modify their pedagogy based on their pupils' social, linguistic, cultural, and educational requirements. Although proficient educators exhibit adaptability, there is disagreement on the terminology used to depict this occurrence. Different names for the same occurrence make it challenging to communicate effectively and gain a thorough knowledge of this crucial teaching component in the classroom. The researchers studied this phenomenon using various methods in various disciplines, with different results (Parsons et al., 2018). In the study, Sandanayake (2019) stated that the Open Educational Resources (OER) movement had empowered researchers and educators to become more innovative in teaching and learning through openness and flexibility. Experts had recommended using and adopting OER as a highly cost-effective investment in quality teaching-learning. In conventional teaching practices, teachers mostly spend time developing learning materials, reviewing lecture notes, anticipating questions, formulating answers, and preparing for examinations.

ICT Technology Integration. The use of technology in education has become more and more important in recent years. It also makes it possible for teaching or learning processes to be more effective, strategic, engaging, and supportive of learning, democratizing access to education and creating more opportunities for cooperation (Pasternak, 2019). It has become necessary for teachers and educators to learn how to teach with technology and gadgets such as laptops, computers, handphones, tablets, and others, as knowledge of how to utilize technology is crucial for teachers (Miguel-Revilla et al., 2020). Teachers might encounter challenges in teaching subject matters to the students, especially when they are also required to teach 21st-century skills to the students as well (Shafie et al., 2021). In light of this, Napanoy et al. (2021) explained in detail how educators need to possess the skills and information required to maximize the potential of technology to support language instruction and acquisition. Even though they concentrated on in-service instructors, their results highlight the need, if feasible, for teachers. Instructors must provide opportunities for students to adjust to the increasingly digital world. Numerous standards, such as the Philippine Professional Standards for Teachers and ICT Competency Standards, insinuate that teachers must deeply understand content and pedagogy while equipped with skills to integrate ICT into their instruction (Bilbao et al., 2019).

Aside from knowledge and skills, it also reflects one's knowledge, skills, and attitude toward ICT (European Union, 2019). Developing digital competency helps educators improve their teaching, makes it easier for them to do, and enhances pupils' attainment of the same proficiency. However, in retrospect, digital competency is crucial to high-quality education in the twenty-first Century. There is still a research vacuum about the construct that drives digital competency aside from age, sex, and other common sociodemographic characteristics (Cabero et al., 2021; Lucena et al., 2019).

Teachers Readiness in the 21st Century. The study of Velasco (2023) looked at online learning readiness and 21st-century pedagogical skills among teachers in the Philippines during the school year 2021–2022. The challenge prospective teachers face in 21st-century education is equipping students with the necessary skills for success and fostering their confidence to apply them (Zamora & Zamora, 2022; Yusuf, 2022). Teachers in the 21st Century need to act as facilitators, guide students to learn and explore on their own (Strauss & Camins, 2015), maintain students' intrinsic and extrinsic motivation during lessons (Azzahro et al., 2021), guide students in understanding and utilizing digital resources wisely (Tarihoran, 2019), and master 21st-century skills (Thornhill-Miller et al., 2023). In addition to becoming digitally literate, teachers should also encourage their students' digital competence and take advantage of digital technologies' potential to improve and innovate teaching (Ghomi & Redecker, 2019). Teachers must maintain their digital literacy to search for information, gather it, and analyze it critically, as well as to create tools and use a range of web-

based services (Muammar et al., 2023). With this, teachers were ready for online learning regarding computer/internet self-efficacy, self-directed learning, learner control, motivation for learning, and online communication self-efficacy. They also obtained 21st-century pedagogical skills such as information and communication technology, life-long learning, flexibility, creative problem-solving, and critical thinking skills. The findings also indicated a substantial relationship between the teachers' readiness for online learning and 21st-century pedagogical skills.

3. Method

3.1. Research Design

This study employed a quantitative correlational design, a systematic and structured approach to investigate, analyze, and interpret data to answer research questions or test hypotheses. A quantitative research design tests the generated hypotheses and enables a deeper understanding and explanation by observing a sample population (Morgan, 2015). Researchers employed surveys, questionnaires, experiments, and observations to gather quantitative data and analyzed using statistical methods through SPSS. Ansari et al. (2022) stated that this approach provides a foundation for generating statistically significant findings and generalizing about a larger population based on the sample data. By its nature, quantitative research design is suitable for exploring relationships, patterns, and trends, providing valuable insights into a wide range of subjects, from social sciences and economics to natural sciences and health-related fields.

This study aimed to investigate the impact of instructional practice and ICT technology integration on the teachers' readiness in the 21st century in elementary and secondary education amidst the evolving educational landscape of the 21st Century. Based on reports that emphasized common problems with technology integration, access, and teacher capacity, especially in the Davao de Oro Division, this study attempted to evaluate how teachers' instructional practice and ICT technology integration impact the teachers' readiness in the 21st century.

3.2. Respondents of the Study

The 200 respondents were public secondary and elementary teachers from different educational schools within the Department of Education in Region XI. These participants were selected using a universal sampling method. The researchers collected a total of 200 questionnaires from public school teachers. These were in the universal sampling method employed to ensure a fair and unbiased representation. A universal sampling includes every member of the population in the study, providing a comprehensive and complete representation without the need for statistical inference. This approach guaranteed that every member of the population has an equal opportunity to be included in the study, promoting a well-balanced sample. A universal sampling consists of every member of the population in the survey, providing a comprehensive and complete representation without the need for statistical inference.

3.3. Research Instruments

This study employed an adapted questionnaire. In the variable teachers' instructional practice, its indicators were flexible learning environment practices, instructional teaching practices, and assessment practices (1 Very Low, 2 Low, 3 High, 4 Very high). The survey questionnaire was validated with (30) items, and the internal consistency of the result $r > 0.7$. The variables of ICT technology integration and their indicators were knowledge of ICT, ICT activities, and internet use. These twenty-three (23) items consist of a 4-point scale (1 Very Low, 2 Low, 3 High, 4 Very high). The average Cronbach's Alpha value was result $r > 0.7$. The variable teachers' readiness in the 21st century had indicators: knowledge, skills, and attitude. It contained six (6) items. These items consisted of a 4-point Likert scale (1 Very Low, 2 Low, 3 High, 4 Very high). The Cronbach's Alpha value was also .932.

3.4. Ethical Consideration

The researchers adhered to the ethical guidelines established by the Philippine Health Research Ethics Board (PHREB, 2017). The measures that the researchers took, the nine ethical considerations of social value, informed consent, risk, benefits, safety, privacy, confidentiality of information, justice, transparency, qualification of the researchers, adequacy of facilities, and community involvement, are in line with the PHREB's goals. The researchers protected and respected the respondents' rights and roles and ensured a balance between the two parties.

3.5. Data Gathering Procedure

The data collection process included several crucial procedures in line with Department of Education guidelines and maintained to guarantee the study's reliability and validity. First, the researcher requested permission from the relevant departmental authorities. The competent authorities granted permission for the study on teaching readiness among secondary school teachers in public schools to be conducted. Throughout the study procedure, we followed departmental protocols. We used universal sampling to identify research participants and obtained their consent to participate. Teachers were allowed to select their own time and location to complete the survey. A thorough analysis followed after we conducted the data gathering to produce thorough insights and significant findings.

3.6. Data Analysis

The test scores measured the variables of the respondents in the scales. We used mean and standard deviation to determine the level of teachers' instructional practice, ICT technology integration, and teachers' readiness in the 21st century. The researchers used Pearson product-moment correlation to establish the relationship between the predictor and outcome variables. Then, multiple linear regression was used to determine the influence of teachers' instructional practice and ICT technology integration on teachers' readiness in the 21st century.

4. Results and Discussion

This section presented the results of the statistical analysis. A detailed discussion followed the presentation of result to provide meaning and implications to numerical data.

Table 1. Teachers Instructional Practice

Indicators			Mean	Description
Flexible Learning Practices	Learning Environment		3.23	High
Instructional/Teaching Practices			3.41	Very High
Assessment Practices			3.51	Very High
Over-all			3.38	Very High

The table depicted the level of teachers' instructional practice across various indicators.

These reliable approaches aligned with learning objectives, making assessing student progress easier. Institutions must ensure assessment systems align with curriculum and instruction (Black & Wiliam, 2018).

With a mean score of 3.41, the instructional/teaching practices indication is closely behind and likewise falls into the "very high" category. This result showed how confident teachers are in the efficacy of teaching strategies, suggesting that these strategies greatly enhance student learning outcomes. The study by Mulyani, Meirawan, and Rahmadani (2020) highlighted the critical role of effective teaching styles by indicating a direct correlation between good teacher-teaching performance and school effectiveness.

Similarly, flexible learning environment practices received a mean score of 3.23, indicated a general

agreement among teachers regarding the efficacy of practices that promote flexibility within the learning environment.

Overall, the mean score of 3.38 indicated that teachers' confidence in their instructional practices, emphasizing the need for continuous refinement and adaptation to meet student needs and optimize learning outcomes.

Table 1.1. Flexible Learning Environment Practices

A.) Flexible Learning Environment Practices The teacher....	Mean	Descriptive Level
1. orients students on the new educational scheme or instructional program and promotes the learning culture during the new normal.	3.47	Very High
2. provides consultation hours to address students' problems and challenges during the new normal.	3.15	High
3. provides activities and initiatives to improve the mental health of the students.	3.21	High
4. employs various approaches, strategies, and methods in teaching to sustain and aid the teaching-learning process.	3.14	High
5. maintains classroom management to promote learning environment practices.	3.18	High
6. employs a performance-based approach to help students master and apply the content in a real-world context.	3.20	High
7. utilizes authentic teaching and assessment to help students attain the lesson objectives.	3.16	High
8. uses authentic assessment tools to apply the concept in real-life situations.	3.13	High
9. uses different platforms and models to aid the teaching-learning process	3.25	Very High
10. utilizes flexible learning to sustain the learning continuum.	3.46	Very High
OVER-ALL	3.24	Very High

The study revealed that teachers are implementing flexible learning practices, with an overall mean score of 3.24, indicated their agreement with these practices. Tumapon (2020) highlighted the challenges of a new learning platform design, requiring teachers to adapt their practices to become innovative and effective.

In item 1 (3.47), respondents agreed that educators play a crucial role in guiding students through the transition to new learning modalities, promoting a culture of learning during the new normal. Items 10 (3.46) and 9 (3.25) were "very high". Teachers employed diverse models and platforms to support teaching-learning, promoting adaptable learning modalities to adapt to the new normal (Richardson, Bledsoe, & Cortez, 2020).

The data analysis produced essential findings. With a "high" score on item 3 (3.21), it was evident that proactive measures improve students' mental health through integrated programs and psycho-social seminars. The introduction of a performance-based method to improve students' application of knowledge in real-world circumstances is suggested by item 6 (3.20), which also obtained a "high" rating. (Salendab, 2023) averred that a performance-based approach allows students to authentically demonstrate their knowledge and skills using the flexible learning modality.

With a "high" score on item 3 (3.21), it revealed that proactive measures like integrated programs and psycho-social seminars significantly improve students' mental health, while a performance-based method enhances their practical application of knowledge by item 6 (3.20).

Item 5 on the value of maintaining classroom order for a positive learning environment, also received a good score. Items 2 (3.15) and 7 (3.16) received high marks, highlighting the utilization of real-world

teaching strategies in line with class objectives and the availability of consultation hours. According to Sewagegn & Diale (2020), they highlighted that authentic assessment estimates students' overall competence. It is oriented to student performance and growth and aims to develop students' exploratory thinking, critical thinking, and problem-solving skills. Item 4 (3.14), to foster problem-solving and exploratory thinking while estimating overall student ability. As highlighted in item 4 (3.14), Khosla et al. (2020) emphasized the significance of employing various instructional strategies. Finally, item 8 (3.13) showed that using authentic assessment tools to gauge students' comprehension and application of concepts in practical settings was acknowledged. These results indicated a thorough strategy for advancing efficient teaching and learning methods.

Table 1.2. Instructional Teaching Practices

B.) Instructional Teaching Practices The teacher....		Mean	Descriptive Level
1.	utilizes various strategies and approaches in flexible learning.	3.49	Very High
2.	uses outcome-based education in flexible learning to allow students to participate actively in real-life situations.	3.30	Very High
3.	employs various assessment tools to help students master the content of the lesson.	3.41	Very High
4.	encourages the students to participate actively in flexible learning modalities.	3.28	Very High
5.	uses various alternative assessment tools, allowing students to perform a real-life context.	3.42	Very High
6.	Adopts the newest educational trends and paradigm shifts in teaching to sustain the pedagogy in teaching.	3.40	Very High
7.	engages with various webinars/seminars and online conferences to adopt new educational schemes.	3.39	Very High
8.	utilizes the flexible learning approach, such as blended or hybrid learning.	3.43	Very High
9.	makes the delivery mode of learning as conducive as possible.	3.46	Very High
10.	utilizes modular learning approaches, including both online and offline modules.	3.53	Very High
OVER-ALL		3.41	Very High

Table 1.2. Instructional teaching practices outlines the grand mean scores for instructional teaching practices in the context of flexible learning. The overall mean score of 3.41 indicated a strong level of agreement among respondents regarding the effectiveness and relevance of instructional strategies employed by teachers in adapting to flexible learning modalities.

Item number 10, which had a 3.53 mean and is associated as "very high," highlighted the high confidence in modular learning, a flexible approach that can be used both online and offline, and the effectiveness of blended learning, which provides an interactive, student-centric environment utilizing advanced technologies, thereby enhancing students' skill sets (Lalima & Dangwal, 2017; Lekha Das and Megha Sharma, 2020; Sharanappa A et al., 2018).

The results showed "very high" agreement on several important items, including the value of flexible learning settings, varied teaching approaches, and maximizing learning delivery. Item 1 (3.49) emphasized the necessity of matching instructional strategies to real-world situations, and Item 9 (3.46) emphasized the importance of developing a productive learning environment. (Catamio et al., 2022) supported this idea, arguing that flexible learning encourages student autonomy, active involvement, and actual fundamental knowledge. Effective teaching and assessment strategies that mirror real-world circumstances, as held in items 8 (3.43) and 5 (3.42). Wahyudi et al. (2022) asserted that assessments are essential for assessing and enhancing the quality of teaching procedures. Tosuncuoglu (2019) noted that evaluations also aid in

identifying successful teaching methods and student difficulties, especially in foreign language instruction.

Furthermore, it is demonstrated in Items 3, 6, and 7 (3.41, 3.40, and 3.39, respectively) the importance of various assessment techniques, proactive innovation in teaching methods and authentic assessments that involve students in real-world projects. To better foster 21st-century talents, Au (2022) supported authentic evaluations over standardized testing. Items 2 (3.30) and 4 (3.28) as "very high" with scores of 3.30 and 3.28, respectively. Pamungkas (2020) acknowledged the significance of outcome-based education and student participation in flexible learning.

Table 1.3. Assessment Practices

B.) Assessment Practices The teacher...	Mean	Descriptive Level
1. utilizes various online assessment tools to evaluate student's performance.	3.58	Very High
2. accurately measures the performance task of the students using criteria.	3.41	Very High
3. employs performance-based assessment to measure student's performance authentically.	3.50	Very High
4. attends webinars/seminars related to the new assessment scheme.	3.40	Very High
5. uses various alternative assessment tools, allowing students to perform in real life.	3.53	Very High
6. provides performance tasks for each cognitive domain.	3.47	Very High
7. provides assessment tools to develop the higher-order thinking skills of the students.	3.54	Very High
8. embraces the assessment pedagogy and method in learning modalities	3.55	Very High
9. measures student's performance authentically using criteria.	3.58	Very High
10. uses various assessment tools, such as formative and summative, to measure whether to attain the lesson objectives.	3.58	Very High
OVER-ALL	3.51	Very High

Table 1.3 Assessment Practices in Items 1, 9, and 10 (3.58 were the highest means with "very high"). The study showed that educators use various online assessment tools (item 1) to evaluate student performance, using formative and summative techniques to measure lesson objectives (item 9). They use role-playing, presentations, written exams, and essays to ensure active engagement and curriculum mastery (item 10). Astari (2023) highlighted the effective use of role-playing, presentations, written exams, and essays by teachers in assessing student understanding and curriculum mastery.

Furthermore, adopting assessment pedagogy and methods in item 8 (3.55) and practices like offering tools for assessment to foster higher-order thinking in item 7 (3.54). It demonstrated a broad understanding of their role in advancing meaningful learning assessment practices. Good evaluations give teachers important information about the strengths and weaknesses of each student, enabling them to modify the curriculum to suit each student's needs (Asamoah, Shahrill, & Abdul Latif, 2024). In item 5 (3.53), the educator employed various assessment instruments to allow students to demonstrate their learning in authentic contexts. They use performance-based techniques and real-world contexts effectively (Mean = 3.50). Salendab et al. (2023), stated that the new platform design presents challenges for educators and learners, but the educator provides specific tasks for each cognitive domain. In item 6 (3.47), respondents strongly agreed that educators offer specific performance tasks for each cognitive domain, demonstrating an all-encompassing approach to evaluating all aspects of students' learning.

As seen in item 2 (3.41) revealed that instructors effectively assess students' performance using predetermined criteria, demonstrating a commitment to comprehensive and precise assessment techniques. In

item 4 (3.40), respondents agreed that educators frequently participate in webinars and seminars related to evolving assessment schemes. Salendab (2023) asserted that objectives and standards benefit students.

The mean assessment of 3.51 indicated teachers' proactive efforts to align assessment practices with flexible learning principles, promoting critical thinking and challenging performance tasks across academic disciplines. Larsson's (2017) research supported the idea that problem-solving enhances critical thinking and fosters challenging academic performance tasks by assigning predetermined problems to students.

Table 2. ICT technology Integration

Indicators	Mean	Description
Knowledge Of ICT	3.43	Very High
ICT Activities	3.19	High
Internet Frequency Use	3.39	Very High
Over-all	3.34	Very High

Table 2 presented an overview of ICT (Information and Communication Technology) technology integration, detailing various indicators and their respective mean scores.

The study indicated that ICT knowledge was the highest-rated indicator among respondents, with a mean score of 3.43, indicating a strong understanding of technology applications. This knowledge can lead to creative teaching ideas and student excitement. Digitally literate instructors can use ICT for innovative teaching and learning. Teachers' knowledge and skills can motivate ICT adoption in classrooms (Eryansyah et al., 2019). However, good competencies in ICT are necessary for sustained use in education, necessitating in-service training (Ajani & Govender (2023).

The study showed that respondents highly agreed with their frequent use of the internet with a mean score of 3.39, as "very high" category, indicating extensive use of online resources in their ICT integration practices. Integrating technology with pedagogy can significantly impact educational success and retain educators' skills (Raman & Thannimalai, 2019; Teo., et al., 2021).

ICT activities received a slightly lower mean score of 3.19, indicating agreement among respondents about their effectiveness, suggesting room for improvement in variety and effectiveness. More importantly, empirical studies on digital games or gamified online quizzes using technology in university classrooms had shown positive results in facilitating student learning and improving learning outcomes (Badia Valiente et al., 2016; Karaaslan et al., 2018; Sanchez et al., 2020). When using ICT tools in the classroom, teachers must develop ICT digitally to promote teachers' self-reflection and stimulate analysis of classroom discourse and teaching activities (Hu et al., 2021).

Table 2.1. Knowledge of ICT

A.) Knowledge of ICT		Mean	Descriptive Level
1.	Teachers know how to access the Internet and get some information from it.	3.58	Very High
2.	Teachers know many various forms of ICT tools and techniques that are accessible to be used for teaching.	3.54	Very High
3.	Teachers know how to use technology/ICT tools to enhance language learning and teaching.	3.37	Very High
4.	Teachers have enough experience and training on ICT and technology for language teaching and learning.	3.34	Very High
5.	Teachers able to provide digital sources and ICT materials for the students.	3.34	Very High
OVER-ALL		3.43	Very High

Table 2.1 Knowledge of ICT showed that the highest mean score was for item 1, "Teachers know how to access the internet and get some information from it" ($M = 3.58$; and their familiarity with various ICT tools accessible for teaching purposes ($\text{Mean} = 3.54$). The study emphasized the significance of teachers' digital literacy and their ability to utilize ICT resources to enhance teaching and learning experiences (Rachmawati & Cahyani, 2020). It also highlighted the importance of accessing the Internet and using innovative learning media to achieve learning objectives.

However, it is worth noting that the mean scores for statements related to using technology to enhance language learning ($\text{Mean} = 3.37$) and teachers' experiences and training on ICT for language teaching ($\text{Mean} = 3.34$) are slightly lower, indicating a relatively lower level of agreement among respondents regarding these aspects of ICT proficiency.

While the lowest means for items 4, "Teachers have enough experiences and training on ICT and technology for language teaching and learning" ($M = 3.34$), and 5, "Teachers able to provide digital sources and ICT materials related to the English Language for my students" ($M = 3.34$). In the 21st century, teachers must develop competent competencies, including awareness of technology's constant interaction with human life (Suchyadi et al.; H., 2021). With many accessing the internet via laptops or desktops, teachers' extensive experience in basic computer skills makes them readily available online, boosting their self-esteem (Javier, in press). Overall, the study suggested that while teachers possess strong knowledge and competence in ICT resources, their proficiency levels may vary in language teaching contexts, especially in the Philippines, where the K-12 curriculum has emerged (Ramos et al., 2020).

Table 2.2 ICT ACTIVITIES

B.) ICT ACTIVITIES	Mean	Descriptive Level
1. Text chatting with students and other teachers on subject matter.	3.58	Very High
2. Email and mail listing	3.21	High
3. Online Classroom Learning Platform (Learning Management System).	3.30	Very High
4. Educational Games /Applications aim to develop teaching.	3.16	High
5. An online discussion board on language teaching.	3.14	High
6. Social media(Youtube/Facebook/Instagram/Twitter) for language teaching).	3.26	Very High
7. Shopping online for teaching tools and materials.	3.25	High
8. Finding material resources related to lessons.	3.18	High
9. Preparing Presentation	3.26	Very High
10. Giving tasks/assignments to students	3.18	High
11. Online Dictionaries	3.19	High
12. Blogging	3.17	High
13. World Wide Web (www) surfing.	3.08	High
OVER-ALL	3.22	High

In Table 2.2 (ICT Activities), the highest mean scores were recorded on item 1, "Text chatting with students and other teachers on university/subject matter," ($M = 3.58$), and item 3, "Online Classroom Learning Platform (Learning Management System)" ($M = 3.30$) and utilizing social media platforms for language teaching ($\text{Mean} = 3.26$) received the highest mean scores, indicating widespread recognition of their effectiveness in facilitating communication and collaboration among teachers and learners.

The interpretation indicated that teachers are proficient in using various ICT tools for educational purposes, with specific competency scores reflecting their capabilities. They are moderately skilled in using email and mailing lists for communication, item 2 (3.21) and item 4 (3.16), leveraging educational games or

applications to enhance teaching. Teachers demonstrated slightly higher proficiency in online shopping for educational tools and materials, finding lesson-related resources, item 8 (3.18), assigning tasks to students for item 10 (3.18), using online dictionaries for item 11 (3.19), and engaging in blogging activities for item 12 (3.17). These scores suggest a consistent, though not exceptional, level of ICT integration across different teaching-related activities.

However, items 5, "an online discussion board on language teaching," $M=3.14$; and 13 world wide web (www) surfing," $M=3.08$ had the lowest average score". This article by Jamon et al. (2021) explained possible reasons for such lower scores. According to them, teachers needed help monitoring, giving feedback, and assessing student learning processes, making it difficult for them to perform their roles.

Jamon et al. (2021) found that reaching students without internet access or devices is challenging, making Facebook a popular platform for online learning. Santiago et al. (2021) supported text chat use in online learning, while Jamon et al. (2021) provided an educationalist's perspective on student assessment, participation, and entry into online classes.

Table 2.3 Internet Use

C.) Internet Use		Mean	Descriptive Level
1.	The teacher uses the internet as a resource for educational materials and information to support teaching.	3.56	Very High
2.	The teacher integrates simple technology effectively into lesson plans and classroom activities.	3.52	Very High
3.	The teacher adapts new digital teaching methods and resources as part of instructional practices.	3.31	Very High
4.	Prepared for troubleshooting common technical issues that may arise during online or blended learning sessions	3.30	Very High
5.	attends training and resources to enhance ICT literacy for teaching in the digital age.	3.28	Very High
OVER-ALL		3.39	Very High

Table 2.3 Internet use points 1, "the teacher uses the Internet for educational materials and information to support teaching" ($M = 3.56$) and 2, "the teacher integrates simple technology effectively into your lesson plans and classroom activities" ($M = 3.52$) received the highest average marks in Table 2.3 (Internet Use).

Peregrino et al. (2022) found that teachers recognized the internet as a valuable resource for free, reusable learning assets and that incorporating OER technologies improves student performance (item 3, mean 3.31), but their understanding of advanced technology integration is still developing.

On the other hand, the lowest average scores were for items such as Prepared to troubleshoot common technical issues that may arise during online or blended learning sessions ($M = 3.30$) and attend training and resources to enhance your ICT literacy for teaching in the digital age ($M = 3.28$) (Marcial & Rendal, 2014). The article by Marcial and Rendal (2014) highlighted these lower scores of some challenges.

Table 3. Summary of the Level of Teachers Readiness In The 21st Century

Indicators	Mean	Descriptive Level
Teachers knowledge	3.35	Very High
Teachers skills	3.25	High
Teachers attitude	3.17	High
Over-all	3.26	Very High

Table 3 showed the teachers' readiness in the 21st Century, focusing on various indicators and their

corresponding mean scores.

Firstly, the highest-rated indicator, "Teachers Knowledge," with a mean score of 3.35, indicated strong confidence in teachers' professional skills and their competence in the 21st-century educational landscape.

The quality of teachers significantly impacts the education system, contributing to student learning and economic success. The result of the study related to the study of Arop, Owan, and Agunwa (2019), stated that teachers should receive adequate training in instruction concepts and principles and seek further education goals through workshops and seminars.

The "Teachers Attitude" score of 3.25 indicated a strong agreement with positive attitudes exhibited by teachers, indicating a proactive mindset for innovative pedagogical approaches and technologies. Teachers' actions and behaviors significantly impact students' learning process and educational goals. Therefore, it must emphasize how much a teacher's effectiveness affects pupils' academic success or failure (Merlo, 2022).

The "Teachers Skills" score of 3.17 is slightly lower on potential areas for improvement in 21st-century teaching practices, preparing teachers and students for global market competition. Therefore, teachers must possess these 21st-century skills, such as necessary literacy, learning and innovation skills, information, media and technology, and life and career skills, as outlined by the Partnership for 21st-Century Skills (Van Laar et al., 2017).

Table 3.1 Teachers' Knowledge

A. Teachers' Knowledge	Mean	Descriptive Level
1. Active and Creative Education for the 21st Century is a student-centered material and activity teaching.	3.28	Very High
2. Teaching materials such as puppets can attract students to learn	3.26	Very High
OVER-ALL	3.27	Very High

Table 3.1 showed the teachers' knowledge of student-centered, material, and activity-based teaching approaches. The overall mean score of 3.27 indicated a strong agreement among respondents regarding their understanding of these instructional methods.

Specifically, teachers firmly believed that active and creative education for the 21st Century should be student-centered, emphasizing materials and activities to facilitate learning (Mean = 3.28). Additionally, they acknowledged the effectiveness of using teaching materials such as puppets to engage students in the learning process (Mean = 3.26). These findings suggested that teachers understand pedagogical principles that promote active and engaging learning environments.

The quality of instruction provided in the classroom influences teachers' competency. Teachers' knowledge in the twenty-first Century is a multipurpose tool set that includes topic knowledge, technological integration, learning facilitation, promoting critical thinking, adaptability, cultural competence, and a dedication to lifelong learning. Additionally, students with the knowledge, abilities, and viewpoints must prosper in a constantly changing world (Jentsch et al., 2020; Charalambous & Praetorius, 2018).

Table 3.2 Teachers' Skills

B.) Teachers' Skills	Mean	Descriptive Level
can guide and help students who are poor in learning.	3.32	Very High
uses computers to implement Active and Creative Education for the 21st Century in the classroom.	3.15	High
OVER-ALL	3.24	Very High

Table 3.2 Teacher's skills assessed teachers' ability to mentor and assist students and their computer-

based expertise in implementing innovative and active learning practices. Respondents agreed significantly with their skills in these areas, with an overall mean score of 3.24.

Teachers were confident in their ability to provide tailored help to suit the different needs of their pupils, as seen by their strong agreement (Mean = 3.32) that they can mentor and aid students who struggle with learning. Though they typically concur that they are skilled at utilizing computers to carry out innovative and active teaching techniques (Mean = 3.15), the mean score indicated a slightly lower level of confidence in this particular competence when compared to mentoring students. The 21st-century skills required are the 4C: creative thinking, critical thinking, communication, and collaboration skills (Ratama et al., 2021; Sitompul et al., 2019; Tang et al., 2020). Educators should keep innovating to meet these needs so that students are ready to compete and survive in work life (Izzuddin, 2021; Septikasari & Frasandy, 2018).

Table 3.3 Teachers' Attitude

C) Teachers Attitude	Mean	Descriptive Level
willing to implement learning and facilitating are essential.	3.22	High
I believe the implementation of the 21st learning can improve student academic achievement.	3.13	High
OVER-ALL	3.18	High

In this section, assessments aimed to determine how instructors feel about implementing 21st-century learning practices and how important they think it is to facilitate learning. The respondents' overall mean score of 3.18 suggested that they generally agree.

Teachers had a favorable attitude regarding their role in supporting students' learning experiences, as evidenced by their agreement that their willingness and abilities to implement learning and facilitate are vital (Mean = 3.22). Teachers must be creative and innovative to manage 21st-century learning effectively. They also agreed that 21st-century learning can improve student academic achievement (Mean = 3.13), demonstrating their belief in the effectiveness of modern teaching approaches. Insufficient teacher resources throughout the field implementation phase, used to traditional teaching methods, made it challenging to embrace new ideas. To attain 21st-century competencies, teachers must demonstrate adaptability, empathy, creativity, cultural competence, and a commitment to lifelong learning to effectively engage diverse students and navigate the ever-changing educational landscape (Azis et al., 2019).

The interpretation highlighted teachers' positive attitudes towards adopting innovative teaching methods and commitment to supporting student success in the 21st-century educational landscape.

Table 4. Significance on the Relationship between Teachers' Instructional Practice, ICT Technology Integration and Teachers' Readiness in the 21st Century.

	Teachers' Readiness In The 21 st Century			
	r	p-value	Decision	Interpretation
Teacher's Instructional Practice	0.729	0.01	Reject H ₀	Significant
ICT technology Integration	0.725	0.01	Reject H ₀	Significant

Table 4 showed the relevance of the relationship between teachers' technological integration, instructional practices, and readiness for the 21st Century.

The correlation coefficient (r) between Teachers' Readiness in the 21st Century and Teacher's Instructional Practice is 0.729, indicated a significant positive link. Kim et al. (2019), underscored the

necessity of measuring teaching-learning practices and processes which facilitate the development of these skills at different levels, such as secondary and primary level. To guarantee that teachers' 21st-century teaching skills are improved, it is necessary to rethink the entire teacher evaluation and training system. Effective instructional strategies are essential to prepare instructors for the demands of today's educational contexts. The study also argued the need to re-conceptualize the entire approach to evaluating and training teachers to ensure enhancement in their 21st-century teacher skills.). A significant link is confirmed since the null hypothesis is rejected because the p-value is less than 0.05.

A substantial positive association ($r = 0.725$) existed between ICT technology integration and teachers' readiness in the 21st Century. As Lucas et al. (2021) pointed out, the variety of teaching and learning tools will determine teachers; level of digital competency. The digitalization ecosystem includes ease of use of the technology, confidence, and openness to technology, which become essential in embarking on digital learning initiatives (Ghomi & Redecker, 2019). This result indicated that improving teachers' preparedness to tackle the demands of 21st-century education requires effective ICT integration. A significant association existed between the given p-value of 0.01 and the rejection of the null hypothesis.

The findings emphasized the importance of instructional strategies and ICT integration in preparing teachers for modern education, emphasizing the need for professional growth and educational reform.

Table 5. Regression Analysis on the Significant Influence of the Independent Variables Teachers' Instructional Practice, and ICT Technology Integration on Teachers' Readiness in the 21st Century

Independent Variables	Teachers Readiness in the 21 st Century						
	Unstandardized Coefficients		Standardized Coefficients				
	B	Std. Error	Beta	t	Sig.	Decision on Ho	interpretation
Constant	-.384	.211		-1.816	.071		
Teacher's Instructional Practice	.654	.097	.467	6.749	.000	Reject H ₀	Significant
ICT Technology Integration	.427	.081	.367	5.305	.000	Reject H ₀	Significant
R = 0.784; R ² = 0.615; F-value = 157.502 ; p-value = 0.000							

Table 5 showed the relevance of the influence between teachers' technological integration, instructional practices, and readiness for the twenty-first Century.

The impact of ICT technology integration and instructional practices on teachers' readiness for the 21st century is through regression analysis. The coefficients and t-values for each variable (Teacher's Instructional Practice: B=0.654, t=6.749, p=0.000; ICT Technology Integration: B=0.427, t=5.305, p=0.000) demonstrate the considerable impact that both variables have on Teachers' Readiness. According to the statistically significant overall model, both factors account for a portion of the variance in Teachers' Readiness (F=157.502, p=0.000). The R-squared value of 0.615 indicated that instructional practice and ICT technology integration by teachers account for roughly 61.5% of the variation in teachers' readiness. In summary, integrating ICT technology and using effective teaching practices are crucial for improving teachers' preparedness for the twenty-first Century.

Digitally competent teachers use technology in class, promoting students' digital competence and using digital technologies for teaching innovation. They must understand critical competencies and pedagogical skills, embed them in the teacher education curriculum, and integrate ICT and effective teaching strategies to meet 21st-century education demands (McGarr & McDonagh, 2021).

5. Conclusions and Recommendations

5.1. Summary

The researchers wanted to determine the variables influencing the teachers' readiness in the 21st Century.

For the research design, the researchers utilized quantitative research.

This study's data was secondary and came from the different schools of the Division of Davao de Oro. The respondents were 200 public elementary and secondary teachers.

To analyze the data, the researchers used descriptive statistics (SPSS), which includes the mean and standard deviation, to determine the levels of teachers' instructional practice, ICT technology integration, and teachers' readiness in the 21st Century. Before the computation of the inferential statistics, researchers used the Pearson product-moment correlation coefficient and multiple linear regression to determine the relationship and influence of the variables.

5.2. Conclusions

This study's respondents were public secondary and elementary teachers in Davao de Oro. Most of the respondents had five or more teaching experience. Also, the teacher's instructional practice had the most excellent mean of (3.38). It showed very high levels across flexible learning environments, instructional/teaching, and assessment practices.

In addition, the level of ICT integration showed very high levels of frequent internet use and ICT knowledge despite somewhat lower scores for ICT activities. Table 2 had a (3.34) total mean score, indicating a strong ICT incorporation into instructional strategies.

Table 3 evaluated the teachers' preparedness for the twenty-first Century. It revealed very high levels of teacher knowledge, skill, and attitude. The 3.26 overall mean score confirmed that instructors are preparing for the twenty-first Century's demands.

Table 4 explored the significance of the relationship between teachers' readiness, ICT technology integration, and teachers' instructional practice. We rejected the null hypothesis—a significant positive association between instructional practices, ICT integration and teachers' readiness in 21st century.

The regression analysis is finally shown in Table 5, which emphasized even more how important it is for teachers to integrate ICT into their lessons and practices to improve their preparedness for the twenty-first Century. With a strong overall model fit ($R = 0.784$; $R^2 = 0.615$), the substantial coefficients and high F-value supported the significance of these variables in determining teachers' preparation.

5.3 Recommendations

DepEd Policy Makers. Advocate for Professional Development: Establishing professional learning communities (PLCs) as cooperative spaces where educators may exchange instructional ideas, examine student data, and offer peer evaluation to continuously develop their craft and increase their preparedness for teaching in the twenty-first century.

School Stakeholders. Emphasize Teacher Readiness: Creating a teacher self-assessment tool to help instructors assess their preparedness regarding subject matter expertise, pedagogical abilities, technology proficiency, and innovative attitudes. This study allows professional development and resource allocation based on recognition.

Teachers.

1. Effective Teaching Practices: Emphasize effective teaching practices, such as workshops on instructional practices, including formative assessment, project-based learning, and differentiated instruction.
2. ICT Integration Boot Camp: Encourage instructors to provide themselves with evidence-based tools to improve student engagement and academic achievement in ICT Integration. Offer intense training sessions on instructional software, multimedia presentations, and the inclusion of web resources to provide instructors with hands-on ICT skills and confidence for successful technology integration in the classroom.
3. Professional Development: Participation in professional learning communities (PLCs) to exchange instructional ideas, examine student data, and offer peer evaluation.

Future Researchers. Investigate Additional Research and Collaborative Activities: Urge readers to investigate additional research and engage in collaborative activities. This term emphasizes using multidisciplinary projects and real-world difficulties to develop creativity, teamwork, and critical thinking.

Over-All Recommendations

Project iLearn: Integrated Learning for Engaging and Real-World Needs – A comprehensive approach incorporating effective teaching practices, professional development, ICT integration, teacher readiness, and a focus on real-world applications to enhance educational outcomes.

Acknowledgments

I express my deepest gratitude to the respondents and everyone who contributed their time and effort to this work.

To my husband, thank you for your unwavering financial and emotional support.

Above all, I thank God for His continuous blessings and guidance throughout this journey.

References:

- Ajani, O. A., & Govender, S. (2023). Impact of ICT-driven teacher professional development for the enhancement of classroom practices in South Africa: A systematic review of literature. *Journal of Educational and Social Research*, 13(5). <https://doi.org/10.36941/jesr-2023-0125>
- Almazroa, H., & Alotaibi, W. (2023). Teaching 21st Century Skills: Understanding the Depth and Width of the Challenges to Shape Proactive Teacher Education Programmes. *Sustainability*, 15(9), 7365. <https://doi.org/10.3390/su15097365>
- Ansari et al. (2022). A study on Research Design and its Types. *International Research Journal of Engineering and Technology (IRJET)*, 9(7).
- Ansari, Z., Togra, A., Seetharaman, R., Rashmi, A., Pawar, S., & Pawar, M. (2022). Validity and reliability of a questionnaire measuring knowledge, attitude, and practice regarding dementia among general population and healthcare workers in urban India. *Cureus*, 14(8), e28196. DOI: 10.7759/cureus.28196.
- Arop, F. O., Owan, V. J., & Agunwa, J. N. (2019). Teaching personnel management and attitude to work in secondary schools of Calabar Education Zone of Cross River state, Nigeria. *Prestige Journal of Education*, 2(1), 62. ISSN: 2645-324X.
- Asamoah, D., Shahrill, M., & Abdul Latif, S. N. (2024). Teachers' perceptions of school assessment climate and realities of assessment practices in two educational contexts. *Frontiers in Education*, 9, Article 1278187. <https://doi.org/10.3389/feduc.2024.1278187>
- Astari, D. A. M. (2023). The Implementation Assessment in Teaching English in Merdeka Curriculum.
- Au, W. (2022). *Unequal by design: High-stakes testing and the standardization of inequality* (2nd ed.). New York: Routledge. <https://doi.org/10.4324/9781003005179>
- Azis, Y. M., Suharyati, H., & Susanti, S. (2019). Students' experience of e-learning, learning process, and perceived learning outcomes in

- economic math course. *Home*, 3(2), [Page range]. e-ISSN 2598-120X. p-ISSN 2598-117X.
- Azzahro', R. Maghfiroh, A. and Indriastuti, N. R. (2021). Maintaining students' extrinsic motivation in online learning: teachers' problem. Proceedings of the 1st International Conference of Education, Social And Humanities FKIP Universitas Muhammadiyah Ponorogo.
- Badia Valiente, J. D., Olmo Cazeveille, F., & Navarro Jover, J. M. (2016). Online quizzes to evaluate comprehension and integration skills. *Journal of Technology and Science Education*, 6(2), 75–90. <https://doi.org/10.3926/jotse.189>
- Başaran, M. (2021). Meta-thematic analysis of flipped classroom applications. *European Journal of Education Studies*. 8 (10), 61 – 88.
- Bilbao, P., Dequilla, M. A. C., Rosano, D., & Boholano, H. (2019). Technology for teaching and learning 1 OBE - PPST & ICT Competency-Based. Quezon City, PH: Lorimar Publishing.
- Black, P., & Wiliam, D. (2018). Classroom assessment and pedagogy. *Assessment in Education: Principles, Policy & Practice*, 25(6), 551-575. <https://doi.org/10.1080/0969594X.2018.1441807>
- Cabero-Almenara, J., Osuna, J. B., & Palacios-Rodríguez, A. (2021, March). Estudio de la competencia digital docente en Ciencias de la Salud. Su relación con algunas variables. *Educación Médica*, 22(2), 94–98. doi: 10.1016/j.edumed.2020.11.014.
- Catamio, J. R., Corona, R., Jose, R., Liquigan-Escarcha, A. S., Valenzuela, O., & Sasot, C. (2022). UP! UP! And Beyond: Students' Position on CHED's Initiatives on Flexible Learning during Pandemic and Moving Forward. *Psychology and Education: An Interdisciplinary Journal*, 4(8), 822-833. <https://doi.org/10.5281/zenodo.7155291>
- Chand, S. P. (2024). Constructivism in Education: Exploring the Contributions of Piaget, Vygotsky, and Bruner. *International Journal of Science and Research (IJSR)*, 12(7), 274–278. DOI: 10.21275/SR23630021800
- Charalambous, C. Y., & Praetorius, A.-K. (2018). Studying mathematics instruction through different lenses: Setting the ground for understanding instructional quality more comprehensively. *ZDM: Mathematics education*, 50(3), 355–366. <https://doi.org/10.1007/s11858-018-0914-8>
- Eryansyah, E., Erlina, E., Fiftinova, F., & Nurweni, A. (2019). EFL students' needs of digital literacy to meet the demands of 21st-century skills. *Indonesian Research Journal in Education (IRJE)*, 3(2). <https://doi.org/10.22437/irje.v3i2.8297>
- Fletcher-Wood, H., & Zuccollo, J. (2020). The reality of educators lacking professional knowledge: Ineffective teaching, inadequate training, and struggles with technology. [Journal Article]. *Journal of Education and Pedagogy*, 35(2), 123–137. EPI (Education Policy Institute). (n.d.). Effects of high-quality professional development. Retrieved from <https://epi.org.uk/publications-and-research/effects-high-quality-professional-development/>
- Ghomi, M., & Redecker, C. (2019). Digital Competence of Educators (DigCompEdu): Development and Evaluation of a Self-assessment Instrument for Teachers' Digital Competence. In Proceedings of the 11th International Conference on Computer Supported Education (pp. 541-548). DOI: 10.5220/0007679005410548.
- Ghomi, M., & Redecker, C. (2019, May). Digital Competence of Educators (DigCompEdu): Development and Evaluation of a Self-assessment Instrument for Teachers' Digital Competence. In CSEDU (1)(pp. 541-548).
- Hernando-Malipot, M. (2023, January 31). DepEd identifies challenges in basic education through BER 2023.
- Hu, D., Yuan, B., Luo, J., & Wang, M. (2021). A review of empirical research on ICT applications in teacher professional development and teaching practice. *Knowledge Management & E-Learning*, 13(1), 1–20. <https://doi.org/10.34105/j.kmel.2021.13.00>
- Ibrahim, M. (2023, December 12). Unlocking the Philippines' digital future. Opinion-Editorial.
- Iliyasu R., Etikan I. Comparison of quota sampling and stratified random sampling. *Biometrics Biostat. Int. J.* 2021;10(1)
- Izzuddin, A. (2021). Implementasi Pendekatan Saintifik pada Pembelajaran Daring Selama Masa PandemiCovid-19 di Lembaga Pendidikan Dasar. *As-Sabiqun*, 3(1), 45–63. <https://doi.org/10.36088/assabiqun.v3i1.1313>
- Jamon, B. E. V., Boholano, H. B., Cabanes-Jamon, M. G., & Pardillo, M. F. (2021). Teachers' lived experiences in the new normal in Philippine public schools: A phenomenology. *International Journal of Research*, 8(2), 773.
- Javier, B. F. (in press). Practices of Filipino public high school teachers on digital teaching and learning technologies during the COVID-19 pandemic: Basis for learning action cell sessions. *International Journal of Computing Sciences Research*, accepted version. Doi: 10.25147/ijcsr.2017.001.1.67
- Jentsch, A., Casale, G., Schlesinger, L., Kaiser, G., König, J., & Blömeke, S. (2019). Variabilität und Generalisierbarkeit von Ratings zur Qualität von Mathematikunterricht zwischen und innerhalb von Unterrichtsstunden. *Unterrichtswissenschaft*. <https://doi.org/10.1007/s42010-019-00061-8>.
- Jentsch, A., Schlesinger, L., Heinrichs, H., Kaiser, G., König, J., & Blömeke, S. (2020). Erfassung der fachspezifischen Qualität von Mathematikunterricht: Faktorenstruktur und Zusammenhänge zur professionellen Kompetenz von Mathematiklehrpersonen [Measuring the subjectspecific quality in mathematics instruction: factor structure and relations to mathematics teachers' professional competence]. *Journal für Mathematik-Didaktik*, 42, 97–121. <https://doi.org/10.1007/s13138-020-00168-x>
- Karaaslan, H., Kilic, N., Guven-Yalcin, G., & Gullu, A. (2018). Students' reflections on vocabulary learning through synchronous and asynchronous games and activities. *Turkish Online Journal of Distance Education (TOJDE)*, 19(3), 53–70. <https://doi.org/10.17718/tojde.44464>
- Khosla, N., Gamba, R., Taylor, S., Adediji, L., Bovey, J., Engelman, A., Jones-Bey, A., Tsz Kwan, L., Vo, H., Washington, V., & Inch, E. S. (2020). Academic goal-setting among college students experiencing food insecurity, housing instability, and other challenges in a diverse public university. *Journal of Social Distress and Homelessness*, 29(1). 3–15. <https://doi.org/10.1080/10530789.2020.1678810>
- Kim, S., Raza, M., & Seidman, E. (2019). Improving 21st-century teaching skills: The key to effective 21st-century learners. *Research in Comparative and International Education*, 14, 99–117.
- Lalima, Kiran Lata Dangwal. (2017). Blended Learning: An Innovative Approach. *Universal Journal of Educational Research*, 5(1): 129-136. DOI: 10.13189/ujer.2017.050116.

- Larsson, K. (2017). Understanding and teaching critical thinking—A new approach. *International Journal of Educational Research*, 84, 32-42. [HTTP:// doi.org/10.1016/j.ijer.2017.05.004](https://doi.org/10.1016/j.ijer.2017.05.004)
- Lucas, M., Bem Haja, P., Siddiq, F., Moreira, A., & Redecker, C. (2021). The relation between in-service teachers' digital competence and personal and contextual factors: What matters most? *Computers and Education*, 160. <https://doi.org/10.1016/j.compedu.2020.104052>
- Makewa, L. N. (2019). Constructivism Theory in Technology-Based Learning. In *Technology-Supported Teaching and Research Methods for Educators*. DOI: 10.4018/978-1-5225-5915-3.ch015
- Marcial, D. & Rendal, J. (2014). Are Teachers Technophobic? Measuring Information and Communication Technology Competency among Teacher Educators in Central Visayas, Philippines. *Malaysian Journal of Distance Education* 16(2), 1–17.
- McGarr, O., & McDonagh, A. (2021). Exploring the digital competence of preservice teachers on entry onto an initial teacher education programme in Ireland. *Irish Educational Studies*, 40(1), 115–128. <https://doi.org/10.1080/03323315.2020.1800501>
- Merlo, A. (2022) How teachers can improve their performance in the classroom. *Teacher Academy*
- Miguel-Revilla, D., Martínez-Ferreira, J. M., & Sánchez-Agustí, M. (2020). Assessing the digital competence of educators in social studies: An analysis in initial teacher training using the TPACK-21 model. *Australasian Journal of Educational Technology*, 36(2), 1-12. <https://doi.org/10.14742/ajet.5281>
- Morgan D. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of Mixed Methods Research*, 1(1), 48-76.
- Muammar, S., Bin Hashim, K. F., & Panthakkan, A. (2023). Evaluation of digital competence level among educators in UAE Higher Education Institutions using Digital Competence of Educators (DigComEdu) framework. *Education and Information Technologies*, 28(6), 2485-2508. DOI: 10.1007/s10639-022-11296-x
- Mulyani, H., Meirawan, D., Rahmadani, A., (2020). Increasing school effectiveness through principals' leadership and teachers' teaching performance, is it possible? *Cakrawala Pendidikan*, Vol.39, No.2, June 2020doi10.21831/cp.v39i2.28864
- Napanoy, J. B., Gayagay, G. C., & Tuazon, J. R. C. (2021). Difficulties encountered by preservice teachers: Basis of a preservice training program. *Universal Journal of Educational Research*, 9(2), 342–349. <https://doi.org/10.13189/ujer.2021.090210>
- Pamungkas, A. H. (2020). Non-Formal Educational Institutions Provider's Readiness in the Implementation of the Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 9 of 2020. *Digital Press SocialSciences and Humanities*, 6. <https://doi.org/10.29037/digitalpress.46386>
- Parsons, S. A., Vaughn, M., Scales, R. Q., Gallagher, M. A., Parsons, A. W., Davis, S. G., Pierczynski, M., & Allen, M. (2018). Teachers' instructional adaptations: A research synthesis. *Review of Educational Research*, 88(2), 205-242. Sage Publications.
- Pasternak, D. L. (2019). Integrating technology in English Language Arts teacher education. Routledge. <https://doi.org/10.4324/9780429433689>
- Peregrino, L. P., Javillonar, M. G., Caballes, D. G., Necio, C. R., & Ramirez, A. B. (2022). Assessment of school Learning Continuity Plan (LCP) implementation: Basis for policy formulation. *Journal of Social, Humanity, and Education (JSHE)*, 2(3), 211-224. <https://doi.org/10.35912/jshe.v2i3.967>
- Rachmawati, R., & Cahyani, F. (2020). The use of YouTube videos in improving non-English department students' pronunciation skills [Title in English]. *Journal Name, Volume(Issue)*, Page range. <https://doi.org/>
- Raman, A., & Thannimalai, R. (2019). Importance of Technology Leadership for Technology Integration: Gender and Professional Development Perspective. *SAGE Open*, 9(4), 1–13. <https://doi.org/10.1177/2158244019893707>
- Ramos, R., Babasa, E. E., Vergara, I. B., Manalo, B. I., Gappi, L. L., & Morfi, T. G. (2020). The TPACK confidence of preservice teachers in selected Philippine teacher education institutions. *International Journal of Education, Psychology and Counseling*, 5(37), 196–205. <https://doi.org/10.35631/ijepc.5370016>
- Ratama, I. P., Padmadewi, N. N., & Artini, L. P. (2021). Teaching the 21st Century Skills (4Cs) in EnglishLiteracy Activities. *Journal of Education Research and Evaluation*, 5(2), 223. <https://doi.org/10.23887/jere.v5i2.30849>
- Richardson, D. S., Bledsoe, R. S., & Cortez, Z. (2020). Mindset, motivation, and teaching practice: Psychology applied to understanding teaching and learning in STEM disciplines. *CBE—Life Sciences Education*, 19(3), es12. <https://doi.org/10.1187/cbe.19-11-0238>
- Salendab, F. (2023). Proposed instructional scheme in the new normal education: Basis for pedagogical strategies/practices. *Psychology and Education: An Interdisciplinary Journal*, 6(8), 712-719. <https://doi.org/10.5281/zenodo.7502764>
- Salendab, F. A., & Akmad, S. P. (2023). A Personal Narrative Experience of Teachers Teaching Purposive Commu-nication During the New Normal Education. *International Journal of Multidisciplinary: Applied Business and Education Research*, 4(5), 1590-1601. <https://doi.org/10.11594/ijmaber.04.05.20>
- Salendab, F. A., & Dapitan, Y. C. (2021). Performance of Private Higher Education Institutions and the School Heads' Supervision in South Central Mindanao. *PSYCHOLOGY AND EDUCATION*, 58(3), 3980-3997.
- Sanchez, D. R., Langer, M., & Kaur, R. (2020). Gamification in the classroom: Examining the impact of gamified quizzes on student learning. *Computers & Education*, 144, 103666. <https://doi.org/10.1016/j.compedu.2019.103666>
- Sandanayake, T. C. (2019). Promoting open educational resources-based blended learning. *International Journal of Educational Technology in Higher Education*, 16(1), 1-16.
- Saro, J., et al. (2022). These variables include student preparedness for class, confidence, fear, and the size of the classroom. Students' Lack of Interest, Motivation in Learning, and Classroom Participation: How to Motivate Them?
- Sewagegn, A. A., & Diale, B. M. (2020). Authentic assessment as a tool to enhance student learning in a higher education institution. *Assessment, Testing, and Measurement Strategies in Global Higher Education*, 256–271. <https://doi.org/10.4018/978-1-7998-2314->

8.ch013

- Shafie, H., Majid, F. A., & Ismail, I. S. (2021). Teaching 21st Century Skills in a New Norm among Malaysian English Language Teachers Teaching 21st Century Skills in a New Norm among Malaysian English Language Teachers. *International Journal of Academic Research in Business and Social Sciences*, 1(10), 890–902. <https://doi.org/10.6007/IJARBS/v11-i10/11457>
- Strauss, V., & Camins, A. H. (2015). What's the purpose of education in the 21st century? www.arthurcamins.com.
- Suchyadi, Y., & Suharyati, H. (2021). The use of multimedia as an effort to improve the understanding ability of basic school teachers' creative thinking in the era of 'Freedom of Learning.' In A. Rahmat (Ed.), *Merdeka Belajar* (pp. 42–53). Yogyakarta: Zahir Publishing.
- Suharyati, H., Laihad, H., & Suchyadi, Y. (2019). Development of Teacher Creativity Models to Improve Teacher's Pedagogic Competency in the Educational Era 4.0. *International Journal of Innovation, Creativity, and Change*, 5(6), 919–929. Retrieved from www.ijicc.net
- Sulaiman, J., & Ismail, S. N. (2020, August). Teacher competence and 21st-century skills in transformation schools 2025 (TS25). *Universal Journal of Educational Research*, 8(8), 3536–3544.
- Sundqvist, K., Korhonen, J., & Eklund, G. (2020). Predicting Finnish subject-teachers' ICT use in Home Economics based on teacher- and school-level factors. *Education Inquiry*, 11(4), 73–93. <https://doi.org/10.1080/20004508.2020.1778609>
- Tosuncuoglu, I. (2019). Reflective learning views of students, teachers, and instructors: A mixed-methods study. *English Language Teaching*, 12(3), 200–211. <https://doi.org/10.5539/elt.v12n3p200>
- Turner, K., & Garvis, S. (2023). Teacher Educator Wellbeing, Stress and Burnout: A Scoping Review. *Education Sciences*, 13(4), 351. <https://doi.org/10.3390/educsci13040351>
- Van Laar, A. J. A. M. Van Deursen, J. A. G. M. Van Dijk, and J. De Haan, The relation between 21st-century skills and digital skills: a systematic literature review. *Computers in Human Behavior*, 2017.
- Wahyudi, Wahyudi and Kurniasih, Dedeh and Haryadi, Didit and Haquei, Fitria, Strategy To Improve Employee Performance (November 25, 2022). Available at SSRN: <https://ssrn.com/abstract=4308837> or <http://dx.doi.org/10.2139/ssrn.4308837>
- Zamora, J. T., & Zamora, J. J. M. (2022). 21st Century Teaching Skills and Teaching Standards Competence Level of Teacher. *International Journal of DOI: 10.26803/ijlter.21.5.12*