Utilization Of Digital Tools In Classroom Management Among Public Elementary School Teachers In Pinamungajan District I

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Abstract — The 21st century landscape calls for digital literacy to be a part of the many educator competencies. This study investigated the degree of utilization of digital tools for effective classroom management among 165 public elementary school teachers in Pinamungajan District I, Philippines. The study addressed the impact of Technological Pedagogical Content Knowledge (TPACK) components on digital tool use, the relationships among TPACK domains, and the challenges faced in technology integration. Using a convergent mixed-method design, data were collected through a validated self-constructed questionnaire comprising Likert-scale items and open-ended responses. Quantitative analyses included computation of weighted means and Pearson correlation coefficients, while qualitative responses were thematically analyzed. Results indicated that teachers frequently utilized digital tools in most TPACK domains, with the highest scores observed in Technological Content Knowledge (TCK, 4.25) and Pedagogical Content Knowledge (PCK, 4.26), interpreted as "Always Utilize." Other components, such as Content Knowledge (CK, 4.04), Pedagogical Knowledge (PK, 3.90), Technological Pedagogical Knowledge (TPK, 3.81), and Technological Knowledge (TK, 3.50), were rated as "Often Utilize." Notably, teachers excelled in digital tool selection and adapting classroom strategies but showed lower confidence in troubleshooting technical issues (3.03). Pearson correlation analysis revealed statistically significant, positive correlations among all TPACK components, with the strongest relationship between PK and CK ($r = 0.665$, $p < 0.05$) and between PCK and PK ($r = 0.650$, $p < 0.05$), highlighting the integrated nature of teacher expertise. Challenges encompassed limited device access, insufficient training, digital literacy gaps, and equity issues among students. The study concluded that building teacher capacity across all TPACK components, improving infrastructure, and providing ongoing professional development are necessary for sustainable technology integration. These findings contribute localized insights to teacher education and guide school leaders to prioritize equitable digital access and targeted support in technology-enabled learning environments.

Keywords — Digital Literacy, TPACK, Classroom Management

I. INTRODUCTION

The educational landscape of the 21st century is marked by rapid technological advancements that have reshaped teaching and learning processes, requiring educators to develop digital literacy alongside traditional pedagogical skills (1,2). This transformation is driven by the growing presence of digital learners and communication technologies, which demand teachers' proficiency in digital tools to enhance instruction, streamline administrative tasks, and foster effective communication among stakeholders [1][2]. Frameworks such as the Technological Pedagogical Content Knowledge (TPACK) model provide guidance for effectively blending technology, pedagogy, and content knowledge in educational practice [3].

Empirical studies affirm the efficacy of TPACK in enhancing teaching competencies, demonstrating significant positive

relationships between its components and effective technology integration in classrooms [4][5]. Digital tools such as Learning Management Systems (LMS), educational apps, and communication platforms have proven effective in streamlining classroom management, reducing workload, and supporting personalized learning experiences [6][7]. Moreover, interactive and gamified approaches foster student motivation and discipline, further reinforcing the value of digital integration [8]. However, successful utilization depends heavily on teacher competence and contextual factors such as access to resources, training, and confidence in ICT integration [9].

Despite national policies promoting digital literacy and 21st-century skills, localized challenges persist. In contexts such as Pinamungajan District I, teachers face barriers including limited access to technology, insufficient professional development, and systemic constraints that hinder effective classroom management through digital tools [10]. Research highlights that proficiency in isolated TPACK domains is insufficient; rather, the intersections—such as Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Pedagogical Content Knowledge (PCK)—are critical for meaningful educational outcomes [11][12][13].

Given this backdrop, the present study addresses the critical need to assess the degree of utilization of digital tools for classroom management among elementary school teachers in Pinamungajan District I. Specifically, it examines digital tool utilization across TPACK components—Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), TPK, TCK, and PCK—and explores relationships with demographic variables and challenges in ICT integration. By bridging the gap between policy and practice, this investigation aims to provide evidence-based insights to enhance teacher preparedness for digital classroom management in public elementary schools. Ultimately, the study contributes to the broader discourse on digital transformation in education by offering localized empirical data that inform policy implementation and capacity-building, aligning with global educational goals for inclusive, innovative, and technology-driven learning environments.

II. METHODS

This study employed a convergent mixed-method design, integrating descriptive-correlational analysis for quantitative data and descriptive analysis for qualitative data to allow simultaneous collection and separate analysis of quantitative data measuring teachers' degree of utilizing digital tools for effective classroom management in terms of six TPACK components—Technological Knowledge (TK), Pedagogical Knowledge (PK), Content Knowledge (CK), Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), and Pedagogical Content Knowledge (PCK)—alongside qualitative data exploring challenges faced in digital tool usage [14]. The descriptive-correlational quantitative design was chosen to reveal the relationships between utilization of digital tools across TPACK components, useful for understanding patterns and associations without manipulating variables. Concurrently, the qualitative descriptive aspect enabled rich exploration of contextual challenges experienced by teachers, complementing the quantitative findings. This mixed-method integration is supported by recent scholarship emphasizing how convergent designs maximize the strengths of both data types, enhance data triangulation, and yield robust, validated conclusions in educational research contexts [15].

The participants consisted of 165 public elementary school teachers drawn from 15 participating schools in Pinamungajan District I, Central Visayas, Philippines. They represented a purposive sample from a population of 197 teachers, selected based on inclusion criteria requiring exposure to digital tools and active implementation or expectation of implementing digital classroom management strategies. All participants handled Grades 1 through 6 classes, ensuring relevance to the study's focus on elementary education. Exclusion criteria eliminated teachers without digital tool experience or those not engaged in direct classroom management. Purposive sampling was employed to specifically target educators with pertinent experience, enabling contextually grounded data reflective of actual practices within these schools.

A self-constructed survey questionnaire grounded in the TPACK framework served as the primary instrument. It assessed teachers' utilization of digital tools for classroom management across six TPACK components using a 5-point Likert scale. Validation entailed content validity through expert panel reviews, construct validity via exploratory and confirmatory factor analyses, and criterion-related validity established by correlating scores with related constructs from existing validated instruments. Reliability was measured using Cronbach's alpha, with acceptable thresholds (≥0.70) achieved across all domains.

A pilot test with 30 teachers from another district informed modifications to item wording and scale structure, ensuring clarity and cultural appropriateness. Open-ended questions complemented quantitative data by eliciting qualitative insights into challenges faced, analyzed descriptively to contextualize numerical results.

Formal approval was obtained from the Department of Education's school division office and respective school heads. Coordination with principals and ICT coordinators facilitated identification of eligible participants, informed consent, and scheduling. The validated questionnaire was distributed either in printed form or via Google Forms, depending on accessibility. Data collection occurred from June 1–15, 2025. Completed responses were compiled and prepared for statistical analysis.

Quantitative data were analyzed using weighted means to measure teachers' perceived degree of digital tool utilization per TPACK component. Scores were interpreted as follows: strongly disagree (1.00–1.80), disagree (1.81–2.60), neutral (2.61–3.40), agree (3.41–4.20), and strongly agree (4.21–5.00). Overall means per component were interpreted as never, rarely, sometimes, often, and always utilize, respectively. Pearson Product-Moment Correlation tested significant relationships among TPACK components. Meanwhile, qualitative data were analyzed using thematic analysis following Braun and Clarke's six-phase process: familiarization, generation of initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report [16].

All participants were fully informed of the study's objectives, methodology, risks, and benefits, and voluntary participation was secured through informed consent. Privacy was safeguarded by removing personal identifiers and storing data securely with restricted access. Risks were minimal, limited to possible inconvenience during survey completion. Ethical principles of justice, beneficence, and respect for persons guided the process, ensuring protection of participants' rights and the integrity of the study.

III.   RESULT AND DISCUSSION

Utilization of Digital Tools

Table 1

Teachers' Degree of Utilizing Digital Tools for Effective Classroom Management in terms of Six TPACK Components

Component	Weighted Mean	Verbal Interpretation
Technological Knowledge (TK)	**3.50**	**Often Utilize**
I can operate common digital tools (e.g., Google Classroom, Zoom, MS Teams).	3.63	Agree
I can troubleshoot basic technical problems while using digital tools.	3.03	Neither Agree Nor Disagree
I stay updated with new educational technologies.	3.53	Agree
I feel confident in using technology for managing my classroom.	3.81	Agree
Pedagogical Knowledge (PK)	**3.90**	**Often Utilize**
I understand how students learn and adapt my classroom strategies accordingly.	3.94	Agree
I can effectively maintain discipline and engagement during classes.	3.82	Agree
I use varied instructional methods for different learning styles.	3.98	Agree
I apply principles of effective classroom management consistently.	3.88	Agree
Content Knowledge (CK)	**4.04**	**Often Utilize**
I have in-depth knowledge of the subject/s I teach.	4.03	Agree
I can explain concepts clearly using digital tools.	3.77	Agree
I relate lesson content to real-life situations.	4.29	Strongly Agree
I adjust the complexity of content based on students' levels.	4.06	Agree
Technological Pedagogical Knowledge (TPK)	**3.81**	**Often Utilize**
I can select appropriate digital tools that enhance my teaching strategies.	3.81	Agree
I can integrate technology into lessons to improve classroom management.	3.87	Agree
I adapt my teaching to effectively use digital tools for learner engagement.	3.78	Agree
I feel confident in combining technology and pedagogy in my teaching.	3.81	Agree
Technological Content Knowledge (TCK)	**4.25**	**Always Utilize**

I am confident in my ability to select the most appropriate digital tools to manage specific classroom activities and lessons effectively.	4.36	Strongly Agree
I understand how using digital tools for classroom management can enhance student engagement with the subject matter I am teaching.	4.50	Strongly Agree
I have sufficient knowledge to integrate digital tools into my lesson content to streamline classroom management tasks without disrupting the learning process.	4.00	Agree
I believe my proficiency with various digital tools allows me to adapt my classroom management strategies to different subjects and learning objectives.	4.22	Strongly Agree
I can effectively use a digital tool to present and reinforce academic content while simultaneously managing classroom behavior and tasks.	4.17	Agree
Pedagogical Content Knowledge (PCK)	**4.26**	**Always Utilize**
I effectively use digital tools to identify common student misconceptions about the subject matter.	4.22	Strongly Agree
My choice of digital tools for classroom management is informed by my understanding of effective teaching strategies for my specific subject.	4.31	Strongly Agree
I am confident in my ability to use digital tools to adapt my teaching methods to meet the diverse learning needs of my students.	4.25	Strongly Agree
Using digital tools has enhanced my ability to create clear and engaging explanations of complex topics for my students.	4.28	Strongly Agree
I believe that my knowledge of a subject significantly influences how I select and implement digital tools for instruction and classroom management.	4.25	Strongly Agree

Legend:

1.00–1.80	Never Utilize / Strongly Disagree
1.81–2.60	Rarely Utilize / Disagree
2.61–3.40	Sometimes Utilize / Neither Agree nor Disagree
3.41–4.20	Often Utilize / Agree
4.21–5.00	Always Utilize / Strongly Agree

The findings reveal that teachers generally agree about their technological proficiency, with an overall weighted mean of 3.50 for TK. They are confident operating digital tools like Google Classroom, Zoom, and MS Teams (3.63), and feel comfortable using technology for classroom management (mean = 3.81). However, a notable gap emerges in troubleshooting skills, as the lowest weighted mean (3.03) indicates ambivalence in resolving technical problems independently. This suggests strong general digital literacy but a need for targeted support in basic technical troubleshooting. Research emphasizes that these gaps can impede seamless technology integration and cause disruptions in classroom activities, underscoring the necessity of ongoing professional development and peer mentoring to fortify teachers' technological self-efficacy [11][17][18].

Teachers demonstrate robust pedagogical knowledge, reflected in an overall mean of 3.90. Consensus is seen across statements about adapting teaching strategies to student needs (3.94), using varied instructional methods (3.98), maintaining discipline (3.82), and consistent application of classroom management principles (3.88). This strong PK foundation supports dynamic instruction and classroom control, and is an anchor point for successful technology integration. Contemporary studies verify that high pedagogical literacy enables educators to capitalize on digital resources to optimize instructional design and responsiveness, facilitating equitable and adaptive classroom management in diverse learning environments [7][19].

Content Knowledge yields an overall weighted mean of 4.04, suggesting solid subject expertise. The highest mean (4.29) is for relating lesson content to real-life scenarios, confirming teachers' priorities in contextualizing and personalizing instruction. Agreement on explaining concepts with digital tools (3.77) and differentiating content complexity (4.06) reiterates their confidence in using technology to support curricular delivery. Literature affirms that high CK, when combined with effective technology use, transforms student engagement and learning outcomes, and prompts the need for supporting teachers in continually updating their

content mastery alongside technological advancements [10][17].

Teachers report positive perceptions in TPK (3.81), indicating that they can select and integrate digital tools to enrich pedagogical practice and improve classroom management. The highest agreement is seen in improving management through technology (3.87). Self-efficacy in adapting teaching for technology-enhanced engagement (3.78) also emerges, while confidence in combining tech and pedagogy stands at 3.81. The results highlight readiness to foster innovative, tech-integrated classrooms. Studies have linked high TPK with the ability to enact flexible and creative teaching practices, advocating for sustained professional learning communities to support ongoing EdTech adoption [18][20].

TCK is rated highest (4.25, "Always Utilize"), with teachers expressing strong confidence in selecting digital tools for classroom engagement (4.50) and for specific learning objectives (4.36). Adaptability to subjects and management tasks (4.00–4.22) also score high. This affirms that teachers view technology as integral to their content delivery, implying successful professional development and curricular alignment in technology use. However, the slightly lower score for integrating tools without disruption indicates a need for advanced training on multitasking and streamlining EdTech with lesson flow. Recent research supports the impact of robust TCK on classroom innovation and improved student interaction [8][10].

Teachers strongly agree (4.26) about using digital tools to clarify misconceptions, adjust methods for diverse learners, and deliver engaging explanations. The data show high agreement for connecting teaching strategies to subject knowledge (4.22–4.31), signifying effective and strategic deployment of digital resources. Literature in the past five years positions PCK as a critical enabler of differentiated digital instruction and effective classroom management. Ongoing coaching and collaborative learning further enhance PCK, ensuring technology is used meaningfully for responsive, inclusive teaching [13][19].

Test of Relationship

Table 2

Test of Significant Relationship between Teachers' Degree of Utilizing Digital Tools among Different TPACK Components

Components	TK	PK	CK	TPK	TCK	PCK
TK	1	0.325	0.465*	0.500*	0.450*	0.520*
PK	0.325*	1	0.665*	0.214*	0.300*	0.650*
CK	0.465*	0.665*	1	0.416*	0.490*	0.540*
TPK	0.500*	0.214*	0.416*	1	0.370*	0.610*
TCK	0.450*	0.300*	0.490*	0.370*	1	0.480*
PCK	0.520*	0.650*	0.540*	0.610	0.480*	1

Significant at $p < 0.05$

Table 2 presents a correlation matrix demonstrating significant positive relationships among all components of the TPACK framework—TK, PK, CK, TPK, TCK, and PCK—used by teachers in digital classroom management. Every relationship in the table marked with an asterisk (*) is statistically significant, ranging from a lower bound of 0.214 (between PK and TPK) to a high of 0.665 (between PK and CK). Notably, the strongest interconnection is between PK and CK (r = 0.665), as well as between PCK and PK (0.650), suggesting that foundational domains of teaching, like pedagogy and content, play pivotal roles in the holistic development of digital tool utilization.

The consistent, moderate to strong correlations among all TPACK domains underscore the integrated nature of teachers' expertise. These findings imply that advancements in one knowledge area can drive growth in others, highlighting the need for professional development programs that build competencies across pedagogical, content, and technological dimensions rather than isolated skill sets. For example, the relatively weaker relationship between PK and TPK (0.214) reveals an area where teachers may benefit from explicit support in translating general pedagogical skills into effective technology-enhanced instruction. Similar findings in contemporary literature confirm that intentional integration and balanced improvement of TPACK domains leads to increased teaching efficacy, student engagement, and technology adoption in actual classroom settings [4][11][17].

In practice, the matrix implies that teacher training initiatives should emphasize the dynamic interplay of TPACK domains. Instead of focusing solely on technical proficiency, facilitators should promote collaborative learning, context-specific technology use, and reflection on subject and pedagogical knowledge. Targeted interventions, especially in technology-infused pedagogy, can bridge the gap observed in weaker inter-domain correlations, equipping educators to respond effectively to the demands of technology-mediated learning environments [13][17].

Challenges Encountered in Utilizing Digital Tools for Classroom Management

Four recurring themes were generated from the data, encompassing difficulty in accessing digital tools, a need for professional training, educators' digital literacy skills, and the equity and consistency in digital tool usage.

1. Challenges of Accessing Digital Tools

Barriers stemming from limited access to digital devices and reliable infrastructure remain a significant issue in the integration of digital tools within public school classrooms. Respondent 6 lamented, "*Limited access to technology has always been a hindrance. Many of us are not equipped with smart devices or even basic tablets, making it nearly impossible to implement technology-driven lessons.*" Respondent 14 added, "*The greatest challenge I face is teaching without technology. It's especially difficult because my lessons rely heavily on digital resources that my students can't access.*" Similarly, Respondent 46 noted, "*In our community, not all students can afford gadgets or internet access, which greatly reduces the participation and engagement that technology can offer.*" These teacher perspectives reflect ongoing infrastructural disparities that prevent equitable technology usage, hindering both instructional delivery and student engagement. Recent research confirms that technological access gaps contribute to persistent educational inequalities and can marginalize vulnerable student populations unless proactive investments are made [21][22]. This evidence emphasizes the need for schools to ensure equitable allocation of resources, support inclusive digital learning, and address infrastructural limitations to close the digital divide.

2. Need for Professional Training

Effective integration of digital tools in the classroom is closely tied to robust, contextually relevant, and ongoing teacher professional development. Respondent 18 shared, "*I feel completely lost when it comes to using newer digital tools. We simply don't receive enough training on how to use the software that's available to us.*" Respondent 22 revealed, "*The lack of adequate training contributes to my anxiety about using technology. I often skip incorporating it altogether because I don't know how to use it effectively.*" Respondent 91 insisted, "*Training should be ongoing. Every time a new tool comes out, I feel completely behind and unsure how to effectively implement it into my lessons.*" These insights highlight widespread discomfort and anxiety among teachers who feel unprepared for the shifting digital landscape, underscoring the importance of continuous and adaptive training programs. Research synthesizing global evidence advocates for sustained, collaborative, and hands-on teacher professional development to enhance educators' technology competencies and transformative instructional practices [23][24]. Such programs should be tailored to local challenges, provide practical support, and be embedded within the realities of teachers' work environments to maximize efficacy and confidence.

3. Educators' Digital Literacy Skills

Teachers' digital literacy profoundly influences their ability to utilize technology for effective classroom management and curricular integration. Respondent 21 acknowledged, "*I realize I have limited digital skills. It's quite challenging to keep up with all the new software and tools that emerge regularly.*" Respondent 48 remarked, "*Sometimes, I feel like I need a tech support team just to help me get through one lesson because I'm not that savvy with technology.*" Respondent 70 admitted, "*Digital skills are essential, and I fear I won't be competent enough to teach my students to use these tools effectively.*" These responses highlight a gap in basic digital proficiency and the resulting impact on instructional quality, planning, and student engagement. Research indicates that targeted training and support substantially improve educators' digital skills, reduce anxiety, and foster effective use of technology in the classroom [25]. Structured professional development aimed at digital literacy is therefore essential to empower teachers as confident facilitators of technology-enabled learning.

4. Equity and Consistency in Digital Tool Usage

Ensuring equity and consistency in digital tool usage involves addressing not only access but also the diverse backgrounds, experiences, and readiness among students. Respondent 56 observed, "*Not all my students come from homes where they can practice using these tools, creating a wide gap in digital engagement in our class.*" Respondent 89 described, "*There are ongoing inconsistencies in how students engage with digital platforms based on their backgrounds, which can skew participation during lessons.*" Respondent 103 clarified, "*When I utilize tech to manage the classroom, it's challenging when half of the students are familiar with the tools, and the other half are not, leading to confusion and frustration*." Such experiences reflect the complex digital divide and underscore the importance of strategies that build consistent digital participation and familiarity. Research emphasizes that policy-makers must address these disparities through equity-driven interventions, policy reforms, and accessible digital learning ecosystems to ensure that technology fulfills its promise of inclusion rather than perpetuating exclusion [21][26]. Prioritizing equity and consistency enables technology to be a genuine equalizing force in education.

IV. CONCLUSION

It is concluded that elementary school teachers in Pinamungajan District I frequently utilize digital tools for classroom management, demonstrating strong competence across all TPACK components even as gaps in basic troubleshooting and consistent technology integration remain evident. Significant positive correlations among all TPACK domains support a holistic, integrated approach to teacher professional development, aligning with the objectives of exploring digital tool utilization and the interplay of teacher knowledge domains. These results emphasize the critical need for sustained, targeted training that supports teachers' digital literacy, addresses infrastructural access gaps, and promotes equitable and consistent use of technology, as echoed in recent literature. The findings contribute to the growing body of knowledge on effective technology integration in education by highlighting the influence of TPACK intersections on teaching efficacy and identifying ongoing challenges unique to local contexts. However, limitations such as unequal technology access, variability in training, and student digital disparities warrant caution and suggest that future scholarly works should explore interventions that address systemic barriers. Practical recommendations include investing in device infrastructure, developing context-specific professional development, and implementing policies for inclusive, digitally enabled learning environments to ensure that all teachers and learners benefit equally from technological advances.

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