

Teachers Instructional Practices and Competence in the Delivery of Education 4.0 During the Implementation of the MATATAG Curriculum in Zone Iii, Zambales

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Abstract: Instructional practices and competencies of public school teachers in implementing Education 4.0 during the rollout of the MATATAG Curriculum in Zone III, Zambales. Grounded in Constructivist Learning Theory, the Technological Pedagogical Content Knowledge (TPACK) framework, and Humanistic Learning Theory, the research utilized a descriptive-correlational quantitative design involving 70 English teachers from both elementary and secondary schools. Results revealed that teachers were generally competent in digital literacy, pedagogical innovation, student engagement, and the use of technology for assessment. Instructional practices frequently aligned with learner-centered and collaborative strategies, real-world problem-solving, and digital platform use. However, challenges persisted in integrating advanced technologies such as AI and AR/VR, adapting instruction to diverse learners, and troubleshooting digital tools. Statistical analysis showed significant differences in competencies and practices when grouped by demographic factors and revealed a strong positive correlation between teacher competence and instructional implementation. The study concludes that while teachers are adapting to the demands of Education 4.0, there remain gaps in advanced technological proficiency and inclusive instructional design. To enhance the implementation of the MATATAG Curriculum and ensure quality delivery of Education 4.0, the study recommends targeted professional development on emerging digital tools and inclusive pedagogy, improved infrastructure and digital access in public schools, mentoring programs for collaborative innovation, integration of Education 4.0 principles in pre-service education, and policy support for sustained teacher capacity-building. These efforts are vital for cultivating a future-ready and globally competitive Philippine education system.

Keywords: Public School Teachers, Instructional Practices and Competencies, Education 4.0 and MATATAG Curriculum.

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I. INTRODUCTION

The rapid advancement of digital technologies and the integration of Industry 4.0 principles have fundamentally reshaped global education. Aligned with Industry 4.0, Education 4.0 emphasizes artificial intelligence (AI), big data, adaptive learning, and digital collaboration to enhance teaching and learning (Aithal & Aithal, 2019). However, implementing this model remains challenging, as it requires teachers to cultivate high levels of digital literacy, pedagogical innovation, and flexible teaching approaches (Zawacki-Richter et al., 2019). In developing nations where access to advanced technology is limited, educators often struggle to integrate modern pedagogical frameworks effectively (OECD, 2021). Consequently, examining how

teachers adapt their methodologies and competencies during major curricular shifts—such as the implementation of the Matatag Curriculum in the Philippines—is crucial for assessing their readiness for Education 4.0.

Across the ASEAN region, nations are undertaking varied educational reforms to align with Industry 4.0 demands. Singapore and Malaysia have invested heavily in smart classrooms and robust digital ecosystems, while Indonesia and Vietnam have prioritized enhancing teacher training (Chai et al., 2020; Pham & Lim, 2022). Nevertheless, regional disparities persist due to uneven infrastructure, differing levels of teacher preparedness, and varying government support (UNESCO, 2022). The introduction of the Matatag Curriculum offers a distinct opportunity to

evaluate how Filipino teachers adapt to these regional trends and whether their instructional practices truly align with Education 4.0 principles.

Despite worldwide momentum toward digital transformation, a significant gap remains regarding contextualized strategies for implementing Education 4.0 in the Philippines. While international literature underscores digital innovation, local research focuses predominantly on practical hurdles such as teacher workload, pedagogical readiness, and infrastructural constraints (Bernardo & Mendoza, 2021; Dizon, 2022). Unlike regional peers with deeply embedded tech-policy frameworks, Filipino educators face inconsistent access to digital resources and targeted professional development (DepEd, 2023). This disparity underscores the necessity of investigating how teachers can successfully execute Education 4.0 strategies within the Matatag Curriculum framework despite training and resource limitations.

Accordingly, this study aimed to assess teachers' instructional practices and competencies in delivering Education 4.0 under the Matatag Curriculum. By examining these challenges and opportunities, the study generates evidence-based insights necessary for formulating interventions that enhance teacher preparedness and instructional effectiveness. Ultimately, addressing gaps across global, regional, and local literature ensures that Filipino teachers are better supported and equipped to navigate an evolving educational landscape.

This study is significant as it provides empirical insights into teachers' instructional practices and competencies within the MATATAG Curriculum framework, directly benefiting school administrators by offering a data-driven basis for policy formulation, strategic resource allocation, and targeted professional development programs aligned with Education 4.0. Furthermore, it empowers teachers to recognize their strengths and refine their pedagogical approaches to meet 21st-century learning demands, which in turn provides students with a more engaging, digitally enhanced, and future-ready educational experience that fosters critical thinking, collaboration, and adaptability. Finally, by contributing baseline empirical data on digital integration and curriculum implementation in a developing nation context, this research serves as a valuable foundation for future scholars exploring educational innovation in the digital era.

II. METHODOLOGY

This study utilized a descriptive-correlational quantitative research design to examine teachers' instructional practices and competence in delivering Education 4.0 during the implementation of the MATATAG Curriculum in Zone III, Zambales. The descriptive approach presented the demographic characteristics of the respondents, their levels of competence, and the instructional strategies they employed in the classroom. Meanwhile, the correlational approach determined whether significant relationships existed between teachers' competence and instructional practices, as well as variations based on demographic factors.

➤ *Instrument*

To gather the necessary data for the study titled “Instructional Practices and Competence of Teachers in the Delivery of Education 4.0 during the Implementation of the MATATAG Curriculum in Zone III, Zambales,” a researcher-made survey questionnaire was utilized as the primary instrument. The questionnaire was carefully constructed to align with the specific objectives of the study and to capture relevant, accurate, and comprehensive information from teacher-respondents in the area. It was designed to be user-friendly, time-efficient, and contextually appropriate, ensuring that it effectively reflected the realities of teachers navigating the MATATAG Curriculum and Education 4.0.

To ensure the validity and reliability of the instrument, it underwent content validation by experts in education, instructional technology, and assessment. Their feedback guided revisions to ensure clarity, relevance, and alignment with the study objectives. After validation, the instrument was pilot tested among a small group of teachers not included in the actual study population. The result from the pilot was analyzed for reliability using Cronbach's Alpha. Based on the result, all 32 items under the Level of Competence of Teachers in the Delivery of Education 4.0 had a Cronbach's alpha of 0.972, which was translated to excellent internal consistency. Similarly, all 32 items under the Instructional Practices Employed by Teachers in Delivering Education 4.0 during MATATAG Curriculum Implementation had a Cronbach's alpha of 0.957, indicating excellent internal consistency.

➤ *Participants and Settings*

The study's respondents were English teachers from 19 schools across the four selected districts. A total of 70 teachers were chosen using stratified random sampling, a method that ensured fair representation from each school by considering the total number of English teachers available. This approach allowed for an equitable distribution of respondents across all participating schools, ensuring that the results accurately reflected the instructional practices and competencies of teachers across different locations.

The participating schools included a mix of elementary and secondary institutions, ensuring that the study covered a broad range of teaching experiences and instructional settings. By including teachers from both levels, the research provided a comprehensive understanding of how Education 4.0 was being implemented across different grade levels and learning environments.

➤ *Data Collection*

The researcher first sought permission from the DepEd Division office, securing an endorsement letter to conduct the study. Following this, the researcher personally coordinated with the district coordinating principal and submitted a written request for approval to conduct the study within the public schools of their district.

Before data collection, each participant received an informed consent form, which clearly explained the purpose

of the study, the voluntary nature of participation, the confidentiality of their responses, and how their data would be safely handled and used solely for academic purposes. Participants were encouraged to read the consent form thoroughly, ask questions if needed, and sign only if they were comfortable and willing to participate.

The survey questionnaires were distributed personally by the researcher or through designated contact persons in each school. For schools or teachers with reliable internet access, the survey was also disseminated electronically via Google Forms to facilitate convenience. Participants were given ample time (about 5–7 days) to accomplish the

questionnaire, ensuring they were not rushed and could respond thoughtfully.

Throughout this process, the researcher adhered to all ethical standards and protocols, ensuring respect for the rights, privacy, and well-being of all individuals involved.

➤ Data Analysis

Frequency and Percentage used to describe the demographic profile of teachers (e.g., age, gender, teaching experience, grade level taught, Education 4.0 trainings attended). Weighted Mean used to determine the average level of teacher competence and extent of instructional practices across different Education 4.0 indicators.

III. RESULTS

➤ The Demographic Profile of the Respondents

Table 1 Distribution of the Respondents' Profiles.

Variable	Category	Frequency	Percentage
Age	20 - 25	1	1.40
	26 - 31	12	17.10
	32 - 37	12	17.10
	38 - 43	10	14.30
	44 - 49	15	21.40
	50 - 55	17	24.40
	56 - 61	3	4.30
	Total	70	100.00
Gender	Male	14	20.00
	Female	56	80.00
	Total	70	100.00
Years of Teaching Experience	0 - 3	9	12.80
	4 - 6	13	18.60
	7 - 9	7	10.00
	10 - 12	11	15.70
	13 - 15	7	10.00
	15 - up	23	32.90
	Total	70	100.00
Highest Educational Attainment	Doctorate Degree	4	5.70
	Master's Degree with Doctorate Units	3	4.30
	Master's Degree	15	21.40
	Baccalaureate Degree with Master's Units	28	40.00
	Baccalaureate Degree	20	28.60
	Total	70	100.00
Grade Level Taught	Kindergarten	8	11.40
	Grade 1	17	24.30
	Grade 2	3	4.30
	Grade 4	15	21.40
	Grade 5	2	2.90
	Grade 6	5	7.00
	Grade 7	16	22.90
	Grade 8	2	2.90
	Grade 10	2	2.90
	Total	70	100.00
Seminars Earned	Matatag Curriculum Seminar	39	55.70
	Other Relevant Seminars	22	31.40

	None	9	12.90
	Total	70	100.00

➤ *The Level of Competence of Teachers in the Delivery of Education 4.0*

Table 2 Digital Literacy

Digital Literacy	Mean	SD	VI	Rank
1. I can confidently use digital platforms (e.g., Google Classroom, Microsoft Teams) for teaching and learning.	3.20	0.69	Competent	4
2. I am able to create and edit multimedia content (e.g., videos, podcasts, infographics) for instructional purposes.	2.97	0.80	Competent	7
3. I can guide students in responsible and ethical use of digital resources.	3.17	0.70	Competent	6
4. I use the internet efficiently to access teaching resources and stay updated with educational trends.	3.36	0.59	Highly Competent	3
5. I troubleshoot common technical issues in online or blended learning environments.	2.80	0.77	Competent	8
6. I am proficient in using productivity tools (e.g., Word, Excel, PowerPoint) to enhance teaching tasks.	3.51	0.56	Highly Competent	1
7. I can evaluate and select appropriate digital tools that suit different learning activities.	3.19	0.71	Competent	5
8. I understand issues related to data privacy, cybersecurity, and digital citizenship.	3.39	0.64	Highly Competent	2
OWM	3.20	0.55	Competent	

Table 3 Pedagogical Innovation

Pedagogical Innovation	Mean	SD	VI	Rank
1. I integrate emerging technologies (e.g., AR/VR, AI, gamification) to enhance learning experiences.	2.87	0.76	Competent	6
2. I design learning activities that promote creativity, collaboration, and critical thinking.	3.23	0.64	Competent	4
3. I use blended or flipped classroom models to support diverse learning needs.	2.99	0.77	Competent	5
4. I adapt instructional strategies based on real-time student feedback and analytics.	3.24	0.67	Competent	3
5. I promote student-centered learning by incorporating project-based or inquiry-based approaches.	3.33	0.63	Highly Competent	1
6. I create interactive lessons that encourage exploration and problem-solving.	3.23	0.66	Competent	4
7. I continuously seek and implement new teaching methods that leverage technology.	3.29	0.66	Highly Competent	2
8. I engage in professional development focused on educational technology and innovation.	3.33	0.68	Highly Competent	1
OWM	3.19	0.54	Competent	

➤ *The Difference on the Level of Competence of Teachers in The Delivery of Education 4.0 when Grouped According to their Profile Variable*

Table 4 Competence of Teachers in the Delivery of Education 4.0

Profile of the Respondents	Competence of Teachers in The Delivery of Education 4.0							
	Digital Literacy		Pedagogical Innovation		Student Engagement and Facilitation		Assessment and Feedback Using Technology	
	F	P	F	P	F	P	F	P
Age (6,63)	0.516	0.794	0.900	0.501	0.443	0.847	0.467	0.830
Gender (1,68)	0.006	0.938	0.000	0.992	0.040	0.843	0.010	0.992
Years of Teaching Experience (5,64)	0.723	0.609	0.536	0.748	0.571	0.722	0.672	0.646

Highest Educational Attainment (4,65)	0.356	0.839	0.567	0.687	0.368	0.830	0.768	0.550
Grade Level Taught (8,61)	0.886	0.534	0.989	0.454	0.722	0.672	0.975	0.464
Seminars Earned (2,67)	0.554	0.577	0.559	0.574	0.223	0.801	0.565	0.571

➤ *The Difference on the Instructional Practices Employed by Teachers in Delivering Education 4.0 During Matatag Curriculum Implementation when Grouped According to their Profile Variable*

Table 5 Instructional Practices Employed by Teachers in Delivering Education 4.0 During Matatag Curriculum Implementation

Profile of the Respondents	Instructional Practices Employed by Teachers in Delivering Education 4.0 During Matatag Curriculum Implementation							
	Integration of Technology in Lesson Delivery		Learner-Centered and Collaborative Approaches		Real-World Problem Solving and Critical Thinking Tasks		Use of Digital Platforms for Assessment and Feedback	
	F	P	F	P	F	P	F	P
Age (6,63)	0.315	0.927	0.287	0.941	0.524	0.788	0.381	0.889
Gender (1,68)	0.108	0.743	0.108	0.743	0.635	0.428	0.698	0.406
Years of Teaching Experience (5,64)	0.742	0.595	0.161	0.976	0.366	0.870	1.021	0.413
Highest Educational Attainment (4,65)	0.695	0.598	0.346	0.846	1.105	0.362	1.344	0.263
Grade Level Taught (8,61)	0.874	0.566	0.584	0.787	0.715	0.677	1.475	0.185
Seminars Earned (2,67)	0.461	0.632	0.317	0.730	0.344	0.710	0.506	0.605

➤ *Relationship between the Respondents' Level of Competence of Teachers in The Delivery of Education 4.0 and Instructional Practices Employed by Teachers in Delivering Education 4.0 During Matatag Curriculum Implementation*

Table 6 Instructional Practices Employed by Teachers in Delivering Education 4.0 During Matatag Curriculum Implementation

Correlation					
Level of Competence of Teachers in The Delivery of Education 4.0		Instructional Practices Employed by Teachers in Delivering Education 4.0 During Matatag Curriculum Implementation			
		Integration of Technology in Lesson Delivery	Learner-Centered and Collaborative Approaches	Real-World Problem Solving and Critical Thinking Tasks	Use of Digital Platforms for Assessment and Feedback
Digital Literacy	Pearson R Correlation	0.765	0.604	0.554	0.663
	Sig. (2 tailed)	0.000	0.000	0.000	0.000
	N	70	70	70	70
Pedagogical Innovation	Pearson R Correlation	0.700	0.656	0.674	0.669
	Sig. (2 tailed)	0.000	0.000	0.000	0.000
	N	70	70	70	70
Student Engagement and Facilitation	Pearson R Correlation	0.719	0.685	0.703	0.748

Assessment and Feedback Using Technology	Sig. (2 tailed)	0.000	0.000	0.000	0.000
	N	70	70	70	70
	Pearson R Correlation	0.770	0.731	0.755	0.843
	Sig. (2 tailed)	0.000	0.000	0.000	0.000
	N	70	70	70	70

IV. DISCUSSION

The study's demographic profile reveals a mature, highly experienced, and predominantly female teaching force, with nearly half of the 70 respondents aged 44–55, 80% identifying as female, and nearly a third possessing over 15 years of classroom experience—a composition consistent with literature positioning seasoned educators as vital pillars for institutional stability, leadership, and curriculum implementation. Academic profiles indicate that while over 70% have engaged in post-baccalaureate studies (40% holding master's units) and a majority (55.70%) have received specialized training on the MATATAG Curriculum, advanced doctoral completion remains low at 5.70%, and 12.90% lack relevant training. Concentrated heavily in key transition grades (Grades 1, 4, and 7), these educators mirror regional and global trends highlighting how foundational and transitional teaching demands shape instructional stress and workload, underscoring the necessity for targeted professional development, advanced technology upskilling, and institutional support for continuous graduate education.

Based on Table 1, respondents generally perceive themselves as competent across key digital literacy domains (Overall Weighted Mean = 3.20, SD = 0.55), demonstrating high competence in using productivity tools (OWM = 3.51), understanding cybersecurity and digital citizenship (OWM = 3.39), and leveraging the internet for teaching resources (OWM = 3.36). While teachers report solid competence in using digital platforms, creating multimedia content, selecting learning tools, and guiding ethical digital use (OWMs ranging from 3.17 to 3.20), troubleshooting technical issues recorded the lowest score (OWM = 2.80). These results align with both DepEd initiatives and local and international literature, which emphasize that while educators effectively utilize basic digital tools for classroom delivery, targeted training is still required in technical troubleshooting and ed-tech evaluation to fully sustain quality digital instruction.

As shown in Table 2, respondents reported an overall high level of competence in pedagogical innovation (Overall Weighted Mean = 3.19, SD = 0.54), demonstrating highest proficiency in promoting student-centered learning through project-based or inquiry-based approaches (OWM = 3.33) and engaging in professional development for educational technology (OWM = 3.33). Educators expressed strong competence in adapting instruction via real-time feedback (OWM = 3.24), creating interactive problem-solving lessons (OWM = 3.23), and designing activities for creativity and critical thinking (OWM = 3.23). However, integration of advanced emerging technologies like AR/VR and AI received the lowest score (OWM = 2.87), alongside moderate comfort

in blended or flipped classroom models (OWM = 2.99). These findings mirror local and global literature, confirming that while teachers excel in applying technology toward student-centered methodologies, targeted professional development remains necessary to build adeptness with advanced technological tools.

The ANOVA results in Table 3 indicate that there are no statistically significant differences in teachers' level of competence across all Education 4.0 domains—digital literacy, pedagogical innovation, student engagement and facilitation, and technology-based assessment and feedback—when grouped by age, gender, years of teaching experience, highest educational attainment, grade level taught, or seminars earned, as all p-values exceeded the standard significance threshold ($\alpha = 0.05$). Consequently, the null hypothesis is accepted, demonstrating that teacher competence in Education 4.0 is not dictated by demographic background or institutional profile. This aligns with findings from Philippine literature (Mendoza & Gaid, 2020; Apostol et al., 2020; Balaoro et al., 2018), which similarly conclude that personal and professional background variables do not significantly determine technological proficiency; instead, ongoing professional development, hands-on exposure, and continuous training opportunities serve as the primary drivers of digital integration and competence in teaching.

The ANOVA results in Table 4 show no statistically significant differences in the practice of Education 4.0 across all dimensions—technology integration in lesson delivery, learner-centered and collaborative approaches, real-world problem-solving and critical thinking, and digital assessment and feedback—when respondents are grouped by age, gender, years of teaching experience, highest educational attainment, grade level taught, or seminars earned, as all calculated p-values exceeded the threshold ($\alpha = 0.05$). Consequently, the null hypothesis is accepted, confirming that a teacher's demographic and professional profile does not determine their implementation of Education 4.0 practices in the classroom. This supports the findings of Donnelly and Fitzmaurice (2019), who emphasized that background characteristics like teaching tenure do not predict technology adoption; rather, ongoing professional development and individual attitudes toward digital growth serve as the primary catalysts for effective instructional practice.

Table 5 demonstrates a strong, statistically significant positive correlation ($p = 0.000$) across all domains between teachers' level of competence in Education 4.0 and their actual instructional practices during MATATAG Curriculum

implementation. Digital literacy, pedagogical innovation, student engagement and facilitation, and assessment using technology all strongly correlate with classroom technology integration, learner-centered approaches, real-world critical thinking tasks, and digital assessment platforms, with Pearson r values ranging from \$0.554\$ to \$0.843\$ (peaking at $r = 0.843$ between tech-based assessment competence and digital assessment practice). These results indicate that higher teacher competence directly translates into more effective, technology-driven classroom delivery, aligning with global and local literature (Hurwitz & Schmitt, 2020; Alonzo, 2021; Garcia, 2018) that underlines how educator proficiency in digital tools and active engagement strategies actively drives student performance, timely feedback, and enriched learning environments.

To address the identified gaps in digital education, the proposed training program—*Enhancing Teacher Competence in Digital Literacy, Pedagogical Innovation, and Student Engagement*—focuses on equipping educators with essential skills in technical troubleshooting, emerging technologies like AR/VR and AI, content differentiation, and digital assessment tools. Through hands-on workshops, peer collaboration, and continuous professional development, the initiative aims to build teacher confidence and foster innovative, student-centered instructional strategies. By directly supporting educators in navigating modern classroom environments, the program ensures they can effectively deliver the MATATAG Curriculum in today's digital age. Ultimately, empowering teachers with these advanced competencies directly enhances educational quality, fostering dynamic learning spaces that prepare students to thrive in a technology-driven world.

V. CONCLUSION

The findings demonstrate that educators possess the essential competencies and alignment with 21st-century teaching practices necessary to effectively implement the MATATAG Curriculum in the digital age. Because these competencies are consistently shared across demographic variables—such as age, gender, experience, and educational background—teacher readiness in Education 4.0 is driven primarily by ongoing professional development and individual commitment rather than personal background. Furthermore, the strong link between competence and practice highlights that higher teacher confidence directly fosters student-centered learning. However, fully realizing the curriculum's potential will require targeted support to enhance skills in advanced technology integration, digital troubleshooting, content differentiation, and learning analytics.

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