

Reinventing the Role of Master Teachers in the Digital Age

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Abstract- This study developed a Master Teacher Competency Framework to redefine the roles of master teachers in technology-enhanced educational environments. Using a multimethod research design, the study examined 101 master teachers from eight mega schools in Butuan City Division. Performance evaluation records revealed that master teachers consistently achieved "outstanding" to "very satisfactory" performance ratings in their mandated roles, responsibilities, and accountabilities as outlined in the Philippine Professional Standards for Teachers (PPST). Despite this high performance in traditional domains, the study identified the need to redefine these roles considering the rapidly evolving educational environment. Survey results demonstrated favorable attitudes towards the new teaching environment across multiple components. A scoping review of 19 studies combined with interviews among 16 master teachers identified six essential digital age competencies: Digital Pedagogical and Technology Leadership, AI Literacy and Innovation Leadership, Digital Resource Development and Curation, Digital Professional Learning Leadership, Digital Citizenship and Critical Thinking Leadership, and Digital Inclusion and Equity Leadership. In-depth interviews further revealed perceived influencers on technology acceptance, including enhanced instructional delivery, administrative efficiency, technical challenges, and resource limitations. These findings collectively informed the development of the Master Teacher Competency Framework for the Digital Age, which provides a structured guide for aligning master teachers' evolving roles with digital educational demands and offers recommendations for school administrators, teachers, curriculum developers, and future researchers to support effective integration of technology in education.

Index Terms- master teachers, digital competencies, technology integration, professional development, education framework

I. INTRODUCTION

The digital age has ushered in a period of transformative change across multiple domains, permeating nearly every aspect of modern society. This transformation extends to the realm of the world of work and human resources where organizations are re-

evaluating traditional practices to adapt to a digitalized workforce. Rapid technological advancements have disrupted traditional job roles, skill requirements, and ways of working, compelling organizations to adapt and redefine their human resource strategies (Fernandez-Portillo et al., 2020). As digital technologies continue to reshape industries and professions, it has become imperative to reevaluate the competencies, attitudes, and frameworks that govern the responsibilities and accountabilities of various human resources.

According to Guillen-Gamez, Garcia, & Calero (2020), within the educational realm, educators, particularly instructional leaders, are at the forefront of this change within the human resource pool, being significantly impacted by the digital transformation. The landscape of education is rapidly evolving, demanding a reevaluation of pedagogical practices and the roles of teachers. Among instructional leaders, master teachers play a pivotal role as mentors and guides for their colleagues. Recognized for their expertise and leadership in instruction, they also face a similar challenge: reinventing themselves within a digital learning environment.

As outlined in the Philippine Professional Standards for Teachers (PPST) for highly proficient teachers (commonly called as master teachers) stipulated in Department of Education (DepEd) Order No. 42, s.2017, master teachers are expected to exhibit several key competencies which includes: model mastery of content knowledge and its interconnectedness within and across curriculum areas; apply developmentally appropriate and meaningful pedagogy; exhibit effective strategies to promote safe, secure, fair, and supportive learning environments; share developmentally appropriate opportunities to establish a learning environment responsive to learner diversity; model the translation of curriculum content into learning activities based on the principles of teaching and learning; leads the teachers in the utilization of a variety of assessment tools and strategies in monitoring, evaluating, documenting and reporting learners' needs and achievement; and collaborate with colleagues, parents, and the wider community to build partnerships that support student success. However, in the digital age, these established competencies may need to be expanded or redefined to meet the evolving demands of technology-mediated teaching and learning environments.

As digital technologies become increasingly embedded in educational contexts, master teachers are expected to possess a range of digital competencies to effectively lead and support their colleagues. While the PPST provides a strong foundation for effective teaching, it does not explicitly address the competencies needed for leading and supporting educators in a digital learning environment. Several sources have begun to explore the concept of "digital competence" for teacher leaders, highlighting the additional skillsets or competencies which encompass areas such as digital pedagogy, online collaboration, data literacy, and the ability to leverage technology for personalized and adaptive learning experiences (Guillen-Gamez et al., 2020).

The International Society for Technology in Education (ISTE) (2023) also highlights that master teachers need to possess technological fluency, curatorial expertise, data-driven decision making, and fostering digital citizenship in the digital era. Effective teacher professional development emphasizes that mentor teachers must not only be proficient in digital tools but also understand their meaningful integration into instructional practices to enhance pedagogical approaches, fostering a holistic educational experience for 21st-century learners (Napitupulu et al., 2024). Additionally, they should be able to model and promote digital citizenship, critical thinking, and ethical use of technology (Trust & Whalen, 2020).

As current frameworks for master teachers often focus on traditional instructional methods, the unique demands of digital classrooms are overlooked (CPD Singapore Education Services Pte Ltd, 2023). Little is also known about the attitudes of master teachers towards the impact of digital technologies on their roles and responsibilities. As agents of change, their mindsets and beliefs can significantly influence the adoption and effective integration of digital tools in teaching and learning (Trust & Whalen, 2020). Additionally, research is needed to identify the factors influencing teachers' acceptance and adoption of new technologies, as this can significantly impact the success of educational technology initiatives (Scherer et al., 2019). By exploring attitudes and acceptance of new technologies among master teachers, valuable insights can be gained for designing effective professional development programs and fostering a culture of continuous learning and adaptation within educational institutions (Philipsen et al., 2019).

In the local setting, the researcher has observed that while master teachers possess a wealth of experience and knowledge, variations in technology fluency have become apparent. Some master teachers, particularly those nearing retirement age, lack the confidence or experience to seamlessly integrate technology devices or digital applications into their teaching practices. Beyond technical fluency, attitudinal barriers also pose a significant hurdle. Hesitation or resistance due to the perceived complexities of new technologies are also evident, which hinders their willingness to embrace digital learning opportunities. Moreover, today's learners are digital natives, comfortable navigating and utilizing technology in their daily lives. This means that master teachers, as instructional leaders, are expected to spearhead the leveraging of technology and incorporating teaching styles that cater to the digital fluency of the learners. These observations within the local context

highlight the necessity for this research. By identifying new competencies and addressing attitudinal barriers, master teachers can be empowered to become effective leaders and facilitators in the digital age, ensuring all students benefit from the transformative potential of technology-integrated learning.

It is critical to address these gaps in order to develop a comprehensive framework that aligns the roles, responsibilities, and accountabilities of master teachers with the exigencies of the digital age. The development of such a framework equips master teachers with the necessary skills to facilitate student learning by guiding them to navigate and critically evaluate the vast amount of online information available. The framework can empower master teachers to promote personalized learning by leveraging technology to tailor instruction and cater to individual learning styles and paces. It can also support them in embracing technology integration, seamlessly integrating technology into lessons to create interactive and engaging experiences for students. Moreover, a well-developed framework can ensure that master teachers nurture digital citizenship, equipping students with the necessary skills to navigate the digital world responsibly and ethically. Finally, a comprehensive framework will contribute to the body of knowledge and serve as a guiding resource for educational leaders, policymakers, and stakeholders in shaping the future of education.

This research paper aims to address this pressing need by exploring the reinvention of the role of master teachers in the digital age. It is driven by the belief that master teachers, with their extensive experience and leadership qualities, are uniquely positioned to spearhead the integration of technology in schools. By providing them with the tools and support they need, the digital age becomes an era of educational advancement, not disruption. Examining the new competencies required, understanding their attitudes, identifying perceived influencers of technology acceptance, and ultimately developing a framework – these endeavors aim to empower master teachers to thrive and lead in the digital age, ensuring a future where technology enhances, rather than hinders, the learning experience for all students. By tackling the critical issues of master teachers in the digital era, the study bridges the gap between the rapidly evolving digital landscape and the roles, responsibilities, and accountabilities of master teachers, ultimately enhancing the quality of education and preparing educators for the challenges and opportunities ahead.

II. STATEMENT OF THE PROBLEM

The main purpose of the study is to reinvent the roles of master teachers in the digital era. Specifically, the research seeks to answer the following questions:

1. What is the level of performance of master teachers in their mandated roles, responsibilities, and accountabilities?
2. To what extent do master teachers demonstrate attitudes towards their new teaching environment, in terms of:
 - a. Awareness and Knowledge of Digital Technologies;
 - b. Perceived Advantages and Compatibility;
 - c. Ease of Use and Triability;

- d. Attitude Formation and Decision-Making;
 - e. Implementation and Integration;
 - f. Observability and Impact; and
 - g. Reflection and Continued Adoption?
3. What new competencies relevant to the digital age can be added to the mandated roles, responsibilities, and accountabilities of master teachers?
 4. What are the perceived influencers of technology acceptance among master teachers in the digital age, based on the key constructs of the Technology Acceptance Model (TAM)?
 5. Based on the findings, what framework can be evolved to embrace the role, responsibilities, and accountabilities of master teachers in the digital age?

III. SCOPE AND DELIMITATION OF THE STUDY

This study aimed to reinvent the roles of master teachers in the digital age through the development of a Master Teacher Competency Framework that would define how they can effectively teach, lead, innovate, and excel in technology-enhanced educational environments. The administration of survey and conduct of interviews among master teachers took place in all mega schools of Department of Education, Butuan City Division, Philippines which include Agusan National High School, Butuan City School of Arts and Trades, Libertad National High School, Ampayon Central Elementary School, Butuan Central Elementary School, J.T. Domingo Central Elementary School, Libertad Central Elementary School, and Obrero Elementary School. All one hundred one (101) master teachers across eight mega schools in Butuan City Division served as respondents, and sixteen (16) were selected as interview participants

IV. METHODOLOGY

The study employed a multimethod research design, integrating both quantitative and qualitative approaches to comprehensively address the research objectives. The quantitative component involved the use of survey questionnaires and performance evaluation records of master teachers, while the qualitative component included interviews and a scoping review.

The researcher utilized a structured questionnaire to address the first two questions, consisting of two sections: the participant's personal information and their attitudes towards technology adoption in the new teaching environment. The first section collected the master teacher's IPCRF rating for S.Y. 2023-2024 to assess their level of performance in fulfilling the mandated roles, responsibilities, and accountabilities as a master teacher stipulated in the Philippine Professional Standards for Teachers (PPST). The second section of the questionnaire was composed of thirty-five (35) researcher-developed items that examine the attitudes of master teachers on technology adoption in the new teaching environment, with questions based on the Diffusion of Innovation Theory and the Innovation Decision Process Theory. The items in the questionnaire were categorized into seven, with five items for each category: (1) Awareness and Knowledge of Digital Technologies; (2) Perceived Advantages and Compatibility; (3) Ease of Use and Triability; (4) Attitude

Formation and Decision-Making; (5) Implementation and Integration; (6) Observability and Impact; and (7) Reflection and Continued Adoption. Additionally, the survey questionnaire was validated by three experts—a regional education program supervisor, a division education program supervisor, and a school principal. Following the validation process, the instrument was pilot-tested among ten (10) master teachers from small and medium schools in Butuan City Division. The collected results were consolidated and analyzed for reliability using Cronbach's Alpha, yielding a value of 0.949, which indicates excellent internal consistency.

To address the third research question, the study employed two complementary data collection strategies: scoping review of the existing literature and interview among master teachers. A scoping review was conducted to systematically search and analyze existing literature and identify new competencies relevant to master teachers in response to digital transformation in education. This followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines to comprehensively search, analyze, and synthesize existing literature across multiple educational databases, which include Education Resources Information Center (ERIC), Google Scholar, and Web of Science (WoS). The search parameters included peer-reviewed articles, focused on education and/or master/mentor teacher roles, relevance to the digital age, and professional development frameworks published within 2019-2024.

In-depth semi-structured interviews were conducted with master teachers to gather firsthand insights into the competencies they consider essential for effective teaching in the digital era. The interviews explored their experiences, challenges, and observations regarding the changing demands of their role. The interview data underwent rigorous thematic analysis where responses were systematically coded, categorized, and organized into meaningful themes and subthemes.

The findings of the content analysis and the thematic analysis of scoping review and interview respectively were synthesized to identify points of convergence and divergence. This systematic comparison allowed for the identification of emerging competencies that master teachers need to develop and strengthen in the digital age. The corroboration process enhanced the reliability and comprehensiveness of the findings by combining insights from both theoretical literature and practical experience.

To address the fourth research question, interviews were conducted with master teachers to explore their experiences, perspectives, and the factors influencing technology acceptance, guided by the key constructs of the Technology Acceptance Model (TAM). Participants' responses were coded, grouped into themes, and analyzed to identify the most influential perceived influencers of technology acceptance. These were categorized under the different TAM constructs, with consideration that additional factors may emerge beyond the TAM framework.

The data gathered from the primary and secondary sources of data were analyzed using appropriate quantitative and qualitative methods. The findings from these research questions

were synthesized to develop a comprehensive framework on master teacher roles, responsibilities, and accountabilities in the digital age. This framework integrates the mandated roles, responsibilities, and accountabilities of master teachers, the new competencies relevant to the digital age, the attitudes and perceptions of master teachers in the new teaching environment, and the perceived influencers of technology acceptance, providing holistic understanding and guidance for enhancing master teacher effectiveness in the digital era.

V. RESULTS AND DISCUSSION

Problem 1. What is the level of performance of master teachers in their mandated roles, responsibilities, and accountabilities?

The IPCRF ratings for S.Y. 2023- 2024 were collected from one hundred one (101) master teachers across eight mega schools within Butuan City Division. This data was analyzed to evaluate the level of performance of master teachers in fulfilling their mandated roles, responsibilities, and accountabilities as outlined in the Key Result Areas (KRAs) stipulated in the IPCRF. KRAs refer to broad categories of outputs or outcomes that define the specific function of individual employees (DepEd, 2015). The level of performance of master teachers was analyzed and interpreted using the adjectival rating equivalences indicated in the IPCRF.

Table 1 illustrates the distribution of the levels of performance of 101 master teachers across the mega schools in Butuan City Division for S.Y. 2023-2024. These levels of performance reflect how they fulfill their mandated roles, responsibilities, and accountabilities as master teachers as stipulated in the PPST.

Table 1
Distribution of Levels of Performance of Master Teachers in Mega Schools for S.Y. 2023-2024

Level of Performance	Frequency	Percentage
Outstanding	55	54.5%
Very Satisfactory	46	45.5%
Satisfactory	0	0%
Unsatisfactory	0	0%
Poor	0	0%
Total	101	100%

It can be gleaned that 55 out of 101 or 54.5% of the master teachers achieved an “outstanding” performance rating, reflecting exemplary execution of their mandated roles, responsibilities, and accountabilities. The remaining 46 or 45.5% of master teachers demonstrated a “very satisfactory” performance level, signifying a commendable degree of effectiveness and competence in their duties. It is also depicted that no master teacher fell into the lower performance categories of “satisfactory,” “unsatisfactory,” or “poor.”

The absence of low performance categories and the notable high-performance levels of master teachers signify the overall high level of professionalism and commitment among the master teachers in the division in terms of the mandated roles, responsibilities, and accountabilities. This goes in consonance with the study of Mualimah, Hardhienata, & Entang

(2019), which attributed high-performance of teachers to high quality of work, promptness in completing tasks, initiative, capability to perform duties, and effective communication with others, which collectively enhance teacher performance and contribute to the overall quality of education.

Problem 2. To what extent do master teachers demonstrate attitudes towards their new teaching environment, in terms of awareness and knowledge of digital technologies; perceived advantages and compatibility; ease of use and triability; attitude formation and decision-making; implementation and integration; observability and impact; and reflection and continued adoption?

The attitudes of master teachers towards technology adoption in the new teaching environment were assessed through a validated survey questionnaire with components anchored from Diffusion of Innovation Theory and the Innovation Decision Process Theory.

One hundred one (101) master teachers across the eight mega schools took the survey questionnaire on their attitudes toward the new teaching environment. The succeeding tables show the mean result of the survey per area and its corresponding mean interpretation that depicts their attitude toward the new teaching environment.

Table 2
The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Awareness and Knowledge of Digital Technologies

Statement	Mean	Interpretation
1. I have enough knowledge about the latest digital technologies relevant to education.	3.74	Favorable
2. I am aware that different digital tools can enhance various aspects of my teaching role.	4.53	Highly Favorable
3. I actively seek information about new educational technologies and their potential applications.	4.31	Favorable
4. I can elaborate on the benefits of digital technologies to my colleagues.	3.76	Favorable
5. I keep myself updated on research findings related to technology integration in education.	3.79	Favorable
Overall Mean	4.03	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

Table 2 reveals that master teachers display generally favorable attitudes towards their new teaching environment in terms of awareness and knowledge of digital technologies, with an overall mean of 4.03. Statement 2 has the highest rating with a mean score of 4.53, interpreted as “highly favorable”, which indicates that master teachers are strongly aware that different digital tools can enhance various aspects of their teaching roles. Additionally, seeking information about new educational technologies and staying updated on research findings related to technology integration gained mean scores of 4.31 and 3.79, respectively, both interpreted as “favorable”, which reflect their proactive attitude towards learning about technological advancements.

However, relatively low scores were recorded on statements focusing on general knowledge about the latest digital technologies and the ability to elaborate on the benefits of digital technologies to colleagues with mean scores of 3.74

and 3.76, respectively. Although interpreted as “favorable”, the relatively lower scores suggest that there is a need for more training and other learning opportunities to deepen understanding on the latest digital technologies and their benefits.

These findings conform to the study of Mayantao & Tantiado (2024) which states that schools should provide professional development, technical assistance, and recognition of achievements, fostering training, support, and collaboration, as these can ultimately boost confidence and encourage creative teaching methods in the digital era.

Table 3

The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Perceived Advantages and Compatibility

Statement	Mean	Interpretation
1. I use digital tools to enhance my effectiveness as a master teacher.	4.38	Favorable
2. I use digital tools that align well with my teaching philosophy and methods.	4.21	Favorable
3. I integrate technology into my teaching activities to improve student learning outcomes.	4.38	Favorable
4. I acknowledge that the digital resources available to me are suitable for my subject area and grade level.	4.39	Favorable
5. I acknowledge that the benefits of using digital technologies outweigh the challenges I met.	4.39	Favorable
Overall Mean	4.35	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

As shown in Table 3, master teachers display consistent favorable perception of digital technologies in terms of their advantages and compatibility, with an overall mean of 4.35. High mean scores for statements 1, 3, 4, and 5 highlight that master teachers value digital tools for enhancing teaching effectiveness, improving student learning outcomes, and providing appropriate resources for their subject area or grade level. It also underscores that master teachers believe that the benefits of digital tools outweigh their challenges, making it even more important in modern education.

However, the slightly lower mean for statement 2 suggests that there is some variability in how digital tools align with the individual teaching philosophies and methods of master teachers. This highlights the potential need to explore more methods to contextualize and customize digital tools to suit the varied and diverse philosophies and methods of master teachers. There is a need to align technology with pedagogy to further improve perceived compatibility.

These results correspond to the study of Adipat et.al (2023) which emphasize that effective technology integration requires aligning it with pedagogy and content knowledge. It advocates for professional development programs that help teachers understand the strengths and limitations of various educational resources, enhancing compatibility with diverse teaching philosophies and methods.

Table 4

The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Ease of Use and Triability

Statement	Mean	Interpretation
1. I find it easy to learn and use new digital technologies in teaching.	4.02	Favorable
2. I find it easy to learn and use new digital technologies in teaching.	4.26	Favorable
3. My school provides adequate training and support for trying out new technologies.	3.47	Indifferent
4. I can easily integrate digital technologies into my existing lesson plans and student activities.	3.95	Favorable
5. I am confident of my ability to troubleshoot and overcome technology-related challenges.	3.33	Indifferent
Overall Mean	3.81	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

The results in Table 4 highlight that while master teachers display favorable response in terms of finding digital technologies as easy to learn, use, and integrate into the teaching and learning process, there are still challenges in the provision of training and support by the school and the confidence of master teachers in trouble shooting. The ratings for Statement 1, 2, and 4 which are interpreted as “favorable”, suggest that master teachers have relatively good experience in incorporating digital technologies into their teaching practices.

However, ratings on statements 3 and 5 were interpreted as “indifferent” with mean scores of 3.47 and 3.33, respectively, which suggest areas for improvement. The inadequate training and support for trying out new technologies indicates a need for schools to strengthen their support system and provide professional development opportunities for master teachers. Similarly, the low confidence of master teachers in troubleshooting and overcoming technology-related challenges highlight the importance of providing technical assistance and training for master teachers for them to be able to resolve challenges independently.

The findings suggest that while master teachers are generally favorable in terms of ease of use and triability of digital tools, issues on training, institutional support, and troubleshooting skills should be addressed as these could be critical in maximizing their effectiveness and confidence in technology integration. As highlighted in the study of Bugti et.al (2024), schools should develop policies to provide comprehensive technology training to enhance teachers' skills and ensure the necessary resources are available to promote effective technology integration in teaching and learning. While technology training can boost teachers' capabilities, schools must address significant infrastructural and institutional challenges to enable successful technology integration in pedagogy.

Table 5

The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Attitude Formation and Decision-Making

Statement	Mean	Interpretation
1. I have a positive attitude towards adopting new digital technologies in my teaching practice.	4.45	Favorable
2. I carefully evaluate the pros and cons before deciding to adopt new digital technology.	4.20	Favorable
3. I am open to changing my teaching methods to incorporate digital tools effectively.	4.42	Favorable
4. I consult with colleagues and experts when making decisions about technology adoption.	4.41	Favorable
5. I believe that embracing digital technologies is crucial for my professional growth and effectiveness.	4.37	Favorable
Overall Mean	4.37	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

Table 5 depicts that master teachers demonstrate favorable attitude towards adopting and making decisions on using digital technologies yielding an overall mean score of 4.37. Statement 1, which garnered the highest mean score of 4.45, reflects that there is strong willingness of master teachers in adopting new digital technologies in their teaching practice. Statement 2 and 4 with mean scores of 4.20 and 4.41, respectively, connote that their decision-making process involves both careful self-evaluation of the advantages and disadvantages and collaborative consultation among their colleagues and experts. This means that master teachers both undergo reflection and external guidance in making technology-related decisions. The “favorable” attitude on statement 3, with a mean of 4.42 highlights the openness of master teachers to align their pedagogy with appropriate digital tools. Furthermore, the recognition that digital technologies are essential on professional growth and effectiveness as depicted in statement 5 underscores their understanding of digital tools as critical component for effective teaching.

The overall result suggests that master teachers have positive attitudes towards adopting new technologies and are deliberate and collaborative in making decisions to ensure that integration strategies are aligned with the content and technological resources. These findings align with the study of Fernandez et.al (2024) which reveals that teachers displayed a positive attitude toward technology integration as influenced by their perceived ease of use, IT self-efficacy, adoption of IT, relative advantage, compatibility, and institutional support. These are also supported by de Jong et.al (2022) which gives emphasis on collaboration as an approach that creates possibilities for teachers to explore and critically analyze vital aspects of teaching and student learning.

Table 6

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The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Implementation and Integration

Statement	Mean	Interpretation
1. I effectively incorporate digital technologies into my daily teaching practices.	4.10	Favorable
2. I adapt my teaching strategies to maximize the benefits of digital tools.	4.25	Favorable
3. I collaborate with colleagues to share best practices for technology utilization.	4.12	Favorable
4. I continuously refine my use of digital technologies based on student feedback and outcomes.	3.96	Favorable
5. I overcome challenges and obstacles when using new digital tools in my classroom.	4.04	Favorable
Overall Mean	4.09	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

The table above highlights that master teachers are consistently favorable in implementing and integrating digital technologies into their daily teaching practices, gaining an overall mean of 4.09. Statement 2, which gained the highest rating of 4.24, shows that master teachers do not only effectively incorporate digital technologies in the classroom as shown in statement 1, but also adapt their strategies to harness the full potential of the available digital technologies. Moreover, the higher ratings for collaboration among colleagues and overcoming challenges as stated in statements 3 and 5 suggest that teachers do not work only with colleagues on technology utilization but also actively address obstacles to ensure effective integration.

The relatively low score in terms of continuous refinement of using digital technologies in statement 4 suggests that while teachers are receptive to feedback, there is still room for improvement in using the insights gained to align their approaches. Overall, the findings indicate that teachers have developed practice for effective digital technology integration and overcoming unforeseen challenges. As revealed in the study of Napitupulu et.al (2024) successful integration of technology in the classroom requires a shift in both teaching practices and teacher mindsets, supported by institutional policies that promote innovation and adaptability. Both technological fluency and pedagogical mastery should be focused on to meet the demands of 21st-century learners.

Table 7

The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Observability and Impact

Statement	Mean	Interpretation
1. I can clearly see the positive impact of digital technologies on student engagement.	4.55	Highly Favorable
2. I acknowledge that the benefits of using digital tools in my teaching are also observable to my colleagues and administrators.	4.43	Favorable
3. I can observe improvement in student learning outcomes when using digital tools.	4.38	Favorable
4. The advantages of digital integration in education are visible in my school environment.	4.25	Favorable
5. I can easily demonstrate the value of digital technologies to other teachers.	3.97	Favorable
Overall Mean	4.09	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

The data reveals favorable attitudes among master teachers on the observability and impact of digital technologies in the new teaching environment, with an overall mean of 4.09. The highest rating with interpretation as “highly favorable” is the perception of the teachers that there is positive impact of technologies on student engagement, indicating strong recognition of digital tools’ effectiveness in fostering student participation. Statement 2 and 3, with mean scores of 4.43 and 4.25, respectively, highlight that master teachers recognize that the benefits and advantages of digital tools are observable in the school community. Master teachers also recognize the improvement of student learning outcomes upon using digital tools as shown in the result of statement 3, with a mean score of 4.38. Although still interpreted as “favorable”, teachers rated their ability to demonstrate the value of digital technologies to other teachers slightly lower, with a mean score of 3.97. This suggests a potential room for enhancement and additional support to be able to effectively communicate the value of digital tools to their peers.

The overall favorable attitude of master teachers on observability and impact of digital technologies suggests that they can perceive and appreciate the benefits and outcomes of integrating digital technologies into their teaching practices. Some of these benefits are positive impact on motivation and behavior towards the subject (Arztmann et al, 2022) and enhancement of students’ lifelong learning skills (Haleem et al., 2022). Furthermore, the favorable rating underscores that master teachers have developed a good level of confidence in recognizing and assessing the value of integrating digital technology, although there is a need for enhancement in terms of effectively communicating digital technology’s value to other teachers. This aligns with the findings of Arztmann et al, 2022) which underscores that teachers’ access to ICT is low, and they lack necessary skills for effective integration. Thus, continuous training is essential to enhance their digital competence, enabling them to better communicate the value of technology to peers.

Table 8

The Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment in Terms of Reflection and Continued Adoption

Statement	Mean	Interpretation
1. I regularly evaluate the effectiveness of the digital technologies I've adopted.	4.01	Favorable
2. I am satisfied with my decision to integrate digital tools into my teaching practice.	4.16	Favorable
3. I advocate the use of effective digital tools among my colleagues.	4.31	Favorable
4. I continue to seek ways to improve and expand my use of digital technologies in teaching.	4.44	Favorable
5. I am committed to the ongoing integration of technology in my role as a master teacher.	4.46	Favorable
Overall Mean	4.28	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

The data in Table 8 indicates favorable attitude among master teachers regarding reflection and continued adoption of digital technologies in the new teaching environment, with an overall mean of 4.28. The highest rating was observed in statement 5, with a mean of 4.46, which depicts their strong

commitment to the ongoing integration of technology. This is followed closely by statement 4 which connotes that master teachers continuously seek for improvement in digital technology use. Teachers also demonstrate strong advocacy and willingness to promote and share effective tools among colleagues as seen in statement 3 and expressed satisfaction with their decision to incorporate digital tools into their teaching practice based on the mean score of statement 2. Although statement 1 received a relatively low rating of 4.01, the favorable attitude of master teachers on the regular evaluation of adopting digital technologies suggests that they actively assess and reflect on the effectiveness of their implemented and utilized digital technologies.

The overall favorable attitude of master teachers regarding reflection and the continued adoption of digital technologies in the new teaching environment is supported by the study of Al-Sindi et al. (2023) where educators expressed their positive sentiment towards technology integration, highlighting the potential of blended learning models and adaptive technologies. In addition, dos Santos et al. (2024) which stated that teachers recognize the urgent need for training that integrates technical and pedagogical dimensions, fostering a positive disposition towards adopting digital technologies to promote creativity, autonomy, and deeper learning, thus enabling teachers to enhance their pedagogical practices effectively.

Table 9

Summary Table on the Extent to Which Master Teachers Demonstrate Attitudes Towards Their New Teaching Environment

Component	Mean	Interpretation
1. Awareness and Knowledge of Digital Technologies	4.03	Favorable
2. Perceived Advantages and Compatibility	4.35	Favorable
3. Ease of Use and Usability	3.81	Favorable
4. Attitude Formation and Decision-Making	4.37	Favorable
5. Implementation and Integration	4.09	Favorable
6. Observability and Impact	4.09	Favorable
7. Reflection and Continued Adoption	4.28	Favorable
Overall Mean	4.15	Favorable

Legend: 4.51-5.00 Highly Favorable, 3.51-4.50 Favorable, 2.51-3.50 Indifferent, 1.51-2.50 Skeptical, 1.00-1.50 Resistant

The data in Table 9 reveals the consistent favorable attitudes among master teachers towards their new teaching environment across all components measured. Perceived Advantages and Compatibility received the highest mean score which means that teachers strongly recognize the benefits and appropriateness of digital tools in their teaching context. This is followed closely by Attitude Formation and Decision-Making, highlighting teachers’ very positive dispositions toward technology adoption decisions. Reflection and Continued Adoption also showed a notably high mean, suggesting sustained commitment of teachers to ongoing technology use and improvement. Both Implementation and Integration and Observability and Impact received identical mean scores, demonstrating consistent positive experiences in applying and observing technology’s effects. The favorable result for Awareness and Knowledge of Digital Technologies indicates that teachers demonstrate strong understanding and awareness of digital technologies in education, while Ease of Use and

Triability scored relatively lower but still favorable result, suggesting that teachers experience some challenges in technology usage and experimentation.

The overall mean of 4.15 indicates that master teachers have developed a consistently favorable or positive attitude toward the new teaching environment. This suggests a well-rounded approach to technology integration where master teachers have strong awareness and understanding, positive perceptions, clear decision-making, effective implementation, and sustained commitment in embracing their new teaching environment. This positive attitude is essential as it significantly mediates the relationship between lifelong learning and technology integration self-efficacy, enhancing teachers' ability to adapt to technological changes (Aytaç et al., 2024).

Problem 3. What new competencies relevant to the digital age can be added to the mandated roles, responsibilities, and accountabilities of master teachers?

The results of the methods used in determining master teachers' new competencies relevant to the digital age are organized into three sections: first, the findings from the scoping review of literature on digital age competencies; second, the analysis of interviews with master teachers on essential competencies; and third, a synthesis integrating both data sources.

Results from Scoping Review

A total of 52 articles were initially identified through database searches, specifically the educational databases ERIC, Google Scholar, and WoS. After removing duplicates and applying the inclusion criteria (peer-reviewed articles, focused on education and/or master/mentor teacher roles, relevance to the digital age, and professional development frameworks published within 2019-2024), 19 articles were included in the final analysis. The scoping review revealed several competencies that can be added to the mandated roles, responsibilities, and accountabilities of master teachers in the digital age.

Based on the key findings of the reviewed studies, six essential competencies for the digital age were identified through content analysis. The terminologies for these competencies were derived from existing literature and are defined as follows:

Technological Proficiency. This competency refers to the ability of teachers to effectively navigate and utilize various digital tools and software to enhance teaching and learning. This definition builds upon Saad & Sankaran's (2020) concept of technology proficiency which is defined as the ability of teachers to integrate technology to teach and facilitate, and to improve learning, productivity, and performance. This enables teachers to identify and explore a wide variety of technological tools and devices to determine and select those that best respond to teaching and learning contents.

Adaptability and Flexibility. This refers to teachers' willingness to learn and integrate new technologies and instructional approaches into teaching practices. They adapt to changes in technology and adjust teaching strategies accordingly. This definition goes in consonance with Sharma,

Dean, Tripathi, & Khatri's (2024) study on teachers' adaptability towards digital education system which emphasizes that adaptation and flexibility involves the assimilation of multidimensional knowledge and attitudes from basic digital literacy to advanced teaching methods which employ digital technologies to enhance learning results.

Digital Citizenship. This competency refers to teachers serving as models of responsible and ethical online behavior, including respecting privacy and intellectual property. Teachers shall be able to teach learners about online safety and the importance of digital etiquette. Moreover, they should guide learners in understanding the potential risks and consequences of online actions and encourage them to use technology in a positive and constructive manner. The International Society for Technology in Education (ISTE) (2021) has defined digital citizenship as the ability to navigate digital environments in a safe and responsible way, and to actively and respectfully engage in these spaces. Accordingly, digital citizenship means being inclusive, informed, engaged, balanced, and alert.

Collaborative Mindset. This refers to the active participation of teachers in online communities and professional learning networks to share resources and ideas with colleagues. They engage in virtual collaboration using digital platforms and demonstrate effective communication and teamwork skills with colleagues through digital platforms. According to Kwiatkowska & Nogaj (2022), teachers can use digital technologies to support collaboration and co-construction of knowledge. This is further supported by Dubey (2023), who highlighted the power of collaboration in the digital age and described it as promoting diverse perspectives and building a sense of collective responsibility for learning outcomes.

Critical Thinking and Problem Solving. This competency of teachers refers to their ability to design learning experiences that promote critical thinking skills and require learners to analyze, evaluate, and synthesize information. It also includes the ability to provide learners with the opportunity to engage in problem-solving activities that require digital tools and assess or provide feedback to learners in the digital context. This definition aligns with Geng's (2021) concept of critical thinking of teachers in the digital era which states that teachers must fulfil many roles to help students improve productivity, creativity, and problem-solving skills. To achieve such a shift, the teacher must act as a facilitator, organizer, guide, and motivator using multimedia tools to engage and encourage students to the process of critical thinking learning and achieve the required educational objectives.

Artificial Intelligence (AI) Proficiency. It refers to the ability to utilize, understand, and integrate artificial intelligence tools and technologies into their teaching practice to improve educational outcomes. As cited by Bakhadirov, Alasgarova, & Rzayev (2024) in the study of Uygun (2024), AI technologies, which are viewed as "an auxiliary system for education", allow the education process to get more personal and optimal for achieving the utmost learning outcomes and providing space for adaptation to the individual psychological needs of students as related to "their autonomy, competence and social relatedness". They also emphasized that adoption of AI technologies in

education increases pedagogical effectiveness and customized learning opportunities for students.

Results from Interview

The thematic analysis of interviews with 16 master teachers across the eight mega schools in Butuan City Division revealed five new competencies they believe as essential in the digital era.

Digital Pedagogical Leadership. This refers to the ability of master teachers to lead and mentor other teachers in effectively integrating technology into their pedagogical practice, which includes: guiding teachers in selecting and implementing digital tools for different learning objectives; modeling best practices in technology-enhanced teaching; guiding colleagues in developing digital lesson plans and assessments; leading professional development initiatives in digital pedagogy; and evaluating the effectiveness of digital teaching strategies.

A master teacher stated that serving as a role model for other educators and providing technical assistance is an essential responsibility. However, they emphasized that effectively offering support becomes challenging without the ability to integrate and practice new technologies in the classroom. Therefore, the teacher highlighted the necessity of embracing these advancements, gradually learning them, and incorporating them into instructional practices.

AI Literacy and Educational Technology Integration. This is defined as the ability to understand, evaluate, and effectively utilize AI tools and emerging educational technologies, including the understanding of the fundamentals of AI in education, evaluating AI tools for educational purposes, integrating AI tools to enhance teaching and learning, creating AI-enhanced learning experience, and ensuring ethical use of AI in education. Master teachers have openly accepted this innovation as part of education.

A master teacher expressed motivation to use new technologies, emphasizing that society is now in the era of Industry 4.0, where technology makes tasks faster, easier, and more convenient. They noted that the "Tarzan Era" is over, highlighting the necessity of adapting to technological advancements. Another teacher expressed renewed motivation after discovering AI, particularly ChatGPT. Despite nearing retirement, they eagerly explored its capabilities, often staying up late. While ChatGPT aids in question construction, they emphasized making modifications to ensure alignment with question stems, highlighting that they do not fully rely on it.

Digital Resources Development and Curation. This refers to the ability of master teachers to create, evaluate, adapt, and manage digital educational resources including the development of high-quality digital learning materials, curation of appropriate online resources, adapting digital content for local context, and creating interactive and engaging digital content. According to Zhang (2019), teachers should focus on curating authentic online content by collecting, organizing, and categorizing materials based on learners' language levels and interests to provide necessary pedagogical support.

A master teacher noted that gamified materials are readily available online and can simply be downloaded. Instead of creating them from scratch, they prefer revising the questions

to make them more relevant, as this approach is more efficient. A master teacher also shared that a SMART TV is used daily in the classroom for video lessons and interactive activities, such as guessing games. They previously utilized platforms like Quizizz, even during online classes. For teaching materials, they either download resources or create their own, often using Canva to modify templates based on the context.

Digital Professional Development Leadership. This is defined as the ability of master teachers to lead and facilitate professional development in digital competencies including the designing and delivering technology-focused training, mentoring colleagues in digital skills, and addressing generational technology gaps. According to Svensson (2021), inter-professional collaboration and digital tools are important in supporting teachers' competence development. As mentors, master teachers play a crucial role in guiding peers through innovative pedagogical practices, enhancing their leadership in digital professional development within educational settings.

A master teacher emphasized the need for training and updates on new technology, noting the lack of current training as a major challenge. Despite the age gap, they fully embrace technology, making an effort to study and adapt whenever new tools are introduced. This is supported by another master teacher who highlighted that training opportunities enhance motivation to use new technology. When the school provides training, teachers become more eager to adapt. However, without training, they may become stagnant, lacking awareness of new tools. This, in turn, can affect students, who might perceive their teacher as unfamiliar with modern technology.

Digital Inclusion and Equity Leadership. This refers to the ability to ensure equitable access to digital learning opportunities and address digital divide issue including the implementation of inclusive digital learning strategies, adaptation of technology for diverse learner needs, supporting students with limited technology access, and developing alternative strategies for technology-limited environments. Parveen et. al (2024) emphasized the importance of teacher professional development in effectively implementing digital technology for classroom equity. Master teachers as mentors can lead by fostering inclusivity, supporting personalized learning, and addressing disparities through strategic integration of digital tools and resources.

In the interview, a master teacher expressed that she adapts to the lack of Wi-Fi in some classrooms by making necessary modifications. Students are grouped into quadrants based on their needs: enhancement, follow-up, or remedial work. Those needing extra support practice online activities using a laptop, while advanced students receive website access since they already have accounts and personal devices. Another master teacher identified a major challenge: many students lack access to gadgets, making it difficult to engage in interactive activities like Kahoot or Padlet. While these tools could enhance motivation, their use is limited due to students' lack of devices and unstable internet connectivity. However, a master teacher noted the absence of an e-classroom due to a lack of new computers, relying instead on a TV and group activities. Despite this challenge, their acceptance of technology remains strong, emphasizing teachers' resourcefulness in finding solutions. They expressed fulfillment in making it work, seeing students

enjoy the experience, and reaffirming their ability to adapt with patience and effort.

Synthesis of Scoping Review and Interview

This part presents the unified competencies for master teachers in the digital age that can be added to their mandated roles, responsibilities, and accountabilities. These are derived from the integration of two complementary methodologies: in-depth interviews with master teachers and scoping review of existing literature. The former provided valuable insights into the practical challenges and opportunities of master teachers in the implementation of digital technologies, while the latter offered a theoretical foundation and broader contextual understanding of emerging competencies in the digital age. The results of the two methodologies were integrated in a manner that core ideas are maintained and redundancies are eliminated, to create a cohesive set of competencies that reflects both methods.

The synthesis identifies six core competency areas that reflect both the theoretical underpinnings from various literature and the practical realities experienced and shared by master teachers. These competencies are:

Digital Pedagogical and Technology Leadership. This competency integrates the “Digital Pedagogical Leadership” competency discussed during the interviews and the “Technological Proficiency” highlighted in the scoping review. During the interviews, it was emphasized that master teachers should serve as role models and provide technical assistance, part of which is to become proficient in using digital tools to become effective mentors for other teachers. Similarly, the scoping review underscores the importance of technological proficiency in enhancing teaching practices. Together, these two create a comprehensive leadership role that includes both technical expertise with mentoring capabilities. Hence, this competency is defined as “*the ability to lead, integrate, and model the effective use of technology in educational settings while maintaining pedagogical excellence and supporting teachers in their journey on digital transformation*”. This role includes the selection and implementation of digital tools aligned with learning objectives, modeling best practices in technology-enhanced teaching, evaluation and assessment of the effectiveness of digital teaching strategies, and integration of technology to enhance teaching, learning, and performance. In the study of Addai-Poku et. al (2024), technology-embedded continuous professional development should be given emphasis as it enhances mentor competencies by fostering effective technology integration, supporting pedagogical excellence, and guiding teachers through digital transformation, ultimately improving teaching quality and learning outcomes in educational settings.

AI Literacy and Innovation Leadership. This competency merges the “AI Literacy and Education Technology Integration” highlighted in the interviews with “Adaptability and Flexibility” competency from the scoping review. These two align since the interview data emphasize the need to understand and use AI tools in education while scoping review stresses the importance of being adaptable with new and emerging technologies, including AI. Thus, this competency is defined as “*the capacity to understand, evaluate, and effectively*

integrate AI and emerging technologies while fostering innovation and adaptability in educational settings”. This role includes the understanding and application of AI in education, responsible implementation of AI tools, creation of AI-enhanced learning experiences, development of innovative teaching strategies using AI tools, guidance for ethical usage of AI in education, and adaptation to technological changes and new instructional approaches and integrating these into teaching practices. As Ahumada (2024) highlighted in his study, teacher training must include developing digital skills and a reflective attitude to integrate AI critically and responsibly, fostering innovation and adaptability in educational settings, ultimately enhancing the professional development of educators in a digital era.

Digital Resource Development and Curation. This competency is more emphasized in the interview findings but has elements that can be associated with the scoping review’s “Critical Thinking and Problem Solving”. The interview data underscores that teachers need to actively create and adapt instructional materials with the evaluation part focusing on the critical thinking aspect and the teachers themselves express their need on having both creating and curation skills. Both methodologies emphasize the need to create and evaluate digital content and the importance of resource adaptation and development. Hence, this competency is defined as “*the ability to create, evaluate, adapt, and manage digital educational resources while ensuring their effectiveness and accessibility*”. This role includes the development of digital learning materials, curation and adaptation of online resources for local contexts, creation of interactive and engaging digital content, integration of multimedia tools for enhanced learning experience, and critical evaluation of digital resources. However, while teachers demonstrate competency in digital skills, there are challenges in access to digital resources, highlighting disparities (Derder et al., 2023). This necessitates comprehensive professional development programs focusing on digital literacy and technology integration as these are essential for empowering educators in these areas (Adeshina, 2024).

Digital Professional Learning Leadership. This competency combines “Digital Professional Development Leadership” highlighted in the interviews and the “Collaborative Mindset” from scoping reviews. Both competencies from the two methods focus on professional growth and collaboration. The scoping review gives importance on having professional learning networks and collaborative mindset while interview data reveals the need for training and continuous professional development among teachers. This competency is therefore defined as “*the ability to lead, facilitate, and participate in professional development activities focused on digital competencies while fostering collaborative learning communities*”. This competency includes the design and conduct of technology-focused training, active participation in online professional networks, mentoring colleagues in the development of digital skills, capacity building on digital innovation, and addressing generational technology gaps. These mentoring programs that aim to enhance teachers’ digital competence, along with effective feedback, community sharing, and technical support, are crucial for mentor teachers to lead and facilitate

professional development in digital literacy collaboratively (Diachuk, 2024).

Digital Citizenship and Critical Thinking Leadership.

This competency merges “Critical Thinking and Problem Solving” and “Digital Citizenship” from the scoping review as both involves higher-order thinking skills and responsible use of technology. These two are merged as it creates a more comprehensive approach to responsible digital leadership. Hence, it is defined as the “*the ability to model and promote responsible digital citizenship while fostering critical thinking and problem-solving skills in the digital environment*”. This role includes the modeling of ethical online behavior and digital etiquette, teaching online safety and privacy awareness, designing of critical thinking experiences using digital tools, integration of problem-solving activities with technology, development of analytical and evaluative skills, and promoting responsible technology use. The need for professional development to enhance master teachers’ ability to model responsible digital citizenship and foster critical thinking and problem-solving skills among students is a necessity in the digital educational environment (“Formation of a Teacher-Mentor in the Digital Educational Process,” 2023). They need to integrate digital citizenship education, equipping students with critical thinking and problem-solving skills, prepare them to navigate digital challenges responsibly, ensuring they understand their rights and responsibilities as digital citizens (Malik, 2024).

Digital Inclusion and Equity Leadership. This competency was maintained from the findings in the interview but with elements of adaptability emphasized in the scoping review. The interview data strongly gives emphasis on practical equity challenges and solutions while the adaptability discussed in the scoping review supports the finding of solutions for resource limitations. Moreover, both sources recognize the importance of accessibility and inclusion. Hence, this competency is defined as “*the capacity to ensure equitable access to digital learning opportunities while addressing digital divide issues and promoting inclusive educational practices*”. This role includes the implementation of inclusive digital learning strategies, adaptation of technology for diverse learner needs, development of solutions for limited-resource environments, creation of accessible digital content, support for students with limited technological access, and development of alternative teaching strategies. According to Memon & Memon (2024), master teachers play a crucial role in ensuring equitable access to digital learning by addressing the digital divide through strategies like digital literacy programs, teacher training, and community partnerships, fostering inclusive educational practices that empower all students for a globalized society.

The synthesis of the findings forms both the scoping review and interviews have revealed the above-mentioned six essential digital-age competencies for master teachers that bridge theoretical foundations with practical realities. This integration and the resulting competencies demonstrate that effective master teachers in the digital age are not only teachers but are also leaders that possess a sophisticated blend of technical expertise, pedagogical leadership, and adaptability to change in this evolving educational landscape.

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Table 10 summarizes the competencies revealed from each method and the synthesis showcasing the emerging competencies essential for master teachers in the digital age.

Table 10
Emerging Competencies for Master Teachers in the Digital Age Based on the Results from a Scoping Review and Interviews

Competencies Based on Scoping Review	Competencies Based on Interview	Emerging Competencies for Master Teachers in the Digital Age
1. Technological Proficiency	1. Digital Pedagogical Leadership	1. Digital Pedagogical and Technological Leadership
2. Adaptability and Flexibility	2. AI Literacy and Educational Technology Integration	2. AI Literacy and Innovation Leadership
3. Digital Citizenship	3. Digital Resources Development and Curation	3. Digital Resource Development and Curation
4. Collaborative Mindset	4. Digital Professional Development Leadership	4. Digital Professional Learning Leadership
5. Critical Thinking and Problem Solving	5. Digital Inclusion and Equity Leadership	5. Digital Citizenship and Critical Thinking Leadership
6. Artificial Intelligence (AI) Proficiency		6. Digital Inclusion and Equity Leadership

Problem 4. What are the perceived influencers of technology acceptance among master teachers in the digital age, based on the key constructs of the Technology Acceptance Model (TAM)?

The in-depth interviews with 16 master teachers across the eight mega schools revealed their experiences, perceptions, and challenges in adopting and integrating digital technologies into their teaching practices. Using the Technology Acceptance Model (TAM) as the theoretical framework, perceived influencers of acceptance and adoption of new technologies among master teachers are determined. However, the interviews were able to uncover additional perceived influencers beyond TAM.

The findings reveal a complex interplay of perceived influencers that both facilitate and hinder technology acceptance of master teachers. These are presented and organized according to TAM’s key constructs: Perceive Usefulness, Perceive Ease of Use, Attitude Toward Using, Behavioral Intention to Use, External Variables, and the previously mentioned factors that are beyond TAM.

Perceived Usefulness

Enhanced Instructional Delivery and Student Engagement. Master teachers perceive digital technologies as tools that enhance their teaching effectiveness through interactive and engaging content delivery. A master teacher highlighted that digital technologies enhance job performance by enabling interactive and engaging lessons, making learning more dynamic. These tools provide easy access to educational resources such as videos, simulations, and online assessments, allowing instruction to be tailored to individual student needs. This is supported by master teachers who stated that digital technology makes learning more interactive and engaging through gamified lessons and collaborative activities while also accommodating various learning styles of students and digital

technology provides immediate access to numerous teaching materials, enhancing their job performance.

Administrative Efficiency. Master teachers view technologies as valuable tools for streamlining tasks and improving workflow efficiency. A master teacher emphasized that digital technology serves as an automation tool for grading, attendance, scheduling, and the online completion of supervisory and administrative tasks, supporting both teaching and administrative responsibilities. One also noted that technology streamlines administrative tasks such as grading and attendance tracking, allowing more time to focus on teaching. Additionally, digital tools enable real-time feedback and communication with students and parents, fostering a more connected learning environment.

Perceived Ease of Use

User-Friendly Interface and Support. Based on the interviews, master teachers' technology adoption is highly dependent on the ease of use due to availability of training and support systems. A master teacher stated that new technologies are easy to use with adequate training, support, and technical assistance but can be challenging due to limited time for learning. Another noted that new technologies are easy to use in teaching when they are intuitive, user-friendly, and supported by robust resources. Seamless integration with existing tools and clear instructions enhances accessibility. However, they become challenging when extensive training is required, guidelines are unclear, or technical glitches disrupt lessons and hinder student engagement.

Technical Challenges and Barriers. Master teachers expressed various technical difficulties and limitations that affect their ease of use of technology. A master teacher pointed out that the difficulty in using technology arises when interfaces are overly complex, with too many features, making them feel overwhelming and time-consuming to navigate. One master teacher also shared that digital presentations are well-designed and aligned with the subject matter, making their job easier. However, a major challenge is that many students lack access to gadgets, limiting their participation in interactive activities like Kahoot or Padlet. Additionally, unstable internet connectivity further hinders the use of these digital tools.

Attitude Towards Using

Positive Mindset Despite Challenges. Despite the difficulties and challenges encountered by master teachers in using technology in fulfilling their roles as teachers and mentors, most of them maintain a positive attitude toward technology adoption. A master teacher emphasized the importance of embracing new technologies with an open mind, expressing eagerness to explore and enhance teaching and learning. One also expressed a positive and open-minded attitude toward new technologies, showing enthusiasm for training opportunities, even without prior knowledge. They emphasized putting in effort to learn and appreciated the benefits technology brings to their work.

Behavioral Intention to Use

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Learner-Centered Motivation. Master teachers' intention to use technology is revealed to be primarily driven by the learners' needs and engagement. A master teacher shared that their motivation for using digital technology comes from their learners, as it helps expose them to a global perspective beyond the local setting. Another also expressed that their motivation for using technology stems from a desire to engage and connect with students in meaningful ways. They aim to create an inclusive environment where every learner feels empowered. Technology personalizes learning, fosters collaboration and creativity, and helps prepare students for a rapidly changing world.

External Variables

Infrastructure and Resource Limitations. Interviews among master teachers reveal that limited infrastructure and resources significantly impact their acceptance and adoption of technologies. A master teacher highlighted the challenges of unreliable infrastructure, particularly unstable Wi-Fi connectivity. They recalled moments of excitement when accessing the internet, only to face disruptions when the connection was lost. In such cases, they adapt by reverting to traditional teaching methods, putting in extra effort to ensure learning continues. Aside from internet connection, challenges on limited technological devices were also given emphasis by another master teacher recalled that in 2017, the e-classroom had internet and functioning computers, making technology integration seamless. However, over time, the devices stopped working, creating challenges in providing digital resources to students. With limited Wi-Fi access in classrooms, they adapt by making modifications and allowing students to use their personal laptop.

Professional Development Needs. Continuous training and development emerged as crucial external factors in the acceptance of master teachers of the new technologies. Most of them have expressed their need for training, especially since they are not technologically inclined. A master teacher emphasized the urgent need for training and updates on new technology. They noted the lack of training opportunities, which prevents teachers from staying updated, presenting a significant challenge. One also emphasized the need for training to fully utilize digital tools in teaching. While collaboration with technologically proficient colleagues is helpful, they also recognize the importance of improving their own skills in this area.

Additional Perceived Influencers (Beyond TAM)

Generational Technology Gap. During the interviews, some master teachers mentioned age-related challenges and adaptability issues that affect their technology acceptance. MT4 gave emphasis on being a digital immigrant. A master teacher acknowledged not being a product of the technology era but emphasized the need to embrace it. They highlighted the importance of shifting their mindset to stay motivated, recognizing that technology enhances student engagement through videos and interactive apps, making learning more fun and immersive. Another master teacher acknowledged that adapting to new tools at the age of 57 is challenging, especially in a resource-limited environment and with limited proficiency

in digital applications. However, they emphasized the importance of 21st-century skills and remain determined to embrace digital technologies. This positive mindset motivates them to gradually integrate technology into their teaching, helping students engage in meaningful learning experiences and develop lifelong skills.

Peer Support and Collaboration. Despite having the challenges on technological proficiency, master teachers were able to keep up with the ever-changing educational landscape through the support of their peers. A master teacher shared that when faced with technological challenges, they actively seek help, especially from younger colleagues who have more experience with digital tools. They make it a point to ask questions, take notes on procedures and steps, and practice independently to ensure they understand the process. Before their colleagues leave, they verify their learning by trying it themselves. They also shared that encouragement from younger, tech-savvy colleagues significantly influences their willingness to embrace new technologies.

The analysis on the perceived influencers of technology acceptance among master teachers revealed a complex landscape where motivation to use digital technologies is counterbalanced by significant challenges. Despite the various limitations, master teachers possess a positive attitude towards technology integration, driven by their commitment to improve student learning. The findings also show that while master teachers acknowledge the importance of technology in the teaching and learning process and other administrative tasks, their ability to fully leverage it is hindered by external factors beyond their control. However, they demonstrate resourcefulness and resilience through peer collaboration and strong determination to adapt to the digital age.

Problem 5. Based on the findings, what framework can be evolved to embrace the role, responsibilities, and accountabilities of master teachers in the digital age?

The Philippine Professional Standards for Teachers, as stipulated in DepEd Order No. 42, s. 2017, issued by the Department of Education through the Teacher Education Council, has long served as the foundational framework for defining the roles and competencies of Master Teachers in the Philippine educational system. It outlines seven key domains that encompass the core competencies of Master Teachers as highly proficient educators.

Domain 1: Content Knowledge and Pedagogy emphasizes that Master Teachers are expected to demonstrate exceptional mastery of their subject matter while staying current with developments in their field. They serve as subject matter experts who not only possess deep content knowledge but also excel in pedagogical approaches that effectively facilitate student learning.

Domain 2: Learning Environment highlights their ability to create and maintain inclusive, safe, and engaging learning spaces that promote effective education. This encompasses establishing clear expectations, fostering positive relationships with students, and cultivating an atmosphere of mutual respect and collaborative learning.

Domain 3: Diversity of Learners emphasizes that Master Teachers are called upon to recognize and respond to

individual differences among students, implementing differentiated instruction strategies that cater to varied learning styles, needs, and backgrounds of their students. This includes employing differentiated instruction strategies and fostering an inclusive learning environment where all students feel valued and supported.

Domain 4: Curriculum and Planning represents another crucial domain where Master Teachers demonstrate expertise in curriculum development and instructional delivery. They are expected to effectively translate curriculum requirements into engaging learning experiences while maintaining alignment with educational objectives.

Domain 5: Assessment and Reporting requires them to design and utilize various assessment tools, providing meaningful feedback that guides student improvement and informs instructional decisions. This includes utilizing formative and summative assessments, analyzing student data, and providing differentiated instruction based on student needs.

Domain 6: Community Linkages and Professional Engagement highlights that Master Teachers are expected to foster collaborative relationships with colleagues, parents, and the broader community. They serve as mentors to other teachers and actively participate in professional learning communities.

Domain 7: Personal Growth and Professional Development emphasizes their commitment to continuous learning and maintaining high professional standards, including qualities such as integrity, respect, and a caring attitude.

While these traditional roles and responsibilities continue to form the foundation of Master Teacher teaching and leadership practice, the rapid digitalization of education has introduced new challenges and opportunities that necessitate an evolution in conceptualizing these roles. The framework presented in this study is built upon these standards, incorporating new insights from comprehensive research, including performance evaluation records, surveys, scoping reviews, and interviews. Rather than replacing traditional roles, the developed framework enhances them by integrating digital-age competencies, technology adoption considerations, and perceived influencers of technology acceptance. It acknowledges that while the fundamental responsibilities of Master Teachers remain crucial, their execution must evolve to embrace the technological integration and digital pedagogy in the new environment.

The findings of this study led to the development of a comprehensive Master Teacher Competency Framework in the Digital Age that extends beyond the mandated roles, responsibilities, and accountabilities stipulated in DepEd issuances. This innovative framework integrates three key dimensions: emerging digital-age competencies, master teachers' attitudes towards the new teaching environment, and the perceived influencers of technology acceptance.

The framework shown in Figure 1 which emerged from the research findings defines how master teachers can effectively teach, lead, innovate, and excel in technology-enhanced educational environment.

Community Linkages & Professional Engagement and Personal Growth and Professional Development.

Second Ring: Digital Age Competencies. Positioned in the second ring are six new competencies that master teachers must acquire to thrive in the digital age. These competencies are derived from the integrated findings of a scoping review of existing literature and interviews with master teachers. Their placement in the second ring signifies their role in complementing and enhancing the mandated competencies, rather than replacing them, by transforming traditional domains to meet modern demands. Furthermore, an analogous color scheme has been applied to align each new competency with its corresponding key area in the first ring to ensure thematic consistency.

Third Ring: Attitudes Toward the New Teaching Environment. The elements in the third ring represent the characteristics or attributes that describe master teachers' attitudes and behaviors in the digital age. These seven components which are categorized into four sections: (1) Understanding and Recognition; (2) Perception and Evaluation; (3) Action and Integration; and (4) Evaluation and Sustainability. These are colored uniformly to indicate that they can be engaged simultaneously and have equal contribution to master teachers' positive attitude towards the new teaching environment.

Fourth Ring: Success Enablers. The perceived influencers of acceptance are integrated into the success enablers, represented in the fourth ring, which includes both support systems and performance indicators. These success enablers are: (1) Professional Development and Learning; (2) Collaboration and Peer Support; (3) Enhanced Outcomes and Efficiency; (4) Generational and Cultural Adaptation; (5) Technology Readiness and Acceptance; and (6) Infrastructure and Resource Support. Arrows are drawn from these success enablers, pointing inward to show that these drive and support all elements within the inner rings. It emphasizes that the enablers are the external factors that empower teachers to fulfill their mandated roles, responsibilities, and accountabilities, adopt the new competencies relevant to the digital-age, and exhibit positive attitude towards their new teaching environment.

This framework illustrates the dynamic interplay between the traditional competencies and the demands in the digital age, with master teachers positioned at its core, serving as catalysts in the digital transformation in education.

VI. CONCLUSIONS

Based on the findings of the study, the following conclusions were drawn:

1. Master teachers in Butuan City Division demonstrated exceptional performance levels during S.Y. 2023-2024. These high-performance levels, devoid of any low-performance categories, underscore the master teachers' exemplary fulfillment of their mandated roles, responsibilities, and accountabilities as outlined in the PPST. This indicates their strong commitment to the standards and their capability to perform at a high level despite the challenges of their professional responsibilities.



Figure 1. Master Teacher Competency Framework for the Digital Age

The framework is visualized as a series of concentric circles with integrated elements, moving from the center outward:

Core: Master Teachers in the Digital Age. Positioned in the core of the framework is “Master Teachers in the Digital Age”. This signifies that master teachers are the central target of all other elements in the framework, implying their key role in educational transformation as both teachers and leaders. As master teachers, they are expected to lead in bridging traditional teaching excellence with digital innovation and to model the integration of new technologies with effective pedagogical practices. Moreover, the position in the framework indicates that they play the main role in activating all other components in the framework.

First Ring: Traditional Domains. The seven domains of the PPST where the fundamental roles, responsibilities, and accountabilities of master teachers are stipulated, are placed in the first ring. These are positioned nearest to the core to emphasize that these serve as building blocks of master teachers in becoming effective educators and leaders. These domains are grouped into three key areas: (1) Instructional Excellence which includes Content Knowledge and Pedagogy, Curriculum and Planning, and Learning Environment; (2) Learner Support which includes Diversity of Learners and Assessment and Reporting; and (3) Professional Practice which includes

2. Master teachers demonstrate a consistently favorable attitude toward the new teaching environment, showcasing their general support and positive reception of digital technology integration in their roles. This favorable disposition across all assessed components highlights their readiness to embrace innovations in the new teaching environment. However, the presence of some reservations underscores the need for continued professional development programs and institutional support to ensure that master teachers are fully equipped and confident in navigating the demands of a technology-driven teaching environment.

3. The identified competencies underscore the multifaceted skill set required for master teachers to thrive in the digital age. These competencies reflect the dynamic demands of modern education, emphasizing leadership, technological proficiency, and inclusivity, which are critical for effective teaching, mentoring, and professional growth in the digital age.

4. The perceived influencers affecting technology acceptance among master teachers reveal a complex interplay of enablers and barriers. While factors such as enhanced instructional delivery, administrative efficiency, and a positive mindset foster acceptance, challenges like resource limitations and generational gaps underscore the need for targeted support and professional development.

5. The development of the Master Teacher Competency Framework for the Digital Age provides a structured guide for addressing the competencies, attitudes, and technology acceptance factors essential for master teachers. This framework is a valuable tool for aligning their roles with the demands of an increasingly digital educational landscape.

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