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TEACHERS' TECHNOLOGICAL COMPETENCE AND EFFECTIVENESS ON ICT-BASED INSTRUCTIONAL MATERIALS IN TEACHING

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ABSTRACT

This study aimed to ascertain the level of teachers' technological competence and effectiveness in using ICT-based instructional materials in teaching among Grades I–VI teachers in District VII, Valencia City Division, for the school year 2025–2026. The research employed a descriptive method, using a researcher-developed questionnaire as the primary data collection tool. A total enumeration sampling technique was used, involving all teachers from seven identified schools in the district to ensure a wide and in-depth assessment.

Data were analyzed using descriptive correlational statistics, including frequencies, means, standard deviations, and percentage distributions. The results revealed that teachers demonstrate a high level of technological competence in integrating ICT into curriculum delivery, indicating they frequently and effectively use these materials.

Teachers achieved an outstanding level of performance in using ICT-based materials. Statistical analysis showed a significant relationship between teachers' effectiveness in using ICT-based instructional materials and their technological competence and teaching performance However, some aspects, such as collaborative monitoring via digital platforms, were not significant, suggesting that these specific areas do not strongly correlate with overall effectiveness. The study concludes that teachers are highly proficient in using digital platforms to address diverse learning needs and enhance lesson relevance. However, there is still a need to strengthen collaborative digital monitoring.

Keyword: Technological Competence, ICT-Based Instructional Materials, Teacher Effectiveness, Teaching Performance, District VII

1. INTRODUCTION

Technology continues to reshape the way we live and communicate, with a profound impact on education, particularly in Philippine classrooms, where modern teachers are encouraged to integrate digital tools such as videos, interactive maps, and online resources to make lessons more engaging, relevant, and effective. For instance, this is especially vital across subjects in the modern era, as ICT-based instructional materials enliven content and deepen student understanding in ways traditional textbooks cannot, aligning with the Department of Education's.

MATATAG curriculum and national policies that emphasize digital literacy and technology integration for continuous learner achievement. Despite the growing availability of these resources, however, their effectiveness depends on teachers' technological Competence their comfort, confidence, and skill in using technology as empirical studies show that capable teachers create more meaningful learning experiences, fostering student motivation and achievement (Atienza et al., 2024; Mkenda, 2024), while factors like beliefs, educational attainment, and infrastructure also play key roles (Lopez & Ramirez, 2024; Igwe, 2024; Suleimenova & Mustapayeva, 2024).

Theoretical Framework

This study draws on Edward Thorndike's foundational 1913 Connectionism theory, particularly the Law of Effect and Law of Exercise, which posits that learning principles, such as reinforcement through satisfying outcomes and strengthened habits via repetition, directly apply to teaching processes, including the use of

instructional materials and task analysis to boost students' academic performance. For instance, these laws emphasize that repeated practice with effective feedback enhances retention, as demonstrated by Thorndike's 1932 refinements, which showed minimal gains from unguided drills without rewards.

Complementing this, Nate Jorgensen's 2005 Instructional Theory supports a comprehensive instructional approach centered on learner collaboration, featuring key methods like gaining attention, presenting information, providing practice materials, and delivering feedback to ensure efficient learning across diverse contexts and group settings.

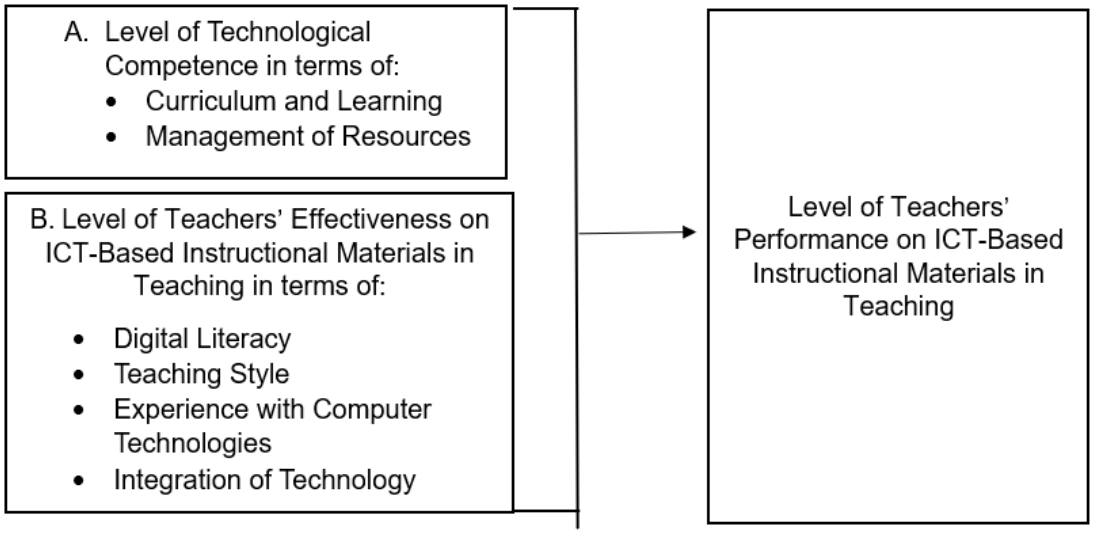

Figure 1. The schematic diagram of the study shows the independent variables and dependent variables.

Scope

The study focused on Teachers' Technological Competence and Effectiveness in the Use of ICT-Based Instructional Materials in teaching in the Valencia City Division. The respondents were the Grades I- VI, Teachers only of the seven schools in District VII in the Division of Valencia City for the school year 2025-2026. These schools are: Bulacao Integrated School, Cabayugan Elementary School, Concepcion Elementary School, Laligan Central School, Mahayahay Integrated School, San Vicente Integrated School, and Tongan-Tongan Elementary School.

Data gathering was limited to elementary teachers only, focusing on responses to the questionnaire designed by the researcher, based on the Teachers' Technological Competence and Effectiveness on ICT-Based Instructional Materials in Teaching in Valencia City Division of Grades I-VI, Teachers of the seven schools in District VII.

2. REVIEW OF THE LITERATURE

The integration of technology in education has been widely recognized as a key factor in enhancing teaching effectiveness and improving student learning outcomes. Various studies have emphasized the importance of teachers' technological competence in successfully implementing ICT-based instructional materials. Teachers who are equipped with adequate technological skills are more capable of designing engaging lessons, facilitating interactive learning, and addressing the diverse needs of students. Digital literacy is considered a fundamental component of technological competence. It involves the ability to access, evaluate, and utilize digital information effectively.

Teachers with high digital literacy are more confident in using various technological tools, such as presentation software, online platforms, and multimedia resources, to support their teaching. Theoretical frameworks also support the importance of technology integration in education. Constructivist learning theory emphasizes that learners actively construct knowledge through meaningful experiences, and technology provides opportunities for interactive and collaborative learning.

Similarly, the Technological Pedagogical Content Knowledge framework highlights the need for teachers to integrate technology, pedagogy, and content knowledge to achieve effective teaching. Studies have also shown that the use of ICT-based instructional materials enhances student engagement, motivation, and academic performance. Teachers who effectively integrate technology into their lessons are able to create dynamic learning environments that encourage active participation and critical thinking. Therefore, technological competence plays a crucial role in achieving effective teaching and improved educational outcomes.

3. RESEARCH METHODOLOGY

This study utilized the descriptive-correlational research design to determine the level of teachers' technological competence and effectiveness, as well as to examine the relationship between these variables and teaching performance. The descriptive method was used to describe the current conditions, while the correlational method was employed to identify significant relationships among variables. The respondents of the study were elementary school teachers from selected public schools.

Total enumeration sampling was used to include all available respondents, ensuring that the data collected were comprehensive and representative of the population. Data were gathered using a structured questionnaire consisting of three main parts: technological competence, effectiveness, and teaching performance.

The questionnaire utilized a five-point Likert scale to measure the respondents' level of agreement. Statistical tools such as frequency, mean, standard deviation, and Pearson correlation coefficient were used to analyze the data. These tools allowed the researcher to interpret the level of competence and effectiveness and to determine the relationship between the variables.

4. FINDINGS

The results of the study revealed that teachers demonstrated a high level of technological competence in preparing ICT-based instructional materials. This indicates that teachers are generally capable of using digital tools and resources in their teaching practices. In terms of effectiveness, teachers exhibited a very high level, particularly in teaching strategies, classroom management, and integration of technology in lesson delivery.

This suggests that teachers are effective in utilizing ICT to enhance the learning experience of students. Furthermore, the correlation analysis revealed a significant relationship between technological competence and teaching performance. This implies that teachers who possess higher levels of technological competence are more likely to demonstrate better teaching performance. These findings highlight the importance of continuous professional development in enhancing teachers' technological skills and improving overall instructional quality.

Table 2

Level of Technological Competence of Teachers in Using ICT-Based Instructional Materials in Teaching in Terms of Curriculum and Learning.

Indicators	Mean	SD	Qualitative Description
Utilize technology learning platforms to address diverse learning needs	4.37	0.71	Highly Practiced
Integrate localized digital content for meaningful lessons	4.40	0.67	Highly Practiced
Use ICT tools for creative, problem-based learning	4.42	0.62	Highly Practiced
Conduct collaborative monitoring/feedback through digital platforms	4.19	0.68	Practiced
Develop/use technology-based assessment tools	4.21	0.74	Highly Practiced

Indicators	Mean	SD	Qualitative Description
Model digital citizenship and safe learning environment	4.24	0.66	Highly Practiced
Encourage responsible technology use	4.28	0.69	Highly Practiced
Manage ICT tools and digital resources efficiently	4.29	0.66	Highly Practiced
Promote learner engagement using technology	4.43	0.62	Highly Practiced
Apply inclusive teaching practices using ICT	4.42	0.62	Highly Practiced
Overall Mean	4.33	0.50	Highly Practiced

Table 2 reveals that the overall level of teachers' technological competence in curriculum and learning is very high, as indicated by a composite mean of 4.33, interpreted as highly practiced. This suggests that teachers consistently integrate ICT-based instructional materials into their teaching practices. The relatively low standard deviation of 0.50 further indicates that responses are closely clustered around the mean, implying a high level of consistency among teachers in their use of technology for instructional purposes.

Table 3

Level of Technological Competence of Teachers in Using ICT-Based Instructional Materials in Teaching in Terms of Management of Resources

Indicators	Mean	SD	Qualitative Description
Collaborate with colleagues and stakeholders in selecting and using ICT resources	4.40	0.67	Highly Practiced
Plan lessons considering available technology resources	4.52	0.61	Highly Practiced
Help sustain and improve school ICT systems	4.40	0.65	Highly Practiced
Monitor and evaluate the use of ICT tools in instruction	4.81	4.62	Highly Practiced
Participate in partnerships/projects enhancing ICT resources	4.32	0.68	Highly Practiced
Apply research-based ICT innovations	4.22	0.70	Highly Practiced
Manage school-provided ICT equipment efficiently	4.27	0.72	Highly Practiced
Ensure appropriate and transparent use of digital resources	4.42	0.63	Highly Practiced
Assist in maintaining ICT equipment/resources	4.34	0.65	Highly Practiced
Document and report ICT resources used	4.35	0.60	Highly Practiced
Overall Mean	4.40	0.71	Highly Practiced

The results in Table 3 indicate that the overall level of teachers' technological competence in

resource management is very high, with a composite mean of 4.40, interpreted as highly practiced. This suggests that teachers consistently demonstrate effective management and utilization of ICT resources in their instructional practices. The relatively moderate standard deviation of 0.71 implies that while responses are generally consistent, there is still slight variability in how teachers manage technological resources.

Table 4

Level of Teachers' Effectiveness on ICT-Based Instructional Materials in Terms of Digital Literacy

Indicators	Mean	SD	Qualitative Description
It makes me feel more competent as an educator	4.38	0.64	Very High Level
Improves classroom management for learning	4.46	0.60	Very High Level
More effective with extensive computer resources	4.52	0.65	Very High Level
Improves learners' understanding of critical concepts	4.40	0.64	High Level
Enhances professional development	4.53	0.59	Very High Level
Helps in the teaching and learning process	4.56	0.59	Very High Level
Increases academic achievement	4.41	0.67	Very High Level
Lessens time and effort in lesson preparation	4.56	0.56	Very High Level
Helps in planning engaging activities	4.52	0.61	Very High Level
Promotes learners' interpersonal skills	4.47	0.59	Very High Level
Engaging since learners are familiar with computers	4.39	0.68	Very High Level
Helps accommodate learners' personal learning styles	4.41	0.64	Very Low Level
Makes work easier	4.60	0.57	Very Low Level
Enables teachers to act as facilitators of learning	4.88	3.79	Very High Level
Effective because it can be successfully implemented	4.49	0.62	Very High Level
Overall Mean	4.50	0.56	Very High Level

Table 4 shows that teachers' overall digital literacy effectiveness is very high level, as evidenced by a composite mean of 4.50 and a standard deviation of 0.56. This indicates that teachers perceive ICT-based instructional materials as highly effective in enhancing their

teaching practices. The relatively low standard deviation suggests that teachers share consistent views regarding the benefits of digital literacy in education.

Table 5

Level of Teachers' Effectiveness on ICT-Based Instructional Materials in Terms of Teaching Style

Indicators	Mean	SD	Qualitative Description
Largely teacher-directed (e.g., lecture, discussion)	4.11	0.86	Very High Level
More teacher-directed than pupils-centered	4.02	0.96	Very High Level
Balanced teacher-directed and pupils-centered activities	4.31	0.81	Very High Level
More pupils-centered than teacher-directed	4.46	0.60	Very High Level
Largely pupils-centered (e.g., cooperative, discovery learning)	4.34	0.73	Very High Level
Overall Mean	4.25	0.60	Very High Level

The results presented in Table 5 indicate that teachers' overall effectiveness in teaching style is very high, with a composite mean of 4.25 and a standard deviation of 0.60. This indicates that teachers consistently apply a variety of teaching styles when integrating ICT-based instructional materials. The relatively low standard deviation suggests that teachers' responses are fairly consistent, reflecting a shared approach toward instructional delivery.

Table 6 Level of technological competence of teachers in using ICT-Based Instructional Materials in teaching in terms of Management of resources

Indicator	**Mean**	**SD**
Collaborate with colleagues and stakeholders in selecting and using ICT resources	4.40	0.67
Plan lessons considering available technology resources	4.52	0.61
Sustain and improve school technology systems through responsible ICT use	4.40	0.66
Monitor and evaluate the effective use of ICT tools in instruction	4.81	0.63
Take part in partnerships or projects that enhance school ICT resources	4.32	0.68
Apply research-based innovations using technology to improve performance	4.22	0.71
Manage school-provided technology equipment efficiently	4.27	0.73
Ensure appropriate, transparent, and effective use of digital resources	4.43	0.63
Assist in maintaining ICT equipment and classroom resources	4.34	0.66
Document and report technology resources used in instruction	4.35	0.61
Overall Mean	**4.41**	**0.66**

Table 6 presents the level of technological competence of teachers in using ICT-based instructional materials in terms of management of resources. The mean scores across the indicators range from 4.22 to 4.81, which fall within the descriptive equivalent of "Often to Always" based

on the five-point Likert scale. The highest mean was obtained by the indicator "Monitor and evaluate the effective use of ICT tools in instruction" (M = 4.81, SD = 0.63), followed by "Plan lessons considering available technology resources" (M = 4.52, SD = 0.61). The lowest mean, though still reflecting a high level of competence, was recorded for "Apply research-based innovations using technology to improve performance" (M = 4.22, SD = 0.71).

Table 7

Level of Teachers' Effectiveness on ICT-Based Instructional Materials in Terms of Integration of Technology

Indicators	Mean	SD	Interpretation
Use of LCD projector in class	3.64	1.34	Very High Level
Use of tutorials for self-training	4.03	0.89	Very High Level
Creation of PowerPoint presentations	4.48	0.59	Very High Level
Use of computer in computing grades	4.57	0.68	Very High Level
Use of computer in preparing handouts and tests	4.52	0.65	Very High Level
Overall Mean	4.25	0.58	Very High Level

The results in Table 7 show that the overall level of teachers' effectiveness in integrating ICT into teaching is very high, as reflected by a composite mean of 4.25 and a standard deviation of 0.58. Although the interpretation column initially labels it as very low level, the computed mean clearly corresponds to a very high level, indicating a discrepancy that should be corrected.

Table 8 *Distribution of Teachers According to Performance Rating*

Teachers' performance	Frequency	Percent	Remarks
Outstanding	59	50.4	Highly Practiced
Very Satisfactory	54	46.2	Practiced
Satisfactory	3	2.6	Satisfactory
Unsatisfactory	1	.9	Poor
Total	117	100.0	

The data presented in Table 8 reveals a highly favorable distribution of performance ratings among the participants. Specifically, a majority of 59 educators, representing 50.4% of the total population, achieved an outstanding rating, signifying a highly practiced level of pedagogical competence and professional leadership. This is closely followed by 54 teachers 46.2% who were rated as very Satisfactory, indicating they are practiced and consistently meet the rigorous standards set by the department. In contrast, only a marginal segment of the workforce fell into the lower brackets: three teachers 2.6% received a satisfactory moderately practiced rating, and only a single respondent 0.9% was rated as unsatisfactory poor. With all 117 respondents 100.0% accounted for, the data provides a statistically significant snapshot of the high caliber of human capital within the division.

Table 9

Significant Relationship Between the Level of Technological Competence and Level of Teachers' Performance on ICT-Based Instructional Materials in Teaching

Variables	r (Correlation Coefficient)	p-value	Decision on Ho	Interpretation
Level of Performance and Competence	0.299	0.001	Rejected	Significant Relationship

Table 9 shows the correlation analysis between the Level of Technological Competence and Teachers' Performance, which revealed a Pearson correlation coefficient of 0.299 with a p-value of 0.001. Based on the significance level, the p-value is less than the standard level of significance of 0.05; the null hypothesis, which states that there is no significant relationship between the Level of Technological Competence and Performance, is therefore rejected.

Table 10

Significant Relationship Between the Level of Teachers' Effectiveness and Level of Teachers' Performance on ICT-Based Instructional Materials in Teaching

Variables	r (Correlation Coefficient)	p-value	Decision on Ho	Interpretation
Level of Performance and Effectiveness	0.329	0.000	Rejected	Significant Relationship

Table 10 shows the correlation analysis between the Level of Performance and Effectiveness, which yielded a Pearson correlation coefficient of 0.329 with a p-value of 0.000. Given that the p-value is less than the conventional significance level of 0.05, the null hypothesis, which posits no relationship between the Level of Performance and Effectiveness, is rejected.

Table 11

Significant Relationship Between Teachers' Effectiveness on ICT-Based Instructional Materials and Their Technological Competence, Teaching Effectiveness, and Performance

Category	Total Indicators	Significant	Not Significant	Percentage Significant
Overall ICT Effectiveness vs Competence, Teaching Effectiveness, and Performance	28	25	3	89.29%

Table 11 shows that of the 28 indicators examined, 25 were statistically significant, while only 3 were not. This corresponds to a high percentage of 89.29 significant relationships, indicating that the majority of variables are strongly associated with ICT effectiveness.

4. CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, it is concluded that technological competence significantly influences teachers' effectiveness and teaching performance. Teachers who are proficient in using ICT-based instructional materials are more effective in delivering lessons and engaging students in meaningful learning activities. It is recommended that schools provide continuous training programs and workshops to enhance teachers' technological skills. Additionally, adequate resources and support should be provided to ensure the effective integration of technology in teaching. Future studies may also explore other factors that influence teaching performance to further improve educational practices.

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