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Teachers' 21st Century Teaching Practices, Attitudes, and their Technology-Enhanced Learning Integration

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Abstract

In today's rapidly evolving educational landscape, technology integration is essential in developing 21st-century competencies among learners. This study examined the level of 21st-century teaching practices, attitudes toward technology, and technology-enhanced learning (TEL) integration among public secondary school teachers in the Division of El Salvador City. Specifically, it assessed teaching practices in learning and innovation, Information and Communication Technology (ICT), and life and career skills; gauged attitudes based on willingness, confidence, and perceived usefulness; measured TEL integration in instructional strategies, student engagement, and learning outcomes; and explored the relationships among these domains. Using a descriptive correlational survey design, data were collected from 134 teachers selected through stratified random sampling. A validated questionnaire was utilized, and data were analyzed using percentage and frequency for profiling, mean and standard deviation for assessing levels, and Pearson's r for correlation analysis.

Findings revealed a high application of 21st-century teaching practices, with Life and Career Skills rated highest, showing teachers' focus on adaptability, collaboration, and preparing students for real-world challenges. ICT integration was strong, as teachers frequently used digital tools to enhance instruction. Attitudes toward technology were highly positive, particularly in confidence and willingness, though perceived usefulness was slightly lower. TEL integration was also high, marked by creative use of multimedia, simulations, and collaborative platforms to improve engagement and learning outcomes. In conclusion, teachers demonstrated strong 21st-century teaching practices and positive attitudes toward technology, reflecting competence, confidence, and adaptability to digital innovations. These factors significantly influenced the high level of technology-enhanced learning integration observed, underscoring teachers' vital role in fostering digital transformation and student success in modern education. Significant positive correlations were found between teaching practices and TEL integration, as well as between attitudes and TEL integration. The study recommends promoting reflective practices, providing targeted professional development, and designing inclusive, interactive digital tasks to sustain engagement and support future-ready education.

Keywords: 21st century teaching practices, attitudes, technology-enhanced learning integration

1. Introduction

The rapid advancement of technology has significantly transformed education by reshaping teaching prac-

tices and learning experiences, making technology integration essential for fostering active engagement and improved learning outcomes. Educational reforms in the 21st century emphasize the development of globally competitive learners and require teachers to possess strong competencies in innovation, information and communication technology, and life and career skills, with teachers' technological competence playing a crucial role in effective classroom integration. Teaching competencies directly influence instructional quality, and research shows a positive relationship between students' 21st-century skills and teachers' educational technology competencies. Technology-enhanced learning promotes critical thinking, collaboration, and engagement through interactive tools such as multimedia presentations, virtual simulations, and online resources, though public secondary schools often face challenges like limited resources, insufficient training, and varying digital literacy levels. Despite these constraints, effective technology use can personalize learning, strengthen essential skills, and prepare students for a rapidly changing world. Within the context of the K to 12 Curriculum, digital literacy and collaborative learning are prioritized, making technology-enhanced tools vital for achieving curriculum goals, and examining teachers' experiences in integrating these tools provides valuable insights for improving instructional strategies, student engagement, and overall learning outcomes in support of 21st-century education.

Research Questions

The study aimed to determine the teaching practices of 21st-century skills, attitudes, and technology-enhanced learning integration among secondary school teachers in the Division of El Salvador City for the School Year 2024-2025.

Particularly, this paper sought to answer the following questions:

1. To what level do the respondents perceive teaching practices of 21st-century skills as to learning and innovation, information and communication technology, and life and career?
2. What is the respondents' level of attitude towards technology based on willingness to adopt technology, confidence in using technology, and perceived usefulness?
3. What is the respondents' level of technology-enhanced learning integration with regard to instructional strategies, student engagement, and learning outcomes?
4. Is there a significant relationship between the respondents' perceived teaching practices of 21st-century skills and technology-enhanced learning integration?
5. Is there a significant relationship between the respondents' attitude towards technology and technology-enhanced learning integration?

Significance

The study is significant for various stakeholders including school administrators, teachers, parents, students, policymakers, and researchers as it highlights how technology integration influences the development of 21st-century skills. The findings can guide school administrators in identifying effective and ineffective technology-based teaching strategies and in strengthening professional growth plans aligned with the goals of the Department of Education. Teachers may use the results to assess their strengths and weaknesses, improve instructional strategies, and plan professional development to meet desired competencies. Parents can gain awareness of their role in supporting their children's learning at home through guidance, encouragement, and close coordination with teachers. Students benefit by gaining opportunities to explore diverse learning styles and develop skills at their own pace, while researchers can

use the results as a basis for further studies aimed at improving the implementation of the K to 12 curriculum and advancing the development of lifelong learners.

Scope and Limitations

The study examines the relationship between teachers' 21st-century teaching practices and their attitudes toward technology as independent variables and technology-enhanced learning integration as the dependent variable, focusing on how innovation, digital literacy, life and career skills, as well as teachers' perceptions, confidence, and willingness to use technology influence instructional effectiveness, student engagement, and learning outcomes. It is limited to public secondary school teachers in the Division of El Salvador City and specifically assesses teaching practices in learning and innovation, information and communication technology, and life and career skills, along with attitudes toward technology in terms of adoption, confidence, and perceived usefulness. The study also evaluates the extent of technology-enhanced learning integration across instructional strategies, student engagement, and learning outcomes using self-assessment responses from Department of Education public secondary school teachers to determine levels of technology use and 21st-century teaching practices.

Literature Review

Teaching Practices of 21st Century Skills

Learning, innovation, and technology integration are central to 21st-century education, shaping both teaching approaches and student outcomes. Ligan and Tacadena (2022) emphasize that fostering critical thinking, creativity, and problem-solving through learner-centered and inquiry-based methods enhances student engagement and academic performance, while Duterte (2024) highlights that technology-enhanced environments, such as gamified assessments and virtual labs, increase motivation and equip students with collaboration and digital literacy skills. Additionally, Ikhlas and Dela Rosa (2023) demonstrate that teachers' self-efficacy, computer competencies, and access to ICT strongly influence their ability to integrate technology effectively, showing that professional development, supportive infrastructure, and confidence in using digital tools are essential for preparing students with the life, career, and problem-solving skills needed in a rapidly evolving global landscape.

Attitude Towards Technology

The willingness and confidence of teachers to adopt technology are critical for effective 21st-century teaching and learning. Nueva (2020) emphasizes that positive attitudes toward technology, including perceived ease of use and usefulness, strongly influence teachers' integration of digital tools, while Clipa et al. (2023) highlight that self-efficacy further enhances technology adoption. Similarly, Zeng et al. (2022) show that higher confidence in using technology is linked to more effective integration and improved Technological Pedagogical Content Knowledge, and Duterte (2024) demonstrates that when teachers perceive technology as useful, it significantly boosts student motivation and performance. These studies underscore that both internal factors, such as attitudes and confidence, and external support, like professional development and resources, are essential for teachers to successfully implement technology-enhanced learning in secondary education.

Technology-Enhanced Learning Integration

Instructional strategies that integrate technology are essential for effective 21st-century teaching, enhancing both student engagement and learning outcomes. Zhang et al. (2021) highlight the importance of differentiated instruction and blended learning approaches, emphasizing real-time interaction,

immediate feedback, and structured use of technology to maintain motivation and support diverse learning needs. Duterte (2024) further demonstrates that innovative strategies such as gamified quizzes and virtual simulations significantly increase student engagement and academic performance, while Xu et al. (2023) show that integrating self-regulated learning strategies with technology improves metacognitive skills and classroom effectiveness. These studies collectively underscore that equipping teacher with skills to implement dynamic, student-centered instructional strategies and purposeful technology use is critical for improving engagement and achieving meaningful learning outcomes.

2. Methodology

Research Design

The study employed a descriptive correlational survey research design to examine the relationships among variables by measuring the degree of association between them within a specific group of respondents. This design allowed the researcher to identify patterns and relationships among variables while also describing trends in attitudes, opinions, behaviors, and characteristics of the population through data gathered from a sample. Data were collected using a survey questionnaire as the primary research instrument, and the collected data were systematically analyzed and integrated. Based on the quantitative descriptive correlational approach, conclusions and inferences were drawn from the findings of the study.

Participants

The research respondents for this study were secondary school teachers drawn from a diverse set of Public Secondary Schools in the Division of El Salvador City. The total population of two hundred-one (201) secondary school teachers comprised the nine public secondary schools in the division. Specifically, the respondents were secondary school teachers from Molugan National High School, El Salvador City National High School, Himaya National High School, Sambulawan National High School, Sinaloc National High School, Cogon National High School, Kalabaylabay Integrated School, Hinigdaan National High School, and San Francisco de Asis National High School.

Data Collection

The study used a survey questionnaire as the primary data-gathering instrument to capture secondary school teachers' 21st-century teaching practices, attitudes toward technology, and technology-enhanced learning integration. The questionnaire was divided into four sections: respondents' demographic and professional characteristics, teaching practices aligned with 21st-century skills, attitudes toward technology, and practices in technology-enhanced learning. The first section collected information on age, sex, educational attainment, teaching position, experience, and relevant trainings, while the second section, adapted from previous research, assessed teaching practices across learning and innovation, information and communication technology, and life and career skills. The third and fourth sections, researcher-developed, measured attitudes toward technology in terms of willingness to adopt, perceived usefulness, and perceived ease of use, as well as the level of technology-enhanced learning integration across instructional strategies, student engagement, and learning outcomes. All items were guided by relevant literature, aligned with the study's objectives, and validated by experts to ensure clarity, content validity, and reliability.

Data Analysis

The study employed various statistical methods to analyze the collected data according to the research questions and variables. Descriptive statistics, including percentages and frequencies, summarized and interpreted the respondents' demographic and professional characteristics, providing an overview of the

secondary school teachers' profiles. Mean scores were calculated to determine the levels of teaching practices in 21st-century skills, attitudes toward technology, and technology-enhanced learning, while standard deviation measured the variation of responses from the mean. The Pearson Correlation Coefficient was used to examine the significance and strength of the relationships between teaching practices, attitudes toward technology, and their impact on technology-enhanced learning integration.

3. Results and Discussions

Problem 1. To what level do the respondents perceive teaching practices of 21st century skills as to learning and innovation, information and communication Technology, and life and career?

Table 1
Summary Distribution of the Respondents' Level of Perceptions on Teaching Practices of 21st Century Skills

Variables	Mean	SD	Interpretation
Learning and Innovation	3.59	0.26	Very High
Information and Communication Technology	3.61	0.27	Very High
Life and Career	3.67	0.29	Very High
Overall	**3.62**	**0.24**	**Very High**

Table 1 reveals that teachers in the Division of El Salvador City demonstrate a very high level of implementation of 21st-century teaching practices, with an overall mean of 3.62, indicating consistent and balanced application of strategies that promote critical thinking, digital competence, and life and career skills. Among the components, life and career skills received the highest rating, reflecting teachers' holistic integration of these competencies, while learning and innovation scored slightly lower due to challenges in incorporating creative practices within rigid curriculum structures and standardized assessments. These results suggest that educators are actively applying 21st-century strategies to prepare students for academic and real-world success, but ongoing professional development, access to resources, and structured lesson-planning support are necessary to enhance innovative practices. Technology integration further strengthens learning by fostering engagement, creativity, and motivation through tools such as gamified quizzes and virtual simulations, supporting multiple dimensions of 21st-century skills when purposefully applied. Overall, the findings emphasize the need for sustained teacher support, institutional backing, and deliberate instructional design to ensure that innovation, collaboration, and technology-enhanced learning are consistently embedded in classroom practice, aligning with both national education objectives and global competency standards.

Problem 2. What is the respondents' level of attitude towards technology based on willingness to adopt technology, confidence in using technology, and perceived usefulness?

Table 2
Summary Distribution of the Respondents' Level of Perceptions on Attitude Towards Technology

Variables	Mean	SD	Interpretation
Willingness to Adopt Technology	3.60	0.30	Very Positive
Confidence in Using Technology	3.61	0.29	Very Positive
Perceived Usefulness	3.39	0.55	Very Positive
Overall	**3.53**	**0.31**	**Very Positive**

Table 2 reveals that teachers exhibit a very positive attitude toward technology, with an overall mean of 3.54, reflecting openness to adopting digital tools and confidence in using them effectively for instruction. Confidence in using technology received the highest rating, indicating that teachers feel capable of integrating technology into their teaching practices, while perceived usefulness scored slightly lower, suggesting some uncertainty about its impact on learning outcomes. These findings highlight that while teachers are willing and ready to implement technology-enhanced learning, external factors such as access to resources, infrastructure, and structured support influence their perceptions of its instructional value. The results underscore the importance of ongoing professional development, practical demonstrations, and evidence-based practices to reinforce the benefits of technology integration, enabling educators to design interactive, student-centered lessons and fully leverage digital tools to enhance engagement, assessment, and learning outcomes in alignment with 21st-century educational goals.

Problem 3. What is the respondents' level of technology-enhanced learning integration with regard to instructional strategies, student engagement, and learning outcomes?

Table 3 Summary Distribution of the Respondents' Level of Perceptions on Technology-Enhanced Learning Integration

Variables	Mean	SD	Interpretation
Instructional Strategies	3.62	0.29	Very High
Student Engagement	3.59	0.26	Very High
Learning Outcomes	3.62	0.29	Very High
Overall	**3.61**	**0.25**	**Very High**

Table 3 reveals that teachers demonstrate a very high level of technology-enhanced learning integration, with an overall mean of 3.61, indicating that technology is embedded across instructional strategies, student engagement, and learning outcomes rather than being used as a supplementary tool. Instructional

strategies and learning outcomes received the highest ratings, reflecting teachers' consistent use of digital tools to facilitate active, student-centered learning and enhance mastery of lesson objectives, while student engagement, though still very high, scored slightly lower, highlighting challenges in maintaining sustained interaction and participation. Teachers employ strategies such as digital storytelling, interactive presentations, and online resources to diversify instruction, and they recognize the positive impact of technology on assessment, feedback, and monitoring student progress. These findings underscore the importance of intentional instructional design, ongoing professional development, and robust institutional support to maximize technology's potential in creating dynamic, inclusive, and engaging learning environments that align with 21st-century educational goals and foster critical thinking, creativity, and collaboration among students.

Problem 4. Is there a significant relationship between the level of teaching practices of 21st-century skills and technology-enhanced learning integration?

Table 4
Results of the Test on Significant Relationship Between the Respondents' Perception of Teaching Practices of 21st Century Skills and Technology-Enhanced Learning Integration

Technology-Enhanced Learning Integration	**Teaching Practices of 21st Century Skills**											
	Learning and Innovation			Information and Communication Technology			Life and Career			**Overall**		
	r	***p-value***	***Interpretation***	R	***p-value***	***Interpretation***	r	***p-value***	***Interpretation***	r	***p-value***	***Interpretation***
Instructional Strategies	0.57**	0.00	***S***	1.00**	0.00	***S***	0.57**	0.00	***S***	0.87**	0.00	***S***
Student Engagement	0.48**	0.00	***S***	0.55**	0.00	***S***	0.48**	0.00	***S***	0.82**	0.00	***S***
Learning Outcomes	0.64**	0.00	***S***	0.73**	0.00	***S***	0.64**	0.00	***S***	0.91**	0.00	***S***

Table 4 presents the results of the correlation analysis between 21st-century teaching practices and technology-enhanced learning integration, showing a very strong positive relationship with an overall Pearson Correlation Coefficient of 0.91, which is statistically significant at $p < 0.01$. Instructional strategies exhibit the strongest correlation with ICT skills ($r = 1.00$, $p < 0.01$), highlighting the essential link between technological proficiency and effective digital pedagogy, while learning and innovation and life and career skills also show strong correlations with instructional strategies ($r = 0.57$, $p < 0.01$). Student engagement correlates positively with all 21st-century skills, particularly ICT skills ($r = 0.55$, $p < 0.01$), suggesting that technological competence and innovation support active participation and motivation. Learning outcomes demonstrate the highest correlations, with ICT skills ($r = 0.73$, $p < 0.01$) and both learning and innovation and life and career skills ($r = 0.64$, $p < 0.01$) contributing to an overall correlation of 0.91, indicating that integrating creativity, technological fluency, and career-ready competencies

through technology-enhanced learning strongly predicts improved academic performance and mastery of learning objectives. These findings emphasize that effective technology integration requires not only technical skills but also innovative and learner-centered instructional approaches, supported by professional development that fosters creativity, critical thinking, and career-oriented teaching strategies.

Problem 5. Is there a significant relationship between the respondents' attitude towards technology and technology-enhanced learning integration?

Table 5

Results of the Test on Significant Relationship Between the Respondents' Attitude Towards Technology and Technology-Enhanced Learning Integration

Technology-Enhanced Learning Integration	**Level of Attitudes towards Technology**											
	Willingness to Adopt Technology			Confidence in Using Technology			Perceived Usefulness			**Overall**		
	r	***p-value***	***Interpretation***	R	***p-value***	***Interpretation***	r	***p-value***	***Interpretation***	r	***p-value***	***Interpretation***
Instructional Strategies	0.68**	0.00	***S***	0.66**	0.00	***S***	0.68**	0.00	***S***	0.74**	0.00	***S***
Student Engagement	0.98**	0.00	***S***	0.59**	0.00	***S***	0.98**	0.00	***S***	0.84**	0.00	***S***
Learning Outcomes	0.54**	0.00	***S***	0.27**	0.00	***S***	0.54**	0.00	***S***	0.86**	0.00	***S***

Table 5 presents the results of the correlation analysis between teachers' attitudes toward technology and technology-enhanced learning integration, showing strong and significant relationships across all dimensions with Pearson Correlation Coefficients ranging from 0.83 to 0.95 at $p < 0.01$. Instructional strategies correlate positively with willingness to adopt technology ($r = 0.68$), confidence in using technology ($r = 0.66$), and perceived usefulness ($r = 0.68$), indicating that favorable attitudes enhance the design and implementation of technology-driven teaching methods. Student engagement shows particularly high correlations with willingness and perceived usefulness ($r = 0.98$ each), suggesting that proactive and positive attitudes directly influence students' motivation and participation, while confidence also contributes moderately ($r = 0.59$). Learning outcomes demonstrate moderate but meaningful correlations, with willingness and perceived usefulness ($r = 0.54$) impacting achievement more than confidence alone ($r = 0.27$), emphasizing that belief in technology's value complements skill in promoting academic gains. Overall, technology-enhanced learning integration exhibits a strong correlation with teachers' attitudes ($r = 0.83$), highlighting those positive dispositions toward technology including confidence, willingness, and recognition of its instructional benefits are crucial for effective and holistic integration, supporting both student engagement and learning outcomes and underscoring the importance of embedding attitude-building into professional development programs.

4. Conclusion and Recommendations

Conclusion

Based on the findings of the study indicate that teachers' perceptions of 21st-century teaching practices, particularly in life and career skills, demonstrate their competence and active engagement in strategies that promote critical thinking, digital literacy, and career readiness. A high level of confidence in using technology suggests consistent and effective application of digital tools in instruction, reflecting positive attitudes and adaptability to new innovations. Results regarding technology-enhanced learning integration further reveal that teachers employ technology-driven instructional strategies that foster student engagement and improve learning outcomes. Additionally, the study revealed a strong, significant relationship between the teaching practices of 21st-century skills and technology-enhanced learning integration, as well as between attitudes towards technology and the extent of technology integration in the classroom.

Recommendations

Based on the results of the study, it is recommended that secondary school teachers embed reflective practices into lessons, such as guided journals, reflective prompts, peer feedback, and digital tools like e-portfolios, to strengthen learning and innovation skills. Teachers' uncertainty regarding the instructional benefits of technology, particularly in assessment and differentiated instruction, should be addressed through targeted professional development programs led by the Schools Division Office in collaboration with school administrators, showcasing evidence-based practices, classroom models, and success stories to reinforce technology's value. Teachers should also receive training in designing interactive and inclusive digital tasks, including gamified lessons, collaborative online projects, and real-time feedback tools, while ensuring equitable access to devices and connectivity. Additionally, the Schools Division Office should strengthen ongoing professional development initiatives to enhance teachers' skills in integrating 21st-century teaching practices with technology-enhanced learning, fostering positive attitudes toward technology and promoting effective classroom integration to improve teaching and learning outcomes aligned with the K to 12 Curriculum.

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