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Research Article

Digital Competence and Influencing Factors Among Elementary Teachers in Zambales: Basis for a Capacity-Building Program

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ABSTRACT

Digital competence is essential for teachers in today's technology-driven educational landscape. This study assessed the level of digital competence among elementary school teachers in Zone III, Division of Zambales, and examined factors influencing their digital proficiency. Anchored on the DigComp 2.2 Framework, the research focused on six competence areas: professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence. A descriptive research design was employed, involving 160 teachers from selected large public elementary schools who responded to a validated and adapted questionnaire. Data were analyzed using frequency, percentage, weighted mean, analysis of variance, and Pearson r correlation. Results revealed that most respondents were female, in middle adulthood, and in the mid-career stage. While teachers demonstrated moderately high levels of self-reported digital competence, findings also showed a statistically significant gap in formal institutional training related to digital integration, indicating reliance on experiential and self-directed learning rather than structured professional development. Significant differences in digital competence were found when respondents were grouped according to age, years of teaching experience, and training exposure. Moreover, moderate relationships existed between digital competence and perceived usefulness, ease of use, availability of infrastructure, and access to digital tools. Based on the findings, an intervention program emphasizing structured training, mentoring, and improved access to digital resources was proposed to support sustained improvement in teaching effectiveness in schools.

Keywords: *Digital Competence; Elementary School Teachers; DigComp 2.2 Framework; ICT Integration; Teaching and Learning; Professional Development; Digital Literacy; Public Elementary Schools; Zone III, Division of Zambales*

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Background

Digital competency is a vital component of effective teaching and learning in the 21st century, particularly as technology continues to reshape educational delivery worldwide. The European Commission's DigComp 2.2 Framework emphasizes the ability to use digital tools confidently, responsibly, and effectively across professional and learning contexts, positioning digital competence as a foundation for lifelong learning and adaptability (Ghomi & Redecker, 2019). Empirical studies affirm that teachers' digital skills significantly influence instructional quality, learner engagement, and the effective integration of technology in teaching and assessment (Aldeeb, 2018). International evidence further indicates that digital competence varies across demographic variables such as age and gender, with younger and male teachers often demonstrating higher proficiency levels (Sanchez et al., 2020).

In the Asian context, including the Philippines, strengthening teachers' digital competence has become a strategic priority in advancing educational quality and equity. The Department of Education (DepEd) has implemented various ICT integration and professional development initiatives (Lucenario et al., 2016), aligning with the United Nations Sustainable Development Goal 4, which promotes inclusive, equitable, and quality education for all (OECD, 2020; UNESCO, 2019). However, despite these efforts, Filipino teachers—particularly at the elementary level—continue to face persistent challenges such as limited formal training, uneven access to digital infrastructure, and varying levels of readiness to integrate technology into pedagogy.

These challenges have direct implications for the successful implementation of the DepEd MATATAG Agenda, which prioritizes (a) strengthening foundational skills, (b) improving teaching quality, and (c) ensuring resilient and future-ready learners. At the elementary level, insufficient digital competence among teachers hinders the effective use of technology-supported instructional strategies, limits innovative assessment practices, and constrains opportunities to develop learners' early digital literacy and critical thinking skills. Consequently, gaps in teachers' digital competence may weaken the delivery of foundational learning competencies that the MATATAG Agenda seeks to reinforce.

Recognizing this, DepEd has issued policy directives to accelerate digital transformation in basic education. DepEd Order No. 16, s. 2023 revises the guidelines of the Department of Education Computerization Program (DCP), emphasizing the systematic integration of ICT resources in public schools to support teaching and learning processes (Marjuni & Suban, 2020). Similarly, DepEd Memorandum No. 39, s. 2023 provides guidance on the pedagogical use of digital arts and multimedia tools to enhance learner engagement and instructional effectiveness (Sarmiento & Oracion, 2019). However, the mere provision of digital infrastructure and policy guidance does not guarantee meaningful technology integration without corresponding teacher competence and sustained professional development.

Aligned with these national priorities, this study addresses existing disparities in access to digital tools and training among elementary schools where some institutions demonstrate successful technology adoption while others struggle due to limited resources and inadequate teacher preparation. By assessing the level of digital competence among elementary school teachers in Zone III, Division of Zambales, and identifying factors influencing their digital skills, this research aims to provide empirical evidence that can inform targeted interventions. Such interventions are intended to strengthen teachers' digital competence, support the effective implementation of the MATATAG Agenda at the foundational level, and ultimately enhance learners' academic performance and readiness for a technology-driven society.

influencing their digital skills, and develop an intervention program designed to capacitate teachers and support improved learning outcomes.

Statement of the Problem

The study aimed to assess the elementary teachers' digital competence, and factors affecting their digital competence level in Zone III, Division of Zambales.

Specifically, it seeks to answer the following questions:

1. What is the profile of the elementary teachers in terms of:
   1.1 Sex;
   1.2 Age;
   1.3 Position;
   1.4 Highest Educational Attainment; and
   1.5 Years in teaching; and
   1.6 Trainings in Digitalization of technology integration in class?
2. What is the level of elementary teachers' digital competence in terms of:
   2.1 Professional Engagement;
   2.2 Digital Resources;
   2.3 Teaching and Learning;
   2.4 Assessment;
   2.5 Empowering Learners; and
   2.6 Facilitating Learners' Digital Competence?
3. How may the factors affecting the elementary teachers' digital competence level may be described as to:
   3.1 Perceived usefulness;
   3.2 Ease of use;
   3.3 Subjective Norms;
   3.4 Infrastructure; and
   3.5 Access to Digital Tools?
4. Is there a significant difference in the elementary teachers' digital competence when grouped according to profile variables?
5. Is there a significant difference in the assessed factors affecting the elementary teachers' digital competence when grouped according to profile variables?
6. Is there a significant relationship between the elementary teachers assessed digital competence and factors affecting the elementary teachers' digital competence?
7. What intervention program on digital competence may be proposed based on the results of the study?

Research Design

This study used the descriptive research design, and a survey questionnaire was used to gather responses on elementary teachers' digital competence and the factors affecting their digital competence. McCombes (2021) defined descriptive research as a type of research that aims to accurately and systematically describe a population, situation, or phenomenon. It can answer questions about what, where, when, and how, but not why. Descriptive research involves observing and describing the behavior of a subject without influencing it in any way. It is used to obtain information concerning the current status of phenomena and to describe "what exists" with respect to variables or conditions in a situation (APA Dictionary of Psychology, n.d.).

Respondents and Location

There were 160 elementary teachers as respondents of the study. The research employed the cluster sampling technique. Cluster sampling is a probability sampling method in which the researcher divides the population into separate groups, called clusters, and then selects a random sample of these clusters to analyze (Booth et al., 2021). This technique is particularly useful when studying large, geographically dispersed populations, as it enhances feasibility and reduces costs associated with data collection.

The researcher used three big public elementary schools as classified by the Schools Division of Zambales. Universal sampling was applied within the selected schools, wherein all elementary teachers were included as respondents. The study was conducted in big schools in Zone III, Division of Zambales, with four districts: Cabangan, San Felipe, San Narciso, and San Antonio. By conducting the study in these diverse districts, the research captured a wide range of perspectives on digital competence and the factors affecting teachers' digital competence levels. This approach ensures that the findings are representative of the entire Zone III in the province of Zambales.

Research Instruments

The research instrument was the main tool used in data collection. The researcher adapted a research instrument on digital competence and the factors affecting teachers' digital competence levels. It consisted of three parts:

- **Part I** covered the profile of elementary teachers in terms of sex, age, position, highest educational attainment, years in teaching, and training in digitalization and technology integration in class.

- **Part II** assessed digital competence in terms of professional engagement, digital resources, teaching and learning, assessment, empowering learners, and facilitating learners' digital competence using a 5-point Likert scale.
- **Part III** examined the factors affecting teachers' digital competence in terms of usefulness, ease of use, subjective norms, infrastructure, and access to digital tools using a 4-point Likert scale.

The questionnaire underwent validity and reliability testing. Ranganathan and Caduff (2023) emphasized that researcher-designed questionnaires must undergo validation to ensure they accurately and reliably measure intended variables. For face validity, the researcher sought suggestions from expert panel members to improve the content of the questionnaire prior to administration. After incorporating the experts' recommendations, a pilot test was conducted among 15 teachers in Zone II, Schools Division of Zambales. Cronbach's alpha was used to determine the reliability of the instrument, and the results confirmed its acceptability for administration.

Data Collection

Prior to data collection, the researcher sought approval from the thesis adviser and the Graduate School dean. A request letter was submitted to the Office of the Schools Division Superintendent for endorsement. Upon approval, coordination with school heads was conducted to facilitate questionnaire distribution. The objectives of the study and instructions were clearly explained to the respondents, and confidentiality of responses was ensured. Data collection was completed within 3 weeks. After retrieving the accomplished questionnaires, responses were encoded into Microsoft Excel and forwarded to a statistician for data processing. Interpretation of results was conducted with the guidance of the statistician and the thesis adviser.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) and Microsoft Excel were used for data computation and interpretation. The following statistical tools were employed:

1. **Frequency and Percentage Distribution:** To describe the respondents' profile, digital competence, and factors affecting digital competence.
2. **Weighted Mean:** To determine the level of digital competence and factors affecting digital competence.
3. **Analysis of Variance (ANOVA):** To test significant differences in digital competence and factors affecting digital competence when grouped according to profile variables.
4. **Pearson Product-Moment Correlation Coefficient (*r*):** To determine the significant relationship between digital competence and factors affecting digital competence and academic performance.

The interpretation of correlation coefficient values followed the guidelines of Zulueta and Costales (2019).

Result and Discussion

This chapter presents and analyzes the collected data using tabular formats, offering clear and detailed insights into the problems identified in Chapter 1.

1. Profile of the Respondents

The frequency and percentage distribution of the respondents' profile as to sex, age, position, highest educational attainment and years in teaching is shown in Table 2.

Table 2 profile of the respondents

Profile Variable	Category	Frequency	Percentage (%)
Sex	Male	23	14.38
	Female	137	85.63
	Total	**160**	**100.00**
Age	21–24 years old	2	1.25
	25–34 years old	37	23.13
	35–44 years old	47	29.38

Profile Variable	Category	Frequency	Percentage (%)
	45–54 years old	51	31.88
	55–64 years old	23	14.38
	Total	**160**	**100.00**
Position	Teacher I	73	45.63
	Teacher II	29	18.13
	Teacher III	44	27.50
	Master Teacher I	9	5.63
	Master Teacher II	3	1.88
	Master Teacher III	2	1.25
	Total	**160**	**100.00**
Highest Educational Attainment	BS/BA Degree	40	25.00
	With MA/MS Units	93	58.13
	MA/MS Degree	15	9.38
	With PhD/EdD Units	7	4.38
	PhD/EdD Degree	5	3.13
	Total	**160**	**100.00**
Years in Teaching	0–4 years	20	12.50
	5–9 years	36	22.50
	10–14 years	31	19.38
	15–19 years	12	7.50
	20–24 years	30	18.75
	25–29 years	17	10.63
	30–34 years	11	6.88
	35 years and above	3	1.88
	Total	**160**	**100.00**
Trainings in Digitalization of Technology Integration	1–2 trainings	66	41.25
	3–4 trainings	44	27.50
	4–5 trainings	38	23.75
	6–7 trainings	6	3.75
	8–9 trainings	6	3.75
	Total	**160**	**100.00**

The profile of the 160 elementary teacher-respondents in Zone III, Division of Zambales reflects a workforce that is predominantly female, largely mid- to late-career, academically progressive, and moderately exposed to digital training.

Sex. The overwhelming majority of respondents are female, confirming that elementary education remains a female-dominated profession. This pattern is consistent with both local and international findings, which attribute the feminization of elementary teaching to traditional gender roles and the nurturing nature associated with early-grade instruction (Daud & Bakar, 2021; Montero-Mesa et al., 2023). While this trend highlights women's central role in basic education, it also suggests the need for more gender-balanced recruitment policies to promote inclusivity and diversity in the teaching workforce.

Age. With respect to age, most respondents belong to the 35 to 54 age range, indicating that the teaching force is largely composed of experienced, mid- to late-career professionals. This age distribution suggests stability and accumulated pedagogical expertise, which can positively influence instructional quality and mentoring within schools. Experienced teachers are known to demonstrate stronger classroom management skills and deeper pedagogical understanding, contributing to improved student outcomes (Ramos et al., 2022). However, the relatively small number of younger teachers mirrors national and international concerns

regarding an aging teaching population and highlights the need for sustained recruitment and retention strategies (Rani et al., 2023; Kiryakova & Kozhuharova, 2024).

Professional Position. In terms of position, most respondents hold the Teacher I rank, followed by Teacher III and Teacher II, with only a small proportion occupying Master Teacher positions. This distribution suggests that many teachers remain in entry-level or lower-ranking positions for extended periods, often due to limited promotion opportunities and structural constraints within the system. The Teacher I position serves as the foundation of instructional delivery in Philippine public schools, where competencies are developed through experience and continuous professional learning (Althubyani, 2024). However, limited upward mobility may affect motivation and long-term professional growth, as promotion is closely tied to mastery of pedagogical skills and advanced educational qualifications (Vongkulluksn et al., 2018; Sanchez et al., 2020; Bem-Haja et al., 2021).

Educational Attainment and Experience. Regarding highest educational attainment, a majority of respondents possess MA/MS units, while fewer have completed graduate or doctoral degrees. This indicates motivation for professional growth and aligns with findings that teachers with advanced education often demonstrate stronger instructional practices and student engagement strategies (Zhao et al., 2021; Momdjian et al., 2024). Years in teaching are concentrated in the 5 to 14 and 20 to 24-year brackets, emphasizing the critical role of mid-career teachers in sustaining instructional quality and mentoring junior teachers (Korkmaz & Akçay, 2023; Yang et al., 2022).

Digital Training Exposure. Finally, exposure to digitalization training is limited for many, with most respondents attending only one or two programs. This suggests gaps in professional development and highlights the need for enhanced digital capacity-building programs to improve technology integration in classrooms (Lucas et al., 2022; Canonizado, 2024; Pozo et al., 2024; Palacios-Rodríguez et al., 2024). Overall, the findings underscore the importance of continuous, targeted professional development, equitable promotion pathways, and strengthened digital capacity-building programs to enhance teacher effectiveness in Zone III, Division of Zambales.

2. Level of Elementary Teacher's Digital Competence

Summary on the Level of Elementary Teacher's Digital Competence

The summary on the level of elementary teacher's digital competence is shown in Table 3.

Table 3. Summary on the Level of Elementary Teacher's Digital Competence

Digital Competence	Mean	Descriptive Rating	Rank
Professional Engagement	4.13	Moderately high level of competence	1
Digital Resources	3.92	Moderately high level of competence	3
Teaching and Learning	4.03	Moderately high level of competence	2
Assessment	3.89	Moderately high level of competence	4
Empowering Learners	3.81	Moderately high level of competence	6
Facilitating Learner's Digital Competence	3.88	Moderately high level of competence	5
Overall Weighted Mean	**3.94**	**Moderately high level of competence**	

Elementary teachers showed a moderately high level of competence in professional development (mean = 4.13, ranked 1st); teaching and learning (4.03, ranked 2nd); digital resources (3.92, ranked 3rd); assessment (3.89, ranked 4th); facilitating learners' digital competence (3.88, ranked 5th); and empowering learners (3.81, ranked 6th). Overall, the teachers' digital competence has a weighted mean of 3.94, indicating active engagement in professional growth.

This high level of professional development participation positively influences teaching practices and student outcomes (Monteiro et al., 2020). While teachers are confident in using technology for professional development and

teaching, ongoing training is needed to enhance their ability to empower students and foster digital literacy (Paquinol et al., 2024; Ghomi & Redecker, 2019). Moderate competence in digital resources suggests teachers are comfortable using digital tools, but further exploration of personalized content and emerging technologies, such as artificial intelligence, could improve engagement and instructional quality (Guillen-Gámez et al., 2021).

3. Factors Affecting the Elementary Teachers' Digital Competence Level

Summary on the Factors Affecting the Elementary Teachers' Digital Competence Level

The summary on factors affecting the elementary teachers' digital competence level is shown in Table 4.

Table 4. Summary on the Factors Affecting the Elementary Teachers' Digital Competence Level

Digital Competence Level	Mean	Descriptive Rating	Rank
Perceived Usefulness	3.67	Agree	1
Ease of Use	3.66	Agree	2
Subjective Norms	3.60	Agree	3
Infrastructure	3.38	Agree	4
Access to Digital Tools	3.30	Agree	5
Overall Weighted Mean	**3.52**	**Agree**	

Teachers generally agreed that **perceived usefulness** ($\bar{x}$ = 3.67) and **perceived ease of use** ($\bar{x}$ = 3.66) most strongly influence their digital competence, followed by subjective norms, infrastructure, and access to digital tools. These findings suggest that teachers are more likely to integrate digital technologies into instruction when they perceive them as beneficial and easy to use, consistent with the Technology Acceptance Model (TAM) (Davis, 1989; Venkatesh & Davis, 2000).

Subjective norms, including support from peers and school leaders, also contribute to digital adoption, reinforcing the importance of collaborative professional environments (Venkatesh et al., 2003). Although infrastructure and access received comparatively lower ratings, they remain essential enabling conditions. The findings underscore the need for adequate technological resources and sustained professional development to strengthen teachers' digital competence (Ertmer & Ottenbreit-Leftwich, 2010; Tondeur et al., 2017).

Overall, both personal beliefs and contextual factors shape digital competence, consistent with the Technology Acceptance Model (TAM) (Davis, 1989). Studies confirm that teachers actively use digital tools for content creation, student engagement, and feedback but continue to face challenges related to skill gaps and limited technological resources

4. Test of Significant Difference on Level of Elementary Teacher's Digital Competence in terms of Professional Engagement When Grouped According to Profile Variables

4.1 Professional Engagement

The test of significant difference in the level of elementary teacher's digital competence in terms of professional engagement when grouped according to profile variables is shown in Table 5.

Table 5. Test of Significant Difference in the Level of Elementary Teacher's Digital Competence in terms of Professional Engagement When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	1.08	0.30	Accept Ho
	Within Groups	158			Not Significant

Source of Variations		df	F	Sig.	Decision/ Interpretation
	Total	159			
Age	Between Groups	4	7.53	0.00	**Reject Ho Significant**
	Within Groups	155			
	Total	159			
Position	Between Groups	5	0.89	0.49	Accept Ho Not Significant
	Within Groups	154			
	Total	159			
Highest Educational Attainment	Between Groups	4	1.43	0.23	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	3.87	0.00	**Reject Ho Significant**
	Within Groups	152			
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	3.18	0.02	**Reject Ho Significant**
	Within Groups	155			
	Total	159			

The results indicate no significant difference in professional engagement based on sex, position, or highest educational attainment (Sig. > 0.05), suggesting comparable engagement across these groups (Spante et al., 2018; Tiria & Caballes, 2020; Dias-Trindade & Albuquerque, 2022). Conversely, age, years in teaching, and digital training significantly influenced engagement ($p < .05$). These findings indicate that younger teachers, those with fewer years of experience, or those with greater exposure to digital training tend to exhibit higher levels of professional engagement (Guillen-Gomez et al., 2021; Al-Khasawneh & Tubaishat, 2020).

4.2 Digital Resources

The test of significant difference in the level of elementary teacher's digital competence in terms of digital resources when grouped according to profile variables is shown in Table 6.

Table 6. Test of Significant Difference in the Level of Elementary Teacher's Digital Competence in terms of Digital Resources When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	0.00	0.96	Accept Ho Not Significant
	Within Groups	158			
	Total	159			
Age	Between Groups	4	3.43	0.01	**Reject Ho Significant**
	Within Groups	155			
	Total	159			
Position	Between Groups	5	1.63	0.15	Accept Ho Not Significant
	Within Groups	154			
	Total	159			
Highest Educational Attainment	Between Groups	4	0.68	0.61	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	2.74	0.01	**Reject Ho Significant**
	Within Groups	152			

Source of Variations		df	F	Sig.	Decision/ Interpretation
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	2.70	0.03	**Reject Ho Significant**
	Within Groups	155			
	Total	159			

Teachers' competence in using digital resources did not significantly differ according to sex, professional position, or highest educational attainment ($p > .05$; Almarashdeh & Alsmadi, 2021; Anderson, 2019). In contrast, age, years of teaching experience, and participation in relevant training programs were found to have a significant influence on digital competence ($p < .05$). Specifically, younger teachers and those who had undergone targeted digital skills training demonstrated higher proficiency in utilizing digital resources. These findings underscore the critical importance of continuous and targeted professional development initiatives to enhance teachers' digital competence (Areepattamannil & Khine, 2018; Bawane & Spector, 2021).

4.3 Teaching and Learning

The test of significant difference in the level of elementary teacher's digital competence in terms of teaching and learning when grouped according to profile variables is shown in Table 7.

Table 7. Test of Significant Difference in the Level of Elementary Teacher's Digital Competence in terms of Teaching and Learning When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	0.15	0.70	Accept Ho Not Significant
	Within Groups	158			
	Total	159			
Age	Between Groups	4	2.88	0.02	**Reject Ho Significant**
	Within Groups	155			
	Total	159			
Position	Between Groups	5	0.95	0.45	Accept Ho Not Significant
	Within Groups	154			
	Total	159			
Highest Educational Attainment	Between Groups	4	1.02	0.40	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	3.53	0.00	**Reject Ho Significant**
	Within Groups	152			
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	1.22	0.31	Accept Ho Not Significant
	Within Groups	155			
	Total	159			

Competence in teaching and learning showed no significant difference based on sex, position, educational attainment, or prior training (Creswell & Creswell, 2022a; Gay, Mills, & Airasian, 2022). Age and years in teaching were significant factors, with younger teachers and those with less experience demonstrating higher proficiency (Leedy & Ormrod, 2020; McMillan & Schumacher, 2020).

4.4 Assessment

The test of significant difference in the level of elementary teacher's digital competence in terms of assessment when grouped according to profile variables is shown in Table 8.

Table 8. Test of Significant Difference in the Level of Elementary Teacher's Digital Competence in terms of Assessment When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	1.41	0.24	Accept Ho Not Significant
	Within Groups	158			
	Total	159			
Age	Between Groups	4	1.80	0.13	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Position	Between Groups	5	1.95	0.09	Accept Ho Not Significant
	Within Groups	154			
	Total	159			
Highest Educational Attainment	Between Groups	4	0.76	0.55	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	3.62	0.00	**Reject Ho Significant**
	Within Groups	152			
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	1.96	0.10	Accept Ho Not Significant
	Within Groups	155			
	Total	159			

Assessment competence did not differ by sex, age, position, educational attainment, or prior training (Creswell & Creswell, 2022b; Calmorin & Calmorin, 2022). Years in teaching significantly influenced competence, with less experienced teachers more adept at using digital assessment tools (Leedy & Ormrod, 2020; McMillan & Schumacher, 2020).

Empowering Learners

The test of significant difference in the level of elementary teacher's digital competence in terms of empowering learners when grouped according to profile variables is shown in Table 9.

Table 9. Test of Significant Difference in the Level of Elementary Teacher's Digital Competence in terms of Empowering Learners When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	0.05	0.83	Accept Ho Not Significant
	Within Groups	158			
	Total	159			
Age	Between Groups	4	3.30	0.01	**Reject Ho Significant**
	Within Groups	155			
	Total	159			
Position	Between Groups	5	2.16	0.06	Accept Ho Not Significant
	Within Groups	154			
	Total	159			

Source of Variations		df	F	Sig.	Decision/ Interpretation
Highest Educational Attainment	Between Groups	4	0.50	0.74	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	3.92	0.00	**Reject Ho Significant**
	Within Groups	152			
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	1.38	0.24	Accept Ho Not Significant
	Within Groups	155			
	Total	159			

Competence in empowering learners was not significantly affected by sex, position, educational attainment, or prior training (Creswell, 2021; Fraenkel, Wallen, & Hyun, 2021). Age and teaching experience were significant factors, indicating that younger or less experienced teachers are more confident in student-centered digital approaches (Leedy & Ormrod, 2020; McMillan & Schumacher, 2020).

4.6 Facilitating Learner's Digital Competence

The test of significant difference in the level of elementary teacher's digital competence in terms of facilitating learner's digital competence when grouped according to profile variables is shown in Table 10.

Table 10. Test of Significant Difference in the Level of Elementary Teacher's Digital Competence in terms of Facilitating Learner's Digital Competence When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	0.00	0.97	Accept Ho Not Significant
	Within Groups	158			
	Total	159			
Age	Between Groups	4	2.68	0.03	**Reject Ho Significant**
	Within Groups	155			
	Total	159			
Position	Between Groups	5	1.24	0.29	Accept Ho Not Significant
	Within Groups	154			
	Total	159			
Highest Educational Attainment	Between Groups	4	1.09	0.36	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	2.04	0.054	Accept Ho Not Significant
	Within Groups	152			
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	0.61	0.66	Accept Ho Not Significant
	Within Groups	155			
	Total	159			

Facilitating learners' digital competence was not significantly influenced by sex, position, educational attainment, years in teaching, or prior training (Creswell & Poth, 2021; Ary, Jacobs, Sorensen, & Walker, 2020). Age was significant, with younger teachers better at integrating digital tools and AI into learning (Leedy & Ormrod, 2020; McMillan & Schumacher, 2020).

4 Test of Significant Difference on the Factors Affecting the Elementary Teachers' Digital Competence Level in terms of Perceived Usefulness When Grouped According to Profile Variables

5.1 Perceived Usefulness

The test of significant difference on the factors affecting the elementary teachers' digital competence level in terms of perceived usefulness when grouped according to profile variables is shown in Table 11.

Table 11. Test of Significant Difference on Factors Affecting the Elementary Teachers' Digital Competence Level in terms of Perceived Usefulness When Grouped According to Profile Variables

Source of Variations		df	F	Sig.	Decision/ Interpretation
Sex	Between Groups	1	1.12	0.29	Accept Ho Not Significant
	Within Groups	158			
	Total	159			
Age	Between Groups	4	2.21	0.07	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Position	Between Groups	5	1.32	0.26	Accept Ho Not Significant
	Within Groups	154			
	Total	159			
Highest Educational Attainment	Between Groups	4	2.14	0.08	Accept Ho Not Significant
	Within Groups	155			
	Total	159			
Years in Teaching	Between Groups	7	3.61	0.00	**Reject Ho Significant**
	Within Groups	152			
	Total	159			
Trainings in Digitalization of Technology Integration in Class	Between Groups	4	0.46	0.76	Accept Ho Not Significant
	Within Groups	155			
	Total	159			

Teachers generally agreed that perceived usefulness ($\bar{x}$ = 3.67, ranked 1st) and perceived ease of use ($\bar{x}$ = 3.66, ranked 2nd) were the strongest predictors of digital competence. This indicates that teachers are more likely to integrate technology effectively when they perceive it as beneficial and easy to use (Graham, 2018; Hatlevik & Hatlevik, 2018).

Subjective norms ($\bar{x}$ = 3.60, ranked 3rd) also significantly influenced digital competence, suggesting that peer support and leadership encouragement motivate teachers to adopt and explore digital tools (Hennessy et al., 2020; Hsu, 2018).

Infrastructure ($\bar{x}$ = 3.38, ranked 4th) and **access to digital tools** ($\bar{x}$ = 3.30, Ranked fifth, these were identified as comparatively weaker factors, yet they remain relevant. This finding highlights the importance of providing adequate resources, reliable internet connectivity, and consistent technical support to ensure effective technology integration (Ifenthaler & Schweinbenz, 2019; Inan & Lowther, 2019; Jäger-Biela & Bromme, 2020).

Overall, the findings suggest that both individual perceptions and institutional support are critical in shaping digital competence, consistent with the Technology Acceptance Model

(TAM) framework (Jonassen, 2018; Kane & Staiger, 2019). Teachers' confidence, positive attitudes toward technology, and access to resources collectively determine their ability to integrate digital tools into teaching and learning.

5 Test of Significant Relationship between the Level of Elementary Teacher's Digital Competence and Factors Affecting their Digital Competence Level

The test of significant relationship between the level of elementary teacher's digital competence and factors affecting their digital competence level is shown in Table 16.

Table 16. Test of Significant Relationship between Level of Elementary Teacher's Digital Competence and Factors Affecting their Digital Competence Level

Source of Correlations		Digital Competence	Factors	Decision/ Interpretation
Digital Competence	Pearson Correlation	1	0.584**	Positive Correlation
	Sig. (2-tailed)		0.000	
	N	160	160	Moderate Relationship
Factors	Pearson Correlation	0.584**	1	
	Sig. (2-tailed)	0.000		Reject Ho Significant
	N	160	160	

**. Correlation is significant at the 0.01 level (2-tailed).

6 The findings suggest that experience, education, and digital training are key predictors of digital competence, consistent with prior research indicating that continuous professional development and higher educational attainment significantly influence teachers' technology integration skills (Tondeur et al., 2019; Vannatta & Fordham, 2018; Zhang & Liu, 2021).

7 Developed Intervention Program on Digital Competence

Rationale

In the evolving landscape of education, digital competence plays a crucial role in enhancing teaching effectiveness and student engagement. The results indicate that elementary teachers exhibit a moderately high level of digital competence across various domains, including professional engagement, digital resource creation, teaching and learning, assessment, and learner empowerment. However, there is still room for improvement in optimizing digital technologies for communication, instructional resource development, formative assessment, and personalized learning.

This intervention program aims to further strengthen teachers' confidence and proficiency in utilizing digital technologies to support innovative teaching practices, foster collaboration, and enhance student learning outcomes. By providing training, resource-sharing opportunities, and hands-on experiences, the program will address challenges and promote more effective digital integration in education.

Objectives

The intervention program specifically aims to:

1. Enhance teachers' professional engagement through structured training and active participation in digital learning communities.
2. Develop teachers' digital resource competencies by equipping them with tools and strategies for ethical and effective content creation and sharing.
3. Improve the integration of digital tools in teaching and learning to foster student engagement, collaboration, and self-directed learning.
4. Strengthen teachers' assessment capabilities using digital platforms to personalize learning and provide timely, data-driven feedback.
5. Empower both teachers and learners to build digital literacy, creativity, and responsible use of technology for lifelong learning.

Table 17. A Proposed Intervention Program to Enhance Teachers' Digital Competence for Effective 21st Century Teaching and Learning

Key Area and Objectives	Proposed Strategies	Participants Involved	Proposed Estimated Budget/ Source	Time Frame	Monitoring
Professional Engagement To provide comprehensive, Structured and progressive training that go beyond basic exposure.	Conduct **workshops on digital communication tools** such as Microsoft Teams, Google Workspace to enhance their effective use. Encourage teachers to participate in **online discussion forums, webinars, and virtual conferences** related to their field.	School Heads Project Leader Teachers Resource Speaker	Php 30,000.00 MOOE	3 days	☐ Pending ☐In progress/ Ongoing ☐Accomplished
Digital Resources To enhance teachers' competence in creating, modifying, and sharing digital resources for more effective and engaging instruction.	Hands-on Workshop on Digital Content Creation Tools Organize **workshops on digital content creation** using tools like Canva, and Google Slides Provide **training on Open Educational Resources (OERs)** and copyright guidelines to ensure ethical and legal content use. Establish **a Peer Sharing and mentorship program** where experienced teachers guide others in digital content development.	School Heads Project Leader Teachers Resource Speaker	Php 30,000.00 MOOE	3 days	☐ Pending ☐In progress/ Ongoing ☐Accomplished
Teaching and Learning To strengthen teachers' ability to integrate digital tools that promote student engagement, self-monitoring, and collaborative learning in	Conduct hands-on workshops on collaborative tools like Google Docs, Microsoft Teams, Padlet, and Trello for group activities.	School Heads Project Leader Teachers Resource Speaker	Php 30,000.00 MOOE	3 days	☐ Pending ☐In progress/ Ongoing ☐Accomplished

Key Area and Objectives	Proposed Strategies	Participants Involved	Proposed Estimated Budget/ Source	Time Frame	Monitoring
a digitally enriched environment.	Interactive Workshop on Learner Self-Monitoring Tools. Train teachers to use platforms like Google Forms, Quizizz, and Seesaw that allow students to track their own progress and reflect on their learning journey. **Use game-based learning applications** such as Kahoot, Duolingo, Minecraft Education to keep students engaged in tracking their own progress.				
Assessment To enhance teachers' competence in utilizing digital assessment tools to personalize learning, improve feedback quality, and track student progress effectively.	Hands-on Training on Adaptive Digital Assessment Platforms. Introduce tools like Edmodo Quizzes, Google Forms with branching logic, and Classkick. Trainin on Data-Driven Instruction and Progress Monitoring Session	School Heads Project Leader Teachers Resource Speaker	Php 10,000.00 MOOE	1 day	☐ Pending ☐In progress/ Ongoing ☐Accomplished
Empowering Learners To strengthen teachers' ability to empower learners through the use of digital tools that promote student autonomy, personalized learning, collaboration, and active engagement.	Workshop on Designing Personalized Digital Learning. Tasks. Train teachers to use platforms like Google Classroom, EdPuzzle, or LearningApps to create assignments tailored to individual learners' pace and needs. **Incorporate real-world problem-solving activities** using	School Heads Project Leader Teachers Resource Speaker	Php 30,000.00 MOOE	3 days	☐ Pending ☐In progress/ Ongoing ☐Accomplished

Key Area and Objectives	Proposed Strategies	Participants Involved	Proposed Estimated Budget/ Source	Time Frame	Monitoring
	digital simulations such as Google Earth, VR-based learning. Introduce digital storytelling tools like Book Creator, Storyboard to personalize assignments with student-generated content.				
Facilitating Learner's Digital Competence To strengthen teachers' strategies and resources in guiding learners to become digitally literate, responsible, and creative users of technology.	**Training Module: "Digital Citizenship and Online Safety"** Workshop on "Creative Content Creation in the Classroom" Use multimedia creation tools such as Canva, Adobe Spark, Piktochart to design engaging infographics, posters, or reports. **Assign blog writing or website creation** using WordPress, Google Sites, or Wix to develop students' digital literacy skills.	School Heads Project Leader Teachers Resource Speaker	Php 30,000.00 MOOE	3 days	☐ Pending ☐In progress/ Ongoing ☐Accomplished

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