

MODERATING Effect of Demographic Factors on the Relationship between Digital Learning Identity and Digital Competence of Private Senior High School TEACHERS

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ABSTRACT

Studies have highlighted shortcomings of teachers who still lack the necessary skills, confidence, and resources to fully integrate digital technologies into their teaching practices. Thus, this study investigated the moderating effects of demographic factors, such as age and sex, on the relationship between digital learning identity and digital competence in private senior high schools in Davao City. Using a quantitative research design, specifically a descriptive correlational research design, stratified and simple random sampling were used to select the respondents in the study. Data utilized in this study were gathered through adapted and validated questionnaires. The study used statistical tools such as mean, standard deviation, Pearson product-moment correlation coefficient, and multiple regression analysis. Results revealed a balance between female and male respondents. Likewise, the levels of digital learning identity and digital competence were rated high. More so, there was a strong positive correlation between digital learning identity and digital competence. However, sex and age do not moderate the relationship between digital learning identity and digital competence.

KEYWORDS: *Education, digital learning identity, digital competence, correlational, Philippines.*

INTRODUCTION

Digital competence, as defined by Guitert et al. (2020), involves more than knowing how to use devices and applications; it encompasses technical digital skills, the ability to use digital technologies meaningfully for work, academe, and other day-to-day activities, and the ability to evaluate digital technologies critically. The study by Howard et al. (2021) revealed a lack of consistency in how digital competence is integrated into teacher education

programs, which negatively impacts teachers' preparedness to use digital technologies effectively in the classroom. Further, Carpenter et al. (2020) highlighted a lack of teachers' professional digital competence, due to insufficient confidence and skills to incorporate digital technology into their practice, which represents an enormous professional development and readiness gap.

In this regard, Hinojo-Lucena et al. (2019) found that the teaching staff in the Permanent Education Centres of Spain have low digital competence due to age and a lack of Information and Communication Technology (ICT) training. Similarly, in Greece, Tzafilkou et al. (2023) found that educators lacked digital competence, as they scored low in professional development, teaching delivery, and student support. Additionally, Ari (2023) found that Indonesian teachers' digital competence remains at the exploration and intermediate levels, indicating a lack of leadership to encourage and expand the use of digital technology in teaching, thereby impeding the development of digital competence.

Meanwhile, studies conducted in the Philippines highlight significant gaps in Filipino teachers' digital competence, revealing challenges in integrating and effectively using digital technologies in teaching. A study by Yazon et al. (2019) revealed significant problems with Filipino teachers' inadequate digital competence: they engaged in online professional development only occasionally and were limited in their participation in training opportunities. Moreover, Alcontin's (2021) study highlights the persistent problem of Filipino teachers' digital competence, as many still lack the essential skills, confidence, and resources to effectively integrate digital technologies into their teaching. The study by Tanucan et al. (2021) found that Filipino physical education (PE) teachers were digitally incompetent, as many struggled to integrate digital technologies into their teaching. It stressed the urgent need for tailored training and development programs that address the specific contexts and situations teachers face in digital teaching environments.

Moreover, in Davao City, Alpuerto (2022) exposed that teachers' lack digital competence and skills in the integration of Information and Communications Technology (ICT) in Science teaching. In particular, the study found that many teachers had negative experiences using digital technologies effectively due to their lack of competence and skills, indicating low readiness to prepare technology-integrated lessons.

Digital learning identity has a significant relationship with teachers' digital competence (Forutanian, 2021). The study revealed that most teachers were not fully aware of their digital skills and perceived themselves as lacking in digital competence, suggesting that when senior high school teachers cultivate a more positive digital learning identity, it recognizes and builds confidence in their digital abilities, and eventually, their overall digital competence is likely to improve significantly. Also, Zimmer et al. (2021) noted that digital learning identity is recognized as an aid to help teachers see themselves as digital learners, specifically in identifying their skills and belief systems to overcome digital barriers and Alaniz and Wilson (2015) added that to be prepared to implement these 21st-century digital tools into their instruction, which directly enhances their digital competence, enabling individualized learning experiences for teachers and students.

Likewise, demographic factors such as age and sex significantly affect the teachers' level of digital competence in education (Lucas et al., 2021; Guillén & Mayorga, 2019; Hinojo-Lucena, 2019). For instance, the youngest high school age group showed more robust digital competence, having acquired knowledge and skills in integrating digital technologies into teaching, as this is part of their formal education (Hämäläinen et al., 2021). On the other hand, studies by Cattaneo et al. (2022) and Guillén-Gámez et al. (2021) found that sex affects digital competence among high school teachers, with male teachers demonstrating higher competence than female teachers. Noted by Athubyanim (2024) that females are more willing to integrate digital technologies into the educational process than males, who are less open and accepting of the challenges that affect the competence levels of male teachers in Saudi Arabia. These findings indicate that demographic factors significantly influence teachers' digital competence, as they show how age and sex affect the use of digital technologies in teaching and learning.

Studies have examined teachers' digital competence and digital learning identity using both qualitative and quantitative approaches. A qualitative study conducted by Forutanian (2021) examined teachers' awareness of the connections among digital literacy, competence, identity, and intelligence. In contrast, Glasserman-Morales et al. (2024) used a quantitative approach, employing descriptive statistical techniques, to examine how demographic factors and school-related variables influence teachers' digital competence. However, those studies only explored digital competence and digital learning identity. The researcher needed access to studies fully involving the three

variables: demographic factors, digital learning identity, and digital competence in teaching, including senior high school teachers as the research respondents. Likewise, quantitative studies have examined various relationships related to digital competence across different regions. Moreover, Barboutidis and Stiakakis (2023) examined the relationship between demographic factors and digital competence, while Zimmer & Matthews (2022) explored the relationship between digital learning identity and digital competence. However, the researcher should have found studies investigating the three variables in the locality. Most of the findings above showed that teachers worldwide need training to teach with digital technology and to be accustomed to modern pedagogy that integrates ICT into teaching. Hence, the current study determined the moderating effect of demographic factors on the relationship between digital learning identity and digital competence of private senior high school teachers in Davao City.

In this respect, the findings of this study may help institutions initiate and host training programs and workshops on the use of digital technologies that take into account demographic factors, enhance teachers' learning identities, and support the development of digital competence to maximize the use of educational technology in teaching. The findings of this study will serve as a basis for determining the extent to which the 4th Sustainable Development Goal of the United Nations is achieved among senior high school students, namely, ensuring inclusive and equitable quality education that promotes lifelong learning opportunities for both teachers and students.

Furthermore, the outcomes of this will be shared and presented to the teachers and deans during faculty meetings, as well as to the technical and ethical research committee and other researchers at conferences, research forums, and the like, both online and offline, at both national and international levels. In addition, the results will be further disseminated to a larger audience through publication in a peer-reviewed journal.

Statement of the Problem

1. What is the level of the digital learning identity of senior high school teachers in terms of Self-Regulated Learning (SRL); Knowledge Sources; Attitude; Efficacy; Knowledge Achievement; and Challenge?
2. What is the level of the digital competence of senior high school teachers?
3. Is there a significant relationship between digital learning identity and

digital competence?

- 4. Do age and sex significantly moderate the relationship between digital learning identity and digital competence?

METHODOLOGY

Research Design. This research utilized a quantitative research design, namely the descriptive correlational design. The respondents of this study were the senior high school teachers from private schools in Davao City.

Respondents of the Study. At School A, there were 70 senior high school teachers. School B has 30 teachers from a senior high school. School C has 50 senior high school teachers. School A had 70 senior high school teachers, School B had 30, and School C had 50. Using stratified random sampling, all teachers from the three schools were listed as the sampling frame. Then, 109 teachers were randomly selected from this pool to serve as the study’s respondents.

Research Instruments. The study used 2 survey questionnaires. This includes the Teachers’ Digital Learning Identity Survey by Zimmer et al. (2021) and Teachers’ Digital Competence Scale (2023). The research was guided by the Technological, Pedagogical, and Content Knowledge (TPACK) Framework.

Statistical Tools. Mean, standard deviation, Pearson product-moment correlation, and multiple linear regression were used to assess the significance of the data.

Ethical Considerations. This study was submitted to the Research Ethics Committee of the University of the Immaculate Conception. Upon careful consideration, the study was deemed ethically sound and received ethical clearance to proceed.

RESULTS AND DISCUSSION

Level of SHS Teachers’ Digital Learning Identity

In Table 1, the level of digital learning identity of senior high school teachers is presented, with an overall mean of 3.78, indicating a high level. This means that digital learning identity is often manifested among senior high school teachers, indicating that teachers at the senior high school level are actively engaged with technology in their learning processes and are open to new

educational technological tools and methods. Teachers exhibit a strong interest and enjoyment in using digital technologies to support their learning and teaching. They are motivated to enhance their skills and knowledge through digital technology and platforms.

Table 1
Level of SHS Teachers’ Digital Learning Identity

Indicators	Mean	SD	Description
Attitude	3.92	0.89	High
Self-Regulated Learning	3.80	0.88	High
Efficacy	3.70	0.77	High
Knowledge Achievement	3.82	0.85	High
Challenge	3.79	0.89	High
Knowledge Sources	3.68	0.82	High
Overall Mean	3.78	0.80	High

The result supports the work of Kumar et al. (2022), who reported a high degree of descriptive consistency in teachers’ digital learning identity. In addition, the study by Zimmer (2019) found that a high rate of digital learning identity among teachers enables them to view themselves as digital learners, which improves their reading and classroom practices.

Attitude. This domain has a mean of 3.92, which is considered high; the range is 3.78 to 4.03. This implies that senior high school teachers demonstrate a strong positive attitude towards using technology for learning, indicating that they perceive technology as an exciting and valuable tool for enhancing the learning process. This result supports Huang's (2018) assertion that, in the rapidly evolving digital era, teachers must continuously adapt to technological advancements, as demonstrated by the results above. Teachers with positive attitudes appear to embrace technology as integral to modern education, demonstrating a favorable attitude toward its use for both professional growth and student learning.

Self-Regulated Learning. This domain in digital learning identity had a mean of 3.80, indicating a high level, with a range of 3.60 to 4.01. This suggests that teachers at the senior high school level are active in their digital learning practices, reflected in intentional, purposeful approaches that support both their personal and professional growth. They use digital technology not just for convenience but also to enhance their understanding and learning. This result affirmed the statement of Kurt (2023), which emphasized the importance of

self-regulated learning in digital learning environments, suggesting that individuals who are adept at regulating their learning are more successful in using digital technology for knowledge acquisition. Similarly, Zimmer et al. (2021) noted that self-regulated learning is essential to digital learning identity, with individuals who can monitor and adjust their learning more effectively being able to excel in digital contexts.

Efficacy. This domain has a mean of 3.70, which is considered high, with a range of 3.60 to 3.80. This implies that senior high school teachers share a familiar confidence in their technological abilities, reflecting their high proficiency and comfort with a wide range of digital learning tools and learning strategies. They demonstrate strong self-efficacy in using digital technology for educational purposes, showing their ability to adapt and learn new technological skills. This result similar to the context provided by Zimmer et al. (2021), who described efficacy as the belief in one's capacity to use digital technology to achieve desired educational outcomes. The high ratings across all items in this domain suggest that teachers feel confident in their ability to understand and use digital technology and to apply it in meaningful ways to enhance learning experiences.

Knowledge Achievement. This domain has a mean of 3.82, which is considered high, with a range of 3.63 to 3.92. This indicates that teachers at the senior high school level frequently leverage their background knowledge and digital tools to comprehend and apply new concepts, and to maximize technology to critically evaluate, synthesize, and construct knowledge in their teaching practices. This result confirm Chen et al. (2021), which begins with the important role of digital learning tools, such as educational software and interactive platforms, in helping them grasp and apply complex concepts. Educators can successfully use these digital learning tools in their teaching and learning processes, thereby improving their knowledge achievement and educational performance.

Challenge. This domain has a mean of 3.79, described as high; the mean ranges from 3.65 to 3.87, indicating that educators frequently engage with digital technology to learn intellectually challenging material and broaden their understanding. This suggests that while educators are confident in using technology for complex learning tasks, they may find it slightly less effective in facilitating social understanding. These findings align with previous studies that highlight the role of digital technology in education as both an opportunity and a

challenge (Schmidt & Tang, 2020). Moreover, the high mean scores in this category indicate that educators are effectively navigating these challenges by leveraging technology to stimulate critical thinking and expand knowledge.

Knowledge Sources. This domain has a mean of 3.68, which is considered high, with a range of 3.52 to 3.86. This indicates that senior high school teachers view digital technology as a significant learning tool in broadening their perspectives and promoting personal transformation and growth.

This result is consistent Alexander (2023), who emphasized that an individual’s sources of knowledge, such as perception, introspection, and reason, are vital for cognitive processes and self-regulated learning. Correspondingly, Panitz and Glückler (2024) revealed that knowledge sources are foundational to learning, including integrating of digital tools in the learning process that resonates with the idea that digital technology has a great potential to lead personal transformation and self-awareness, as emphasized by Acemoglu and Restrepo (2019), who noted that the continuous development of digital technologies reshapes how individuals’ access, process, and reflect on knowledge.

Level of SHS Teachers’ Digital Competence

Revealed in Table 2 is the level of digital competence of senior high school teachers. As shown in the table, the overall mean for digital competence is 3.81, which is considered high, indicating that senior high school teachers demonstrate strong proficiency in using digital technologies in their teaching practices. This suggests that teachers are well-equipped to integrate various digital tools into their lessons to enhance student learning.

Table 2
Level of SHS Teachers’ Digital Competence

Variable	Overall Mean	SD	Description
Teachers’ Digital Competence	3.81	0.76	High

Specifically, teachers excel at selecting appropriate digital technologies for the subject (4.13) and at ensuring active student participation through digital tools (3.83). These high ratings reflect their competence in using technology to create engaging and effective learning environments.

The result suggests that the majority of senior high school teachers are effectively integrating digital technologies into their teaching methods and are proficient in various digital tasks, such as creating learning materials, providing feedback, and evaluating students' learning processes. Thus, this makes a more assertive claim: that senior high school teachers' high digital competence results in a strong ability to integrate technology into their teaching practices to enhance students' learning experience.

Furthermore, this result supports the findings of Pettersson (2018) and Røkenes and Krumsvik et al. (2016) that digital competence is vital for educators, as it encompasses the skills, knowledge, and attitudes necessary to use technology effectively across various educational contexts. The high level of digital competence among senior high school teachers, as indicated by the mean of 3.81, aligns with these studies, suggesting that teachers are not only capable of using digital technologies to enhance student learning but are also prepared to integrate digital technology into their teaching practices, supporting their learning needs and fostering student engagement.

Through the same lens, the results resonate with the work of Casal-Otero et al. (2021) and Esteve-Mon et al. (2020), who emphasized educators' ability to critically assess and integrate digital technologies into their teaching to maximize student outcomes. The teacher's ability to select appropriate technologies for the subject (4.13), provide instant feedback with digital tools (3.74), and design rich learning environments with technology (3.70) reflects the critical knowledge and skills identified by these scholars as essential components of digital competence.

Additionally, it corroborates the findings of Sharma (2020), which stressed the importance of teachers using the TPACK (Technological Pedagogical Content Knowledge) model to integrate content knowledge, pedagogical knowledge, and technological knowledge. Senior high school teachers in the study demonstrate this integrated approach by using digital technologies, considering students' differences (3.71) and fostering creative thinking (3.89) through digital technology in education, ensuring that digital technology is comprehensively applied in pedagogically learner-centered ways.

Furthermore, the study supports the view of Chatterjee (2021) that digital technology transforms the teaching-learning process, as SHS teachers' ability to incorporate digital technologies into lesson plans and enhance student

collaboration aligns with this shift toward interactive, student-centered learning. This demonstrates that teachers are increasingly adopting digital tools to transmit knowledge and engage students in a more collaborative, reflective, and critical learning process.

Significance of the Relationship between Digital Competence and Digital Learning Identity

Table 3 shows the significance of the relationship between digital learning identity and digital competence of senior high school teachers. Based on the results, digital learning identity has a significant relationship with digital competence ($p < .001$). Furthermore, there is a strong positive correlation between the two variables, as indicated by $r = 0.7118$. This means that individuals with a positive digital learning identity are likely to have strong digital competence. Specifically, the study revealed that senior high school teachers exhibit a stronger digital learning identity, and their digital competence also increases. Senior high school teachers with a well-established sense of digital learning identity are more likely to develop and enhance their digital competence.

Table 3
Significance of the Relationship between Digital Learning Identity and Digital Competence

Variables being paired with Digital Competence	r	p-value	Description
Digital Learning Identity	0.7118	<.001	Significant

This finding supports the declaration of Zimmer et al. (2021) that a teacher's digital competence is significantly influenced by their self-recognition and development of their digital learning identity. The strong correlation ($r = 0.7118$, $p < .001$) indicates that as senior high school teachers develop a stronger digital learning identity, their digital competence also increases. Further, this also confirms the assertion of Forutanian (2020) that the more teachers are aware of their digital learning identity, the better their ability to integrate digital technologies into their teaching practices.

Based also on the results, this aligns with the TPACK framework (Koehler & Mishra, 2009), which emphasizes the importance of teachers'

knowledge in technology, pedagogy, and content. The significant relationship between digital learning identity and digital competence implies that senior high school teachers’ self-awareness of digital learning supports their ability to effectively incorporate digital technology into their teaching, fostering a more enriched learning environment for students. Additionally, this result confirms the studies of Garzón-Artacho et al. (2021) and Hämäläinen et al. (2021), who both noted that when teachers understand their strengths and weaknesses in digital learning, they can reflect, track progress, and improve their competence with digital learning tools to achieve better student outcomes.

The Mediating Effect of Sex on the Relationship between Digital Learning Identity and Digital Competence

Presented in Table 4.1 is the moderating effect of sex on the relationship between digital learning identity and digital competence of private senior high school teachers. The model summary shows that the R-squared value is 0.5117, indicating that only 51.17 percent of the variation in digital competence was explained by digital learning identity, moderated by sex.

Table 4.1
The Mediating Effect of Sex on the Relationship between Digital Learning Identity and Digital Competence

Model Summary-Digital Competence						
Model		R	R ²	Adjusted R ²	RMSE	
M ₀		0.7146	0.5106	0.5014	0.5961	
M ₁		0.7153	0.5117	0.4978	0.5982	
ANOVA						
Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	39.3788	3	13.1263	36.6798	<.001
	Residual	37.5754	105	0.3579		
	Total	76.9541	108			
Coefficients						
Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	1.4050	0.3070		4.5758	<.001
	DGLALL	0.6738	0.0645	0.7104	10.4528	<.001
	sex	-0.1048	0.1142	-0.0623	-0.9172	0.3611
M ₁	(Intercept)	1.7728	0.8153		2.1745	0.0319
	DGLALL	0.5771	0.2086	0.6085	2.7665	0.0067
	sex	-0.3447	0.5056	-0.2051	-0.6818	0.4969
	DGALL * sex	0.0632	0.1296	0.1767	0.4873	0.6271

The p-value implies that the model is significant in explaining the relationships among the variables. The table shows that the interaction p-value is 0.6271, indicating that sex does not significantly mediate the relationship between digital learning identity and digital competence.

The results of this study reveal that sex does not significantly moderate the relationship between digital learning identity and digital competence, as indicated by the p-value of 0.6271 for the interaction term in Model M₁. This is consistent with the findings of Basri et al. (2023), who found that digital competence is more strongly influenced by self-efficacy, interest, and experience than by biological sex. It suggests that motivation, adaptability, and device accessibility are much more important than the type of digital device used. Through the same lens, Alkan and Doğan (2022) conducted a research study concluding that although male and female learners may use digital platforms differently, such variation should not lead to significant differences in overall digital proficiency. These results are consistent across several studies, supporting the hypothesis of a non-sex-related influence on digital competence, with individual and contextual factors as the principal drivers.

On the other hand, the result contrasts with some of the studies reviewed in the literature, which suggest that sex plays a critical role in shaping digital competence and digital learning identity. The study by Pérez-Calderón et al. (2021), it revealed that sex significantly impacts the ability to use digital technologies in teaching, particularly noting the differences in digital competence by an individual's sex in digital competence. Correspondingly, Lissitsa et al. (2017) highlighted differences between males and females, as well as age, that affect teachers' digital competence, specifically noting that females face challenges in adopting digital learning tools in education.

Despite these assertions, the results of this study suggest that sex, when combined with digital learning identity, does not significantly influence digital competence. This result may be due to several factors, such as the possible evolution of digital competence in both sexes over time, with increasing accessibility to digital technology and the availability of training reducing the gap between men and women in digital skills. It is worth noting that the study by Gómez-Trigueros et al. (2020) highlights the importance of providing both male and female educators with the necessary resources and training to ensure inclusivity and integrate digital technologies into education. This aligns with the findings of this study, which suggest that other variables, such as access to

training and support, may better explain digital competence than sex alone.

Furthermore, the ANOVA results ($F=36.6798$, $p<.001$) and the regression model's significance indicate that, although the overall model is statistically significant, the interaction between digital learning identity and sex is not a key moderator of digital competence. This suggests that digital learning identity, more than sex, plays a pivotal role in shaping digital competence. This supports the idea that teachers' self-awareness and recognition of their strengths and weaknesses in utilizing digital technologies, as discussed by Zimmer et al. (2021), may be more influential than one's sex in fostering digital competence.

In line with the TPACK framework, which emphasizes integrating technological, pedagogical, and content knowledge, the findings suggest that factors such as digital learning identity are more critical for enhancing digital competence than demographic factors, such as sex. The TPACK framework posits that effective integration of technology requires an understanding of technology (TK), pedagogy (PK), and content (CK), and this study aligns with the idea that teachers' ability to integrate digital technology effectively into their teaching depends more on their digital learning identity than on sex alone. In conclusion, this study highlights that, while demographic factors like sex are often discussed in the literature as influencing digital competence, sex does not significantly moderate the relationship between digital learning identity and digital competence in this case.

The Mediating Effect of Age on the Relationship between Digital Learning Identity and Digital Competence

Presented in Table 4.2 is the moderating effect of age on the relationship between digital learning identity and digital competence of private senior high school teachers. The model summary shows that the r-squared value is 0.5344, indicating that only 53.44 percent of the variation in digital competence was explained by digital learning identity, moderated by age. The p-value implies that the model is significant in explaining the relationships among the variables. The table shows that the interaction p-value is 0.4003, indicating that age does not significantly mediate the relationship between digital learning identity and digital competence.

The analysis shows that the relationship between digital learning identity and digital competence is not moderated by age. The interaction term between digital learning identity and age had a p-value of 0.4003, greater than the

threshold of 0.05, indicating that age does not significantly moderate this relationship.

Table 4.2
The Mediating Effect of Age on the Relationship between Digital Learning Identity and Digital Competence

Model Summary-DCALL						
Model		R	R ²	Adjusted R ²	RMSE	
M ₀		0.7289	0.5313	0.5224	0.5834	
M ₁		0.7310	0.5344	0.5211	0.5841	
ANOVA						
Model		Sum of Squares	df	Mean Square	F	p
M ₁	Regression	41.1253	3	13.7084	40.1740	<.001
	Residual Total	35.8288	105	0.3412		
		76.9541	108			
Coefficients						
Model		Unstandardized	Standard Error	Standardized	t	p
M ₀	(Intercept)	2.2692	0.5003		4.5354	<.001
	DGLALL	0.5249	0.0897	0.5534	5.8507	<.001
	age	-0.2287	0.0971	-0.2228	-2.3549	0.0204
M ₁	(Intercept)	2.9937	0.9936		3.0130	0.0032
	DGLALL	0.3476	0.2283	0.3665	1.5223	0.1309
	age	-0.5369	0.3777	-0.5229	-1.4216	0.1581
	DGALL * age	0.0798	0.0945	0.2200	0.8445	0.4003

This result aligns with the study by Pérez-Calderón et al. (2021), which found that age can determine the level of digital competence among teachers, with younger groups demonstrating higher levels. However, this finding contrasts with the assertion made by Shah and Udgaonkar (2018), who suggested that a teacher’s age significantly influences their level of digital competence in teaching. Specifically, it posits that as teachers age, they often attain higher designations through their competence in digital learning tools. Furthermore, the study by Cantabrana et al. (2019) found that teachers need to connect their age and competencies to their professional practice, particularly when using digital technologies.

While the current study did not find a significant moderating effect of age, it is crucial to consider that other factors, such as professional development

programs or exposure to digital technology, may influence how age interacts with digital learning identity and digital competence.

Additionally, the TPACK framework, which is the theoretical foundation of this study, emphasizes the interconnection of content, pedagogy, and technology in effective teaching. The TPACK framework emphasizes the importance of teachers possessing content, pedagogical, and technological knowledge to effectively integrate digital technologies into the learning environment. Age may still play a role in how teachers approach integrating digital technology within the TPACK framework, with younger teachers possibly having a natural inclination toward digital technology due to their familiarity and comfort with digital tools. In comparison, older teachers may face challenges and require additional support, which must be considered and addressed.

The findings of this study also resonate with research by Lissitsa et al. (2017) and Krumsvik (2016), which highlighted the influence of demographic factors such as age on digital competence. While the present study did not find age to be a significant moderator, it is crucial to note that the relationship between digital learning identity and digital competence is complex and influenced by various contextual factors. The digital competence of teachers can be shaped by factors such as professional development, training opportunities, and personal motivation to engage with digital learning tools, which might explain why the moderating effect of age was not statistically significant in this study. In conclusion, while age did not significantly moderate the relationship between digital learning identity and digital competence in this study, the results still underscore the importance of considering demographic factors when investigating teachers' digital competencies. Therefore, while age may not have a strong moderating effect, it is essential to provide targeted support and professional development opportunities to teachers, particularly older teachers, to enhance their digital competence in line with the TPACK framework.

CONCLUSION

The demographic profile of senior high school teachers shows a balanced gender distribution and a slight majority of younger teachers (23-30 years). This indicates that digital learning identity and digital competence may not be strongly influenced by age or sex but may be more closely related to other factors, such as personal engagement and professional development. The level of digital learning identity across all sub-domains was high, indicating that

senior high school teachers are confident and engaged in using technology to enhance their learning and teaching practices. This implies that they are highly motivated to use technology in many ways. The level of digital competence among teachers was high, suggesting they are proficient in using digital technologies for educational purposes. This indicates that teachers are well-equipped to use a range of digital learning tools to enhance their students' learning environment. The significant positive relationship between digital learning identity and digital competence suggests that the more involved senior high school teachers are in their digital learning processes, the greater their competence with digital tools. The lack of significant effects from sex and age on the relationship between digital learning identity and digital competence shows that the key factor is how much teachers engage with digital tools, not their demographic traits. Thus, professional development should target all teachers equally to enhance their digital competence and improve student outcomes.

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