Teachers' Competencies, Digital-Based Teaching Strategies, Teaching Quality And Instructional Performance Among Key Stage 2 Teachers

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Abstract — The increasing integration of digital technologies in Philippine basic education has heightened the need to understand how teachers' competencies, digital-based teaching strategies, and teaching quality influence instructional performance, particularly at the Key Stage 2 level. This study examined the relationships among these variables and determined the extent to which teachers' competencies and digital pedagogical practices contribute to instructional performance. Using a descriptive-correlational design, the study involved 191 Key Stage 2 teachers from the Schools Division of San Carlos City for the school year 2025–2026. A researcher-modified survey instrument, pilot-tested for reliability, gathered data on teachers' competencies, implementation of digital-based teaching strategies, perceived teaching quality, and IPCRF/OPCRF-based instructional performance. Descriptive statistics, Pearson correlation, and multiple regression analyses were applied. Results revealed that teachers demonstrated high levels of competencies and teaching quality, a high extent of digital-based strategy implementation, and very satisfactory instructional performance. Significant positive relationships were found among all major variables, indicating that higher competence is associated with stronger digital strategy use, enhanced teaching quality, and better instructional performance. Regression analysis showed that teaching quality was the strongest predictor of instructional performance, followed by teachers' competencies and digital-based strategies. These findings suggest that teachers who are digitally competent, pedagogically prepared, and instructionally skilled achieve stronger performance outcomes. The study concludes that digital competence and high-quality teaching practices are essential drivers of effective instruction in the elementary context. It recommends sustained

professional development, targeted digital pedagogy training, and strengthened instructional support systems to enhance teachers' performance and learning outcomes among Key Stage 2 learners.

Keywords: Teachers' competencies, digital-based teaching strategies, teaching quality, instructional performance, Key Stage 2 teachers

I. INTRODUCTION

Education systems worldwide are undergoing rapid digital transformation, reshaping how teachers plan, deliver, and assess instruction. As classrooms evolve into technology-enriched learning environments, teachers are expected to possess not only foundational digital literacy but also the pedagogical expertise to integrate digital tools meaningfully into the learning process. In the digital era, teacher competence in technology integration has become a defining factor of instructional quality and learner engagement, especially in primary education where foundational academic skills and higher-order thinking capacities are shaped.

International studies show that digitally competent teachers create more interactive, student-centered learning environments and implement diverse assessment strategies that support deeper learning (Ifenthaler & Schweinbenz, 2021; Petko et al., 2022). Digital competence, however, is not limited to technical skills; it includes pedagogical alignment, ethical use, adaptive instruction, and the ability to design inclusive, feedback-rich learning experiences (Redecker, 2020). These competencies are particularly critical in Key Stage 2—Grades 4 to 6—where learners require structured guidance, multimodal learning support, and formative assessment practices to transition toward more complex cognitive tasks.

In the Philippines, the Department of Education (DepEd) emphasizes technology integration as an essential component of effective teaching through policy directions such as the Philippine Professional Standards for Teachers (PPST), the Digital Rise Program, and the Basic

Education Development Plan 2030. Despite these reforms, national and regional assessments consistently reveal that teachers vary in digital readiness, pedagogical integration of technology, and quality of instructional delivery (Natividad & Santiago, 2022; Palaoag et al., 2023). These disparities highlight the need for empirical, division-level studies that examine digital competence and instructional practices in specific contexts.

At the division level, Key Stage 2 teachers play a pivotal role in sustaining learner engagement and achievement across major subject areas. Digital-based teaching strategies such as multimedia-based lessons, interactive platforms, and digital formative assessments have been shown to improve student motivation, conceptual understanding, and performance when used coherently with pedagogical goals (Bond et al., 2021; Martín-García et al., 2022). However, effective implementation depends on teachers' competencies, instructional decision-making, and the overall quality of teaching.

Despite this global and national momentum, there remains limited empirical research within the Schools Division of San Carlos City examining how teachers' competencies, digital-based teaching strategies, and teaching quality collectively influence instructional performance, particularly among Key Stage 2 teachers. Initial division observations and program reviews indicate varying levels of digital integration across schools, uneven access to capacity-building initiatives, and diverse performance outcomes based on IPCRF/OPCRF ratings. This gap underscores the need for localized, evidence-based analysis that will guide policymaking, professional development, and resource allocation.

Literature Review

A strong body of contemporary scholarship has deepened global understanding of the competencies teachers must possess, the pedagogical value of digital-based teaching strategies, the nature of teaching quality, and the dimensions of instructional performance in technology-mediated learning environments. These constructs have evolved significantly in the last five years, driven by rapid digital transformation and heightened expectations for instructional effectiveness.

The following literature establishes the conceptual grounding for the variables examined in the present study and their relevance to Key Stage 2 instruction

Recent literature conceptualizes teacher competencies as integrated, multidimensional capacities encompassing knowledge, skills, attitudes, and professional dispositions necessary for effective and adaptive teaching practice. Darling-Hammond et al. (2020) argue that modern teacher competence extends beyond subject expertise to include the ability to design coherent instruction, manage learning environments, assess learners, and differentiate instruction. This holistic view of competence aligns with global models emphasizing technological, pedagogical, and content-based proficiency.

One of the most influential conceptual models is the **Technological Pedagogical Content Knowledge (TPACK)** framework, originally developed by Koehler and Mishra (2009) and continuously refined in digital pedagogy research. Scherer and Siddiq (2020) affirm that TPACK remains the most robust model for understanding how teachers integrate technology with content and pedagogy to achieve meaningful digital instruction. Complementing this, the **DigCompEdu Framework** (Redecker, 2020) outlines six domains of digital competence—ranging from professional engagement to digital resource management and learner empowerment—reinforcing the view that digital competence permeates multiple facets of teaching.

Contemporary perspectives highlight teacher dispositions as crucial competency components. Scherer et al. (2021) emphasize that motivation, self-efficacy, and openness to innovation play decisive roles in determining whether teachers actively engage in technology-enhanced pedagogy. These psychological dimensions shape teachers' willingness to experiment, adopt digital tools, and adjust pedagogical practices.

Contextual factors also influence teacher competence. According to Voogt et al. (2020), institutional culture, leadership support, and opportunities for professional learning communities significantly determine competency development and sustainability. Hammond et al. (2021) further note that continuous professional development integrated with mentoring and collaborative reflection promotes higher digital competence.

In addition, digital assessment literacy has emerged as a core component of teacher competence. García-Peñalvo (2021) defines digital assessment competence as the capacity to create, administer, and interpret formative and summative assessments using digital tools, which is particularly essential for Key Stage 2 learners who are developing higher-order thinking and metacognitive skills.

Collectively, conceptual literature positions teacher competencies as foundational inputs that shape the adoption of digital strategies, the quality of instruction, and ultimately, the performance outcomes reflected in standards-based evaluation systems.

Digital-Based Teaching Strategies

Digital-based teaching strategies are conceptualized as pedagogically grounded uses of digital tools and platforms that enhance learning by supporting engagement, interaction, differentiation, and assessment. Bond et al. (2021) describe these strategies as instructional approaches leveraging multimedia, interactivity, collaboration, and adaptive technologies to deepen learning and foster more student-centered environments.

Recent literature identifies several major conceptual categories of digital strategies. Reisoğlu and Çebi (2020) classify them into multimedia-supported instruction, interactive learning platforms, learning management systems, and technology-enabled assessment tools. These strategies support multimodal learning by incorporating audio, visual, textual, and interactive elements that enhance cognitive processing.

A second conceptual perspective links digital strategies to constructivist learning theory, which posits that learners actively construct knowledge through interaction, exploration, and reflection. Crompton and Burke (2021) explain that digital tools inherently support constructivist principles by enabling inquiry-based learning, collaboration, and authentic tasks. Examples include virtual simulations, online collaborative documents, and interactive problem-solving platforms.

Digital differentiation has also gained prominence. Ifenthaler and Egloffstein (2020) conceptualize digital differentiation as the strategic use of adaptive technologies that respond to individual learner needs through personalized feedback, varied content pathways, and flexible pacing—an especially valuable approach in heterogeneous Key Stage 2 classrooms.

Digital assessment is a recurring theme in recent conceptual discourse. Martín-García et al. (2022) highlight that real-time digital assessment systems enhance the assessment-for-learning cycle by providing immediate, data-informed feedback and enabling teachers to adjust instruction based on analytics.

Engagement strategies are further situated within digital pedagogy. Merritt et al. (2020) describe digital engagement as an intersection of interactivity, gamification, and social learning features that increase student motivation and participation.

Puentedura's (2020) updated **SAMR Model** continues to serve as a reflective tool for conceptualizing technology integration at levels from substitution to redefinition, guiding teachers in evaluating the pedagogical value of their digital practices.

Nuere and de Miguel (2020) conceptualize instructional performance as a culmination of professional behaviors, instructional decisions, and demonstrated teaching outcomes. It includes lesson planning, instructional delivery, assessment practices, student support, and reflective professionalism.

Salas-Pilco and Yang (2022) emphasize that digital competence is increasingly central to performance evaluation frameworks, as modern teaching relies heavily on technology-mediated planning, instruction, and assessment.

Hattie (2023) situates instructional performance within a broader continuum of teacher effectiveness, highlighting dimensions such as clarity, structured instruction, and evidence-based teaching strategies.

Kraft and Papay (2020) further conceptualize instructional performance as dynamic and developmental, shaped by professional learning, collaboration, and continuous reflection.

Within the IPO model, instructional performance represents the output variable—reflecting how teacher competencies (inputs) and digital-based teaching strategies and teaching quality (processes) shape measurable professional outcomes

A substantial body of empirical studies published from 2019 to 2024 has examined the variables central to the present research—teacher profile, teachers' competencies, digital-based teaching strategies, teaching quality, and instructional performance. To ensure alignment with the study's Statement of the Problem, the following review is organized according to the relationships among these constructs and incorporates both international and Philippine-based unpublished theses and dissertations.

II. METHODOLOGY

Research Design

This study employed a **descriptive–correlational research design**, which is appropriate for describing existing conditions and examining the statistical relationships among naturally occurring variables without manipulating them. According to Creswell and Creswell (2023), a correlational design seeks to determine "the degree of association between measurable variables as they exist in real settings," while the descriptive component allows researchers to portray characteristics, perceptions, or levels of variables within a population.

The present research aimed to (a) describe the levels of teachers' competencies, digital-based teaching strategies, teaching quality, and instructional performance; and (b) determine the relationships among these variables based on the research problems and hypotheses. Because the study sought to explore how the variables **co-vary** and to what extent they are associated, the descriptive–correlational design was deemed methodologically suitable.

Sample of the Study

The sample of the study consisted of **191 Key Stage 2 teachers** (Grades 4 to 6) from the public elementary schools in the Schools Division of San Carlos City for School Year 2025–2026. These teachers were selected because Key Stage 2 requires more complex instructional design, digital integration, and assessment practices, making them appropriate respondents for examining teachers' competencies, digital-based teaching strategies, teaching quality, and instructional performance.

Sampling Technique

A **stratified random sampling technique** was employed. Stratified sampling is recommended when the target population contains distinct subgroups, ensuring that each group is proportionately represented (Fraenkel, Wallen, & Hyun, 2021). This procedure enhances the representativeness and precision of the findings (Creswell & Creswell, 2023).

Stratification Procedure

The total population of Key Stage 2 teachers in the division was divided into three strata:

1. **Grade 4 Teachers**
2. **Grade 5 Teachers**
3. **Grade 6 Teachers**

Each stratum was assigned a sample proportionate to its total number of teachers within the population. After determining the proportional allocation, the respondents were randomly selected using a random number generator to ensure unbiased selection within each grade level.

This sampling design ensured that all grade levels under Key Stage 2 were fairly represented, reducing sampling error and improving the reliability of correlation and regression analyses.

Adequacy of Sample Size for Regression Analysis

The sample size of **191 respondents** meets and exceeds the minimum requirement for regression analysis. According to Green's (1991) rule of thumb, the minimum sample size for regression should be:

$N \geq 50 + 8m$, where m = number of predictors

In this study, the primary predictors include teachers' competencies, digital-based teaching strategies, and teaching quality. With **three main predictors**, the minimum required sample would be:

$50 + 8(3) = 74$ respondents

Since the study gathered **191** respondents, the sample size is statistically adequate to perform correlational and regression analyses with high statistical power.

Pilot Testing

Before the full administration of the instrument, a **pilot test** was conducted with **30 Key Stage 2 teachers outside the locale of the study**. This step was done to ensure that:

- the items were clearly understood,
- the structure of the questionnaire was functional,
- the Likert-scale statements measured the intended constructs.

The pilot-test respondents were not part of the final sample to avoid contamination of data and ensure the independence of responses. Reliability testing (Cronbach's alpha) was computed for each subscale, and revisions were implemented based on feedback and statistical results.

Inclusion Criteria

Teachers were included if they:

1. were assigned to teach Grades 4–6 during SY 2025–2026;
2. held permanent, provisional, or contract-of-service teaching positions;
3. were willing to participate and gave informed consent.

Exclusion Criteria

Teachers were excluded if they:

1. were on leave during data collection;
2. were not handling Key Stage 2 classes;
3. declined to participate.

Measures

This study utilized a structured research instrument composed of four major scales representing the variables of the study: (a) teachers' competencies, (b) digital-based teaching strategies, (c) teaching quality, and (d) instructional performance. All scales were **adapted and**

modified from validated international instruments to ensure methodological rigor while aligning the content to the Philippine basic education setting, particularly Key Stage 2 instruction.

The full questionnaire consisted of **Likert-scale items (1–5)**, where:

1 = Strongly Disagree

2 = Disagree

3 = Neutral

4 = Agree

5 = Strongly Agree

The structure and content of each section are described below.

1. Teachers' Competencies Scale

Adapted from:

- DigCompEdu Framework (Redecker, 2020)
- TPACK Survey Instrument (Schmidt et al., 2009)
- Teacher Digital Competence Scale (Scherer & Siddiq, 2019)

This scale measured four sub-domains aligned to SOP No. 2:

1. ICT knowledge and digital skills
2. Pedagogical integration of technology
3. Motivation and openness to innovation
4. Availability and use of digital resources

Items focused on digital operations, instructional design using technology, adaptive use of digital tools, and reflective practice. Since the original tools were designed for diverse educational contexts, the items were modified to reflect **DepEd classroom realities**, availability of digital resources, and tasks aligned with Key Stage 2 instruction.

2. Digital-Based Teaching Strategies Scale

Adapted from:

- Florida Technology Integration Matrix (FCIT, 2019)
- Digital Pedagogy Activity Models (Bond et al., 2021)
- Martín-García et al. (2022) digital assessment practices

This scale measured four sub-areas aligned to SOP No. 3:

a. Technology-enhanced instructional design

b. Learner engagement and interaction strategies

c. Assessment and feedback using digital tools

d. Technology-supported differentiation

Items reflected teachers' digital strategy implementation, such as multimedia integration, game-based tasks, online assessment, digital collaboration, and differentiation through adaptive digital content.

Procedures

The conduct of the study followed a systematic and structured process to ensure accuracy, reliability, and ethical integrity. The procedures were implemented sequentially, beginning with securing institutional approval and culminating in the preparation of data for statistical analysis.

Data Processing

Data gathered from the respondents were encoded, organized, and analyzed using both **Microsoft Excel** and **IBM SPSS**. The processing procedures ensured accuracy, consistency, and compliance with the assumptions required for the statistical tests used in the study. Responses from online and printed questionnaires were combined in one dataset. Items were grouped according to the major variables: teachers' competencies, digital-based teaching strategies, teaching quality, and instructional performance.

Ethical Considerations

The researcher maintained professional integrity by ensuring honesty and accuracy in data collection and reporting, avoiding manipulation or falsification of results, acknowledging all adapted tools and sources,ensuring transparency in methodology, and

upholding respect for all respondents, school personnel, and institutions involved.

III. RESULTS AND DISCUSSION

This section presents the salient findings based on the research problems, beginning with the profile of the respondents.

Summary of Findings

This study examined the profile of 191 Key Stage 2 teachers and analyzed their levels of competencies, extent of digital-based teaching strategies, perceived teaching quality, and instructional performance. It further explored the relationships among these variables and identified the significant predictors of instructional performance. The findings are summarized below.

1**. Profile of Teacher-Respondents.** The respondents were predominantly mid-career teachers, mostly aged 31–40 and 41–50, female, married, and with substantial teaching experience. Nearly half had graduate-level qualifications, and 71% had participated in relevant ICT or pedagogy-related training.

This demographic composition reflects national trends where mid-career, female-dominated teaching workforces participate actively in professional development (UNESCO, 2022).

Prior studies emphasize that teaching experience and continuous training play essential roles in shaping digital readiness and professional competence (Darling-Hammond et al., 2020; Gümüş, 2022).

2. Teachers' Competencies Teachers demonstrated **high levels of competence** (overall mean = 4.17).

The highest-rated dimension was **Motivation and Openness to Innovation** (M = 4.33), indicating strong willingness to adopt technology and instructional innovations. ICT literacy and pedagogical integration were also rated high, suggesting a foundational readiness for technology-enabled learning.

Consistent with literature, teacher motivation is a critical determinant of effective ICT integration (Scherer et al., 2021), while digital competence serves as a prerequisite for high-quality instruction (Redecker, 2020).

However, **Availability and Use of Digital Resources** (M = 3.94) was the lowest, highlighting structural limitations. This supports global evidence showing that ICT integration is often constrained by resource disparities within public schools (UNESCO, 2022).

3. Extent of Digital-Based Teaching Strategies Teachers reported a **high extent** of digital-based instructional practices (overall mean = 4.06).

Strongest implementation was noted in **Learner Engagement and Interaction** (M = 4.15) and **Technology-Enhanced Instructional Design** (M = 4.09).

Digital assessment, differentiation, and the use of multimedia tools were also implemented at high levels.

These results align with the argument that technology enriches learner engagement, enables interactive learning environments, and supports diversified instruction (Tondeur et al., 2020). However, slightly lower scores in technology-supported differentiation indicate persistent challenges in applying ICT for individualized learning, consistent with findings that differentiation remains a globally difficult area for teachers even with technology (Tomlinson, 2017).

Perceived Teaching Quality **Teaching quality was rated** high **overall (M = 4.16). The highest rating was** Instructional Delivery and Clarity **(M = 4.27, Very High), suggesting that teachers effectively communicate concepts and facilitate learning.**

Learner engagement, assessment practices, and inclusive instruction were also rated high. These findings support the premise that technology-enhanced pedagogies and strong planning contribute to improved instructional clarity and learner engagement (Kyriakides et al., 2023).

5. Instructional Performance (IPCRF/OPCRF)

Teachers' instructional performance was rated **Very Satisfactory** overall (M = 4.23). The highest-performing dimension was **Professional Development & Ethics** (M = 4.30, Outstanding), demonstrating strong commitment to lifelong learning and adherence to professional standards.

High performance in lesson planning, delivery, assessment, and learner support reflects alignment with the Philippine Professional Standards for Teachers (NEAP, 2022).This aligns with prior studies underscoring the link between continuous learning and improved instructional practice (Darling-Hammond et al., 2020).

6. Relationship Between Teacher Profile and Major Variables. Correlation analysis revealed that **Years of Experience** and **Trainings Attended** were **significantly related** to teachers' competencies, digital strategies, teaching quality, and instructional performance ($p < .05$).Meanwhile, **age, sex, and civil status** showed no significant relationships.These findings affirm existing research that experience and professional development are strong contributors to teacher effectiveness and digital competence (Tondeur et al., 2020; Kyriakides et al., 2023), while demographic variables typically do not predict performance outcomes (UNESCO, 2022).

7. Interrelationships Among the Four Major Variables. All relationships among the four variables were **positive, strong, and significant** ($p < .05$). The strongest association was observed between **Teaching Quality and Instructional Performance** ($r = .734$), followed by competencies and digital strategies.This supports evidence that teacher competence and pedagogical quality are strong drivers of classroom performance (Darling-Hammond et al., 2020), and that digital strategies enhance teaching quality, learner engagement, and instructional delivery (Scherer et al., 2021).

8. Predictors of Instructional Performance. Regression results showed that **65.9% (R^2 = .659)** of instructional performance is explained by Teachers' Competencies, Digital-Based Strategies, and Teaching Quality. All three predictors were significant; however: Teaching Quality emerged as the strongest predictor **(**β = .402, p = .000), followed by**:**

- **Teachers' Competencies** (β = .371, p = .001)
- **Digital-Based Strategies** (β = .329, p = .002)

These results reinforce international evidence that high-quality teaching practices have the greatest influence on instructional success and student outcomes (Darling-Hammond et al., 2020; Kyriakides et al., 2023).

Similarly, competencies and digital strategies contribute significantly to effective instruction, aligning with frameworks of digital pedagogy and teacher professional standards (Redecker, 2020).

IV. CONCLUSIONS

Based on the results of the study, several key conclusions emerge regarding teachers' competencies, digital-based teaching strategies, teaching quality, and instructional performance among Key Stage 2 teachers in the Schools Division of San Carlos City.

First, the teachers exhibit **high levels of competencies**, particularly in motivation and openness to innovation, ICT knowledge, and pedagogical integration of technology. These findings confirm that teachers in the division possess a strong foundation for implementing technology-enabled teaching, consistent with literature emphasizing the role of digital competence in effective pedagogical practice (Redecker, 2020; Scherer et al., 2021).

Second, the teachers demonstrate a **high extent of digital-based teaching strategies**, especially in fostering learner engagement and designing technology-enhanced instruction. This

reflects increasing teacher capability in integrating digital tools to support interactive and multimodal learning environments, aligning with global trends on technology-enhanced pedagogy (Tondeur et al., 2020).

Third, the respondents report **high levels of teaching quality**, with very high ratings in instructional delivery and clarity. This indicates that teachers effectively communicate instruction, organize learning tasks, and foster engagement—practices identified as essential to high-quality teaching (Kyriakides et al., 2023). The high teaching quality subsequently contributes to their **very satisfactory overall instructional performance**, with outstanding performance in professional development and ethics, underscoring teachers' strong commitment to lifelong learning (Darling-Hammond et al., 2020).

Fourth, consistent with prior research, profile variables such as **age, sex, and civil status** do not significantly influence competencies, strategies, or performance (UNESCO, 2022). Instead, **years of teaching experience** and **participation in professional development training** were found to significantly enhance teachers' competencies, digital strategies, teaching quality, and instructional performance. These findings highlight the importance of accumulated professional expertise and continuous learning in improving pedagogical outcomes (Tondeur et al., 2020; Darling-Hammond et al., 2020).

Fifth, the study reveals **strong, positive, and significant relationships** among the four major variables, validating the study's IPO framework. Teachers' competencies serve as the primary **input**, enabling teachers to effectively employ digital-based strategies as the **process**, resulting in enhanced teaching quality and improved instructional performance as the **output**. These interrelationships affirm theoretical models indicating that digital competence, technological integration, and pedagogical quality are mutually reinforcing (Scherer et al., 2021).

Finally, regression analysis identifies **teaching quality as the strongest predictor** of instructional performance, followed by teachers' competencies and digital-based strategies. This reinforces global evidence that high-quality teaching—characterized by clear instruction, differentiation, engagement, and effective assessment—has the greatest influence on learner outcomes (Kyriakides et al., 2023; Darling-Hammond et al., 2020). While digital strategies support

instructional improvement, it is ultimately the quality of teaching practices that most powerfully elevates performance.

Overall, the study concludes that **strengthening teacher competencies and digital pedagogy, supported by sustained professional development and robust instructional leadership, is crucial in enhancing teaching quality and instructional performance**. The findings provide a strong basis for designing a contextualized professional development program tailored to the needs of Key Stage 2 teachers in the Schools Division of San Carlos City.

REFERENCES

[1.] AbouJabal, R. (2023). Digital competence among teachers in Jordanian private schools based on the DigCompEdu framework (Unpublished master's thesis).
[2.] Alayan, A. (2022). School heads' technological leadership and ICT integration of teachers in the Division of Quezon. Philippine E-Journals.
[3.] Al-Rsa, A. (2024). Teaching performance quality and its relationship to students' perceptions in Jordan. Journal of Educational Evaluation, 12(3), 44–59.
[4.] Anderson, T. (2021). Inclusive education and teacher preparedness: A conceptual overview. Journal of Special Education Practice, 18(2), 101–115.
[5.] Bancifra, M. (2022). Supervisory practices and teachers' performance based on the IPCRF in public elementary schools. Asia Pacific Journal of Education and Human Development, 8(1), 22–34.
[6.] Basilotta-Gómez-Pablos, V., García-Valcárcel, A., & Casillas-Martín, S. (2022). Digital competence among teachers: A comparative analysis across training backgrounds. Contemporary Educational Technology, 14(3), Article ep367.
[7.] Bennett, C. (2021). Seminars and their role in professional development: A review. Journal of Professional Learning, 5(2), 45–60.
[8.] Bond, M., et al. (2021). Digital learning strategies and student engagement: A systematic review. Educational Technology Research and Development, 69(2), 985–1007.
[9.] Caoile, R. (2024). Technology integration, teaching effectiveness, and teacher performance in Sirawai District (Master's thesis). ResearchGate.
[10.] Campado, J. (2023). Assistive technologies and inclusive instruction among Filipino teachers. International Journal of Professional Development, 4(1), 75–90.
[11.] Caratiquit, J. (2023). ICT competence and techno-efficacy among teachers in Philippine public schools. Journal of Instructional Pedagogy, 12(4), 55–70.
[12.] Casilao, M. (2025). Digital competence and technology integration among teachers in Passi City, Iloilo. International Journal of Social Management Studies, 9(1), 44–62.
[13.] Cestina, R. (2023). Teaching performance and its correlates among elementary teachers. DergiPark Journal of Education, 15(2), 212–225.
[14.] Cochrane, T., et al. (2020). Collaborative digital tools and pedagogical engagement. Australasian Journal of Educational Technology, 36(4), 27–45.
[15.] Crompton, H., & Burke, D. (2021). Mobile learning and student collaboration: A conceptual synthesis. Interactive Learning Environments, 29(7), 1123–1138.
[16.] Cruz, A. (2021). Teacher-learner interaction in blended learning environments. Philippine Journal of Open Learning, 5(1), 77–89.
[17.] Cruz, E. (2025). Digital competence and instructional practices of Araling Panlipunan teachers. Philippine E-Journals.
[18.] Darling-Hammond, L., et al. (2020). Educator competencies for the 21st century. Journal of Teacher Education, 71(5), 550–568.
[19.] Deci, E., & Ryan, R. (2020). Self-determination theory: Basic psychological needs in motivation, development, and wellness. Guilford Press.
[20.] Del Mundo, J. (2021). In-service training and teacher professional development in the Philippine context. Philippine Normal University Journal on Teacher Education, 9(1), 89–103.

[21.] Del Rosario, M. (2023). Learner population profiling in educational research. Educational Measurement Journal, 7(2), 33–44.
[22.] Delos Santos, A. (2021). Radio-based instruction in rural communities: Challenges and innovations. Journal of Alternative Learning Modalities, 3(1), 42–59.
[23.] Demissie, T. (2022). TPACK competencies and technology integration among Ethiopian teachers. ScienceDirect – Computers & Education, 182, 104–120.
[24.] Fajardo, M., & Torres, R. (2023). Digital pedagogy as a predictor of teacher performance in Philippine public schools. Asia Pacific Research Education Journal, 3(2), 44–58.
[25.] García-Peñalvo, F. (2021). Digital assessment literacy in the post-pandemic classroom. Computers in Human Behavior, 122, 106–126.
[26.] Gonzales, P. (2021). Digital platforms in Philippine education. Journal of ICT in Learning, 4(2), 65–78.
[27.] Gümüş, S. (2022). Teacher digital competence: Scale development and validation. Journal of Educational Technology, 40(1), 55–78.
[28.] Hammond, T., et al. (2021). Professional learning communities and digital competence development. Teaching and Teacher Education, 105, 103–151.
[29.] Hattie, J. (2023). Visible learning: A synthesis of meta-analyses on achievement (Updated ed.). Routledge.
[30.] Ifenthaler, D., & Egloffstein, M. (2020). Digital differentiation and adaptive learning systems. Education and Information Technologies, 25(5), 3655–3670.
[31.] Ifenthaler, D., & Schweinbenz, V. (2021). Motivation and digital pedagogy adoption among teachers. Journal of Computer-Assisted Learning, 37(3), 635–650.
[32.] Javier, M. (2021). Digital teaching practices of Filipino high school teachers during the pandemic. ERIC.
[33.] Koehler, M., & Mishra, P. (2009). What is TPACK? Teachers College Record, 111(7), 173–198.
[34.] Kraft, M., & Papay, J. (2020). Professional growth and teacher performance. Educational Researcher, 49(4), 1–15.
[35.] Kyriakides, L., et al. (2023). Dynamic model of educational effectiveness: Updated synthesis. School Effectiveness and School Improvement, 34(1), 1–25.
[36.] Lopez, A. (2023). Understanding demographic variables in social research. Journal of Human Development Studies, 14(1), 22–35.
[37.] López-Belmonte, J., et al. (2021). Flipped classroom and digital competencies in K–12 education. Educational Research International, 2021, 1–11.
[38.] Maulana, R. (2025). Digital teaching quality in Southeast Asian classrooms. Asia-Pacific Educational Review, 26(1), 55–70.
[39.] Manila Bulletin. (2024). DepEd reports nationwide enrollment for SY 2024–2025.
[40.] Martínez, L. (2022). Technology-enhanced learning environments. Global Journal of Innovations in Education, 6(2), 112–130.
[41.] Martín-García, A., et al. (2022). Online formative assessment and instructional quality. Journal of Primary Education Technology, 15(4), 99–119.
[42.] Merritt, S., et al. (2020). Digital engagement and learning motivation. Computers & Education, 152, 103–115.
[43.] Momdjian, N. (2024). Teachers' digital competence in Lebanon. Middle East Journal of Educational Technology, 10(2), 65–80.

[44.] Montales, J. C., & Digo, G. (2024). Administrative workload and school leadership effectiveness. Philippine Educational Leadership Review, 12(1), 1–18.
[45.] Montilla, D. (2023). Pedagogical digital competence and student motivation. Philippine E-Journals.
[46.] Morgan, T. (2021). Academic specialization and labor market demands. Journal of Higher Education Studies, 11(3), 44–59.
[47.] Navarro, C. (2021). Educational TV programs as alternative learning delivery. Philippine Journal of Media Literacy, 2(1), 18–29.
[48.] Natividad, J., & Santiago, R. (2022). ICT readiness among Philippine teachers. Journal of Educational Innovations, 5(2), 55–72.
[49.] Nuere, S., & de Miguel, L. (2020). Digital pedagogy and teacher performance ratings. Computers & Education, 159, 104–112.
[50.] OECD. (2021). Digital Education Outlook 2021. OECD Publishing.
[51.] OECD. (2023). Teachers and Technology Use in Education. OECD Policy Briefs.
[52.] Overa, D. (2024). Teaching effectiveness and students' academic performance in Piñan National High School (Unpublished master's thesis).
[53.] Paglinawan, E., & Decir, A. (2024). Communication competence and organizational commitment in SIP implementation. Journal of Educational Management, 9(1), 77–91.
[54.] Palaoag, T., et al. (2023). Digital readiness of teachers in Philippine rural schools. Journal of ICT Education, 13(2), 44–59.
[55.] Peters, M. (2022). Meta-analysis on digital competence and teaching effectiveness. Educational Technology & Society, 25(3), 127–141.
[56.] Peterson, J., & Chang, A. (2021). Models of teaching experience in credentialing systems. Teacher Education Quarterly, 48(2), 1–18.
[57.] Petko, D., et al. (2022). Digital competence and instructional quality. Education and Information Technologies, 27, 1375–1399.
[58.] Pham, T., & Dang, V. (2022). Digital self-efficacy and technology integration. ASEAN Journal of Education, 9(3), 22–40.
[59.] Puentedura, R. (2020). The SAMR Model: A guide for transforming learning. Ruben R. Puentedura Publications.
[60.] Redecker, C. (2020). European Framework for the Digital Competence of Educators (DigCompEdu). Joint Research Centre.
[61.] Reisoğlu, İ., & Çebi, A. (2020). Digital learning and multimodal instruction. Technology, Pedagogy and Education, 29(3), 387–405.
[62.] Reyes, C. (2021). Distance learning modalities in Philippine public schools. Journal of Education Continuity, 4(1), 55–70.
[63.] Rivera, M. (2021). Defining teaching experience in modern education. Global Journal of Teacher Education, 12(2), 66–82.
[64.] Salas-Pilco, S., & Yang, Y. (2022). Digital pedagogy and teaching quality across contexts. Computers & Education, 180, 104–124.
[65.] Santos, L. (2021). Teacher in-service training and curricular reforms. Philippine Normal University Research Journal, 6(1), 90–105.
[66.] Scherer, R., & Siddiq, F. (2019). Digital self-efficacy and integration behaviors. Computers & Education, 136, 122–140.

[67.] Scherer, R., et al. (2021). Motivation and digital technology adoption among teachers. Teaching and Teacher Education, 103, 103–149.
[68.] Schmidt, D., et al. (2009). Technological Pedagogical Content Knowledge survey development. Journal of Research on Technology in Education, 42(2), 123–149.
[69.] Schunk, D., & Pajares, F. (2017). Self-efficacy and teacher learning environments. Review of Educational Psychology, 37(1), 135–155.
[70.] Servancia, O. (2025). Digital competence and action research capability among Maramag teachers. Journal of Instructional Pedagogy, 11(2), 1–20.
[71.] Shernoff, D., et al. (2020). Engagement and digital learning environments. Journal of Educational Psychology, 112(6), 1085–1100.
[72.] Siddiq, F., & Scherer, R. (2019). Teacher digital competence and instructional integration. Computers & Education, 142, 103–118.
[73.] Taylor, B. (2022). Project-based and competency-based learning innovations. Educational Reform Review, 18(3), 44–62.
[74.] Teig, N., et al. (2024). Teacher motivation and digital teaching quality. Journal of Instructional Sciences, 33(1), 1–19.
[75.] Thompson, R. (2023). Sex, gender, and demographic variables in research. Journal of Social Science Methods, 42(2), 55–70.
[76.] Tondeur, J., et al. (2020). Teacher beliefs and pedagogical technology integration. Educational Technology & Society, 23(1), 47–61.
[77.] Tomlinson, C. (2021). Differentiated classroom: Responding to the needs of all learners (Updated ed.). ASCD.
[78.] Voogt, J., et al. (2020). Teacher professional learning for digital competence. Journal of Professional Capital and Community, 5(4), 349–365.
[79.] Wilson, M. (2017). Educational attainment and human capital development. Journal of Comparative Education, 53(4), 455–475.
[80.] Wimmer, H. (2019). Modular learning systems: Foundations and practices. Journal of Distributed Education, 29(1), 20–33.
[81.] Zevallos, P. (2018). Digital competence and teaching practices among private school teachers in Peru. OAPub.
[82.] Zhu, X., & Liu, Z. (2020). Digital transformation and teacher disparities in Asia. Asian Education Studies, 5(2), 33–49.