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Gender and Age as Determinants of Technological Efficacy of Teachers in Implementing the Standard-Based Curriculum in the Wa Municipality, Ghana

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Abstract

This study examined the impact of age and gender on technological self-efficacy of teachers in implementing Ghana's Standard-Based Curriculum (SBC). As the Ghanaian educational reforms increasingly integrate technology to enhance critical thinking, creativity, and digital literacy, understanding the influences of age and gender on the confidence of teachers in using digital tools is essential. A descriptive cross-sectional design with a sample of 280 in-service teachers in the Wa Municipality was used for the study. The Educational Technological Self-Efficacy Scale by Raphael and Mtebe (2017) was used to collect data for the study. The data were analysed descriptively and inferentially. Findings revealed that 35.0% of teachers reported lower technological self-efficacy, indicating substantial barriers to effective digital integration. Additionally, male and older teachers reported higher levels of perceived ease of use and support, highlighting demographic disparities in technology adoption. These results emphasize the need for targeted professional development and support systems to address specific demographic challenges in technology integration, ultimately enhancing the success of the SBC. The study contributes to a broader understanding of how age and gender shape technology use in education and provides insights for policy initiatives aimed at equitable technological competency development among teachers.

Keywords

Technological Self-Efficacy, Standard-Based Curriculum (SBC), Age, Gender, Technology Integration, Educational Reform, Digital Literacy, Teacher Demographics, Professional Development

1. Introduction

Through adopting technology, education systems around the globe are quickly modifying their practices to expedite the accelerated pace of teaching and learning for both teachers and students (Fishman et al., 2016; Malik, 2018; McHaney, 2023). The global shift towards technology is motivated not only by rapid technological innovation, but increasingly by positioning digital literacy as a key 21st-century skill (Tudose et al., 2024). However, much of the global work is conducted in the well-resourced classrooms of Europe, North America and selected Asia contexts and has not sought to explain the dynamics of the integration of technology into teaching in low- and middle-income countries (LMICs), especially scarce evidence in Sub-Saharan Africa, making generalizing findings about teachers' technological self-efficacy difficult across global contexts. It is important to note that the proper use of technology and the will to use it depend on the self-efficacy levels of those using it. Technological self-efficacy refers to an individual's belief in their capability to effectively use technology to accomplish specific tasks (Bandura & Wessels, 1997; Compeau & Higgins, 1995). Within the educational context, it represents teachers' confidence in integrating digital tools into teaching and learning, which directly influences their willingness to adopt technology-driven instructional practices. In the view of Wray et al. (2022), self-efficacy refers to people's faith in their capabilities to accomplish actions that will lead to a desired outcome. In the area of education, teacher self-efficacy has been shown to affect curriculum enactments.

In the African terrain, several studies have been conducted. For example, Mtebe (2020) found that instructors' belief in their ability to use e-learning systems in Tanzania was influenced more by organizational support and peer learning than by the mere availability of resources. Similarly, Hennessy et al. (2022) emphasized that teachers' technological confidence in low- and middle-income countries is sustained by ongoing professional development that provides continuous guidance and contextual relevance, rather than by isolated training programs. Bervell and Umar (2017) highlighted a notable research gap regarding technology adoption in K-12 education across Sub-Saharan Africa, pointing to the importance of examining teachers' technological self-efficacy in these settings. Furthermore, Dahri et al. (2023) demonstrated that performance expectancy is typically a strong predictor of technology adoption, which makes the finding of universally low expectancy among Ghanaian teachers both unusual and significant. Collectively, these studies provide a robust comparative framework, underscoring the original-

ity of the present study and situating its findings within broader conversations about technology use, self-efficacy, and educational innovation in resource-constrained environments.

In Ghana, the globalisation of these 21st-century drivers converges with the state-driven reform work including the Standards-Based Curriculum (SBC), targeted at developing learner critical thinking, creativity and technological capability (Chaitey, 2023). An important component of the SBC incorporates the effective use of technology for teaching, which requires teachers to access and develop strong technological self-efficacy, to meaningfully shape their teaching practices using digital tools (Rad et al., 2023). The present study of the process of technology integration in Ghana provides context-specific findings both responding to the significant gap in the global literature in LMIC contexts.

While beneficial to the noxious desire of education in Ghana, it also is fraught with challenges. New research suggests that demographic characteristics such as age and gender predispose teachers and impact their confidence and willingness to adopt new technologies and to a significant degree, shape the pace and preference of in-depth purposes of integration and teaching practices (Kerzic et al., 2021). For example, younger teachers are more often ready to adopt technology as a result of their exposure during pre-service training (Yushau & Nannim, 2020). The intricate relationships of these dynamics highlight a need to see how personal and demographic factors intertwine with structural limitations and barriers to influence technological self-efficacy in Ghanaian settings.

Although the aspect of gender in relation to technological self-efficacy has been explored in a number of studies, the existing evidence base is far from conclusive. While some research has shown that male teachers reported superior levels of self-efficacy towards using ICTs than female teachers (Azumah & Najah, 2024; Yadav, 2023), other researchers have argued that gender is not solely deterministic; the systemic access to meaningful training and professional development accounts for some of the differences (Yadav, 2023). The variability in results points to an evident gap in comparative research on gender and technological self-efficacy. In fact, majority of such studies have been conducted in well-resourced contexts; therefore, it remains unclear about how gender dynamics operate within the local and structural constraints of resource-poor contexts such as Sub-Saharan Africa.

In Ghana, the limited availability of professional technology development opportunities (Agyei & Voogt, 2011) raises questions about how gender interacts with structural barriers to education. It remains vital to understand whether the differences we observe can be attributed to a competency gap at the time of the survey. Taking Ghana's experience within the wider literature framework makes this study contextually relevant to help understand why we see the phenomenon of gender and technology integration often differ.

The integration of technology into educational practice has emerged as a worldwide priority, with many modern curricula articulating digital proficiency as a key

skill to have (Agormedah et al., 2022; Apau, 2021; Mahama, 2022). In Ghana, for example, the SBC is a clear example of this framework shift internationally: purposely developing critical thought and problem-solving skills through the purposeful incorporation of digital proficiencies within instructional approaches. Nevertheless, the degree of accomplishment of this reform predominantly hinges on the extent of teachers' technological self-efficacy since the self-efficacy of a teacher shapes their willingness to adapt, create, and adequately utilize curricular contexts. Teachers with greater technological self-efficacy are more likely to engage in experimentation with digital technologies, apply innovative practices, and be responsive and resilient in technology-enhanced settings (Ajani, 2024; Gomez et al., 2022; Kroesen, 2023). However, most studies have neglected the contexts in which self-efficacy functions as a moderating variable (e.g., unreliable infrastructure, and limited ICT resources and training inequities). This is why data from Ghana are particularly useful for observing how systemic barriers interact with demographic factors to shape teachers' confidence and effectiveness.

Again, the technological competency of teachers in Ghana varies as a result of inequities related to training, resource access, and demographic factors (e.g., age and gender). Studies confirm that these factors influence teachers' technology use and self-efficacy in the classroom. For example, younger teachers tended to be more adaptable to using digital tools, due in part to their exposure to technology during their teacher training (Agormedah et al., 2022). On the other hand, older teachers frequently have difficulty with new technologies, which can result in issues with integrating and limit the overall effectiveness of SBC (Almanthari et al., 2020; Liu, 2011). This age gap indicates the context-specific need for appropriate support and differentiated professional development that considers the unique experiences of early-career teachers and seasoned teachers. Gender differences complicate the matter further. Male teachers often report being more confident and using ICT more often in their practice, a trend based in part on social identity and gender inequities in access to culturally relevant training and ability to utilize resources (Hanham et al., 2021; Huffman et al., 2013; Scherer & Siddiq, 2015). However, relying on studies largely conducted outside of Sub-Saharan Africa detracts from the applications to Ghanaian context. The Ghanaian example provides important information about the way social identities and cultural systems intersect around systemic inequities in relationship to self-efficacy and tech use in education. Since both male and female teachers are integral to developing inclusive and technology-rich classrooms, it is important consider these topics through the context of Ghana as a means of expanding the body of knowledge and conversations about equity in technology use.

2. The Study Context

Ghana has a history of multiple educational reforms that take either national priorities or global trends into consideration. The most recent reform is known as the Standards-Based Curriculum (SBC) which is characterized by a focus on six

core competencies: critical thinking and problem solving (CP), creativity and innovation (CI), communication and collaboration (CC), cultural identity and global citizenship (CG), digital literacy (DL), and personal development and leadership (PL) (Apau, 2021; Mahama, 2022; Oppong, 2024). The general structure of the education system in Ghana includes nine years of basic education (early childhood, primary, and junior high), three years of secondary education, and three to four years of tertiary education through the use of universities, technical institutions, teacher training colleges, and nursing schools (NaCCA, 2019).

At face value, as stated, the curriculum is good considering! However, for the curriculum to effectively and appropriately address the contextual realities of teacher preparation, resources, and demographics, there must be a wider acceptance of the curriculum. As Agormedah et al. (2022) state, the quality of education and curriculum is dependent on not only the design of a curriculum but also on the ability of teachers to be equipped with the necessary knowledge and skills to effectively use the curriculum. Additionally, the intersection of the age and gender along with the epistemological issue of self-efficacy around technology utilization, presents serious implications for the long-term viability of the SBC in Ghana.

Recent studies have looked closely at all of these teacher values (Ofosu-Asare, 2024; Annan-Brew et al., 2024; Asare et al., 2023), and have indeed discovered that the integration of ICT cannot be separated from the confidence teachers have and their level of skill. In the case of Ghana, these realities indicate that policy implementation must proceed further than a curriculum reform and address demographic divisions in access to equitable training and structured professional development. Through the analysis of how age and gender influence tech efficacy in Ghana, this study provides stakeholders with context-specific examples possible to examining barriers to ICT adoption, and also highlights how context-specific evidence from the Ghanaian case can advance global knowledge of structural and practical challenges that might be suggestively invisible in more resource-rich contexts. Ultimately this study addressed the following two questions:

1) What are the levels of teachers' technological self-efficacy in implementing the SBC in Ghana?

2) What are the contributions of (a) age and (b) gender of teachers on their technological self-efficacy in implementing the SBC in Ghana?

3. Materials and Methods

3.1. Design and Sample Selection

This study utilized a descriptive cross-sectional survey design, selecting a sample of 280 in-service teachers from the Wa Municipality through a cluster sampling procedure. A cluster sampling procedure was adopted because the study population was geographically dispersed. This approach allowed for efficient data collection from naturally occurring groups (schools) while ensuring representativeness across diverse educational settings. The sample consisted of 55% (154) males and

45% (126) females. The teachers held various qualifications, including Diplomas, Bachelor's, and Master's degrees, and were actively employed by the Government of Ghana under the Ghana Education Service.

3.2. Instrumentation

A questionnaire was adopted to collect data, specifically designed to address the research question posed in this study. The instrument included two main sections: demographic information (covering gender and age) and technological self-efficacy. Three primary variables were examined within the questionnaire. Gender was defined as the biological categorization of participants as male or female. Age represented the teachers' chronological age, measuring the number of years they have accumulated since birth. Technological self-efficacy was assessed using the Educational Technological Self-Efficacy Scale by Raphael and Mtebe (2017), which includes four dimensions across 19 items: performance expectation ($\alpha = 0.79$), perceived ease of use ($\alpha = 0.81$), social influence ($\alpha = 0.70$), and support ($\alpha = 0.73$), with an overall composite reliability of $\alpha = 0.909$.

3.3. Data Collection

Ethics were prioritized due to the involvement of human subjects. Ethical approval was obtained from the University of Cape Coast's Institutional Review Board (UCCIRB), identified as CES-ERB/UCC-EDU/V4/20-54. School principals, serving as gatekeepers, were informed of the study's purpose before data collection began. To minimize the risk of participant withdrawal, the anonymity of respondents was assured, and confidentiality of the data provided was strictly maintained. Following these steps, questionnaires were distributed to selected respondents across various schools. Completing the questionnaire took approximately 15 minutes, although respondents were given a three-day period to return the completed forms. This extended timeframe allowed respondents to balance their daily responsibilities while completing the questionnaire at their convenience.

3.4. Data Analysis

The collected data were organized and entered into SPSS version 26. The data were then screened and edited to identify potential outliers, although no outliers were detected. Descriptive statistics, including means, standard deviations, skewness, and kurtosis, were calculated to verify the data's adherence to required assumptions. Additionally, a simple bivariate correlation was conducted to explore the relationships between gender, age, and technological self-efficacy. Frequency counts and percentages were used to examine levels of technological self-efficacy. Furthermore, a simple multivariate linear regression analysis (using a stringent alpha level of 0.01) was employed to investigate the relationship between age and technological self-efficacy, while a One-Way MANOVA was applied (using a stringent alpha level of 0.01) to assess the impact of gender on technological self-

efficacy.

4. Results

Preliminary Results/Assumption Test Results

The descriptive statistics for the study variables are summarized in Table 1. The variable *gender* showed a relatively balanced distribution between male and female respondents (M = 1.45, SD = 0.50). The skewness and kurtosis values ranged between the recommended threshold ±2 and ±7, suggests that the distribution of gender was approximately symmetrical but slightly platykurtic, indicating a flatter-than-normal distribution. For *technological self-efficacy*, the distribution appeared normal (M = 1.96, SD = 0.81). The skewness and kurtosis values ranged between the recommended threshold ±2 and ±7, showing that the distribution of gender was approximately symmetrical but slightly platykurtic, indicating a flatter-than-normal distribution. The variable *age* showed seemingly balanced distribution (M = 22.38, SD = 2.68). The skewness and kurtosis values showed a positively skewed distribution with a leptokurtic shape. This suggests that the age variable was skewed to the right, with more respondents in the lower age range, and had a sharper peak than a normal distribution.

Table 1. Descriptive results of the variables.

Variables	Mean	SD	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	S. E	Statistic	S. E
Gender	1.45	0.50	0.202	0.146	−1.973	0.290
Technological Self-efficacy	1.96	0.81	0.072	0.146	−1.485	0.290
Age	22.38	2.68	1.730	0.146	7.681	0.290

The correlation matrix in Table 2 presents relationships among the study's primary variables: gender, age, technological self-efficacy composite, and several aspects of technological self-efficacy, including performance expectancy, perceived ease of use, social influence, and support.

Gender showed a significant negative correlation with age (r = −0.180, $p < 0.002$), indicating a weak but statistically significant inverse relationship, suggesting that as age increased, there was a slight decrease in gender coding (with male and female coded differently). Specifically, the correlation suggests that female teachers tend to be younger than male teachers. This demographic pattern could result from recent recruitment drives that have attracted younger female teachers into the profession. It also implies that the older teaching cohort is more likely to be male, perhaps due to historical gender imbalances in teacher education and employment. Gender also had a negative correlation with the technological self-efficacy composite (r = −0.204, $p < 0.001$), indicating that males reported slightly higher technological self-efficacy than females. Additionally, Gender correlated

negatively with perceived ease of use (r = −0.164, $p < 0.006$) and Support (r = −0.188, $p < 0.002$), suggesting that males perceived technology as slightly easier to use and felt more supported in their technology use compared to their female counterparts.

Table 2. Correlation matrix of the study variables.

Variables		1	2	3	4	5	6	7
Gender (1)	Pearson Correlation	1						
	Sig. (2-tailed)							
Age (2)	Pearson Correlation	−0.180**	1					
	Sig. (2-tailed)	0.002						
Technological Self-Efficacy Composite (3)	Pearson Correlation	−0.204**	0.211**	1				
	Sig. (2-tailed)	0.001	0.000					
Performance Expectancy (4)	Pearson Correlation	−0.092	0.084	0.558**	1			
	Sig. (2-tailed)	0.126	0.163	0.000				
Perceived Ease of Use (5)	Pearson Correlation	−0.164**	0.137*	0.709**	0.538**	1		
	Sig. (2-tailed)	0.006	0.022	0.000	0.000			
Social Influence (6)	Pearson Correlation	−0.112	0.198**	0.704**	0.472**	0.585**	1	
	Sig. (2-tailed)	0.060	0.001	0.000	0.000	0.000		
Support (7)	Pearson Correlation	−0.188**	0.150*	0.676**	0.414**	0.451**	0.506**	1
	Sig. (2-tailed)	0.002	0.012	0.000	0.000	0.000	0.000	

**Significant at ≤ 0.01 level; *significant at ≤ 0.05 level.

Age was positively correlated with the technological self-efficacy composite (r = 0.211, $p < 0.000$), indicating that as teachers' age increased, so did their overall technological self-efficacy. Age also showed a significant positive correlation with social influence (r = 0.198, $p < 0.001$), suggesting that older teachers felt a stronger social influence or motivation from peers to use technology. Furthermore, age had a low positive correlation with perceived ease of use (r = 0.137, $p < 0.022$) and support (r = 0.150, $p < 0.012$), indicating a slightly higher perceived ease and support for technology use among older teachers.

Technological self-efficacy (composite) was strongly correlated with each of its subscales: performance expectancy (r = 0.558, $p < 0.000$), perceived ease of use (r = 0.709, $p < 0.000$), social influence (r = 0.704, $p < 0.000$), and support (r = 0.676, $p < 0.000$). These strong correlations reflect that each dimension contributed significantly to the composite measure of technological self-efficacy.

The subscales of technological self-efficacy were also positively correlated with one another, with correlations ranging from moderate to high. For example, per-

ceived ease of use and performance expectancy (r = 0.538, $p < 0.000$), and social influence and support (r = 0.506, $p < 0.000$), indicating that as teachers' perceptions of ease and support increased, so did their expectations of performance and influence from social factors in using technology. Recognising this demographic tendency is crucial when interpreting subgroup comparisons because it highlights that gender and age are not independent in the sample. Therefore, differences in technological efficacy by gender might partially reflect age-related experience differences rather than purely gender-based disparities.

These findings collectively highlight the roles of gender and age in shaping teachers' perceptions of their technological self-efficacy. Specifically, the data indicate that male and older teachers generally reported higher technological efficacy, with various subcomponents of technological self-efficacy strongly interrelated, suggesting an integrated approach to fostering these attributes could be beneficial.

Research Question One: *What are the levels of teachers' technological self-efficacy in implementing the SBC in Ghana*?

The results in Table 3 provide a descriptive analysis of teachers' technological self-efficacy in implementing the Standard-Based Curriculum (SBC), focusing on their overall self-efficacy and four key dimensions: performance expectancy, perceived ease of use, social influence, and support.

Table 3. Levels of technological self-efficacy in implementing the standard-based curriculum (SBC).

Overall Teachers' Technological Self-Efficacy		
Levels	**Frequency**	**Percent**
Low Level	98	35.0
Moderate Level	95	33.9
High Level	87	31.1
Total	280	100.0
Levels based on the Dimensions of Teachers' Technological Self-Efficacy		
Performance Expectancy Dimension		
Low Level	280	100.0
Perceived Ease of Use Dimension		
Low Level	94	33.6
Moderate Level	106	37.9
High Level	80	28.6
Total	280	100.0

Continued

Social Influence Dimension		
Low Level	96	34.3
Moderate Level	134	47.9
High Level	50	17.9
Total	280	100.0
Support Dimension		
Low Level	99	35.4
Moderate Level	97	34.6
High Level	84	30.0
Total	280	100.0

In terms of overall technological self-efficacy, teachers were distributed across three levels. Approximately 35.0% of teachers was within the low level of technological self-efficacy, indicating limited confidence in their ability to use technology effectively for SBC implementation. In contrast, 33.9% of teachers reported a moderate level of self-efficacy, suggesting that while they had a baseline comfort level with technology, they might lack the full confidence needed for optimal integration. The remaining 31.1% of teachers reported high technological self-efficacy, indicating they felt well-prepared to use technology in delivering the curriculum. This spread suggests that while a majority of teachers (68.9%) reported at least moderate levels of technological self-efficacy, a considerable portion still experiences significant limitations.

An examination the levels of technological self-efficacy across specific dimensions reveals nuanced insights into teachers' readiness and perceived challenges. For the Performance Expectancy dimension, all teachers (100%) reported a lower level of self-efficacy. This indicates a broad concern regarding their expected performance in using technology for educational purposes. The low confidence in performance expectancy suggests that teachers may doubt their capacity to achieve desired educational outcomes with technology, which could reflect broader apprehensions about their technological proficiency and instructional effectiveness in a technology-integrated environment.

In the perceived ease of use dimension, the distribution is more varied, with 33.6% of teachers at the low level, 37.9% at the moderate level, and 28.6% at the high level. A moderate majority suggests that most teachers found technology somewhat accessible and manageable but still faced challenges that may affect their confidence and consistency in integrating it into their teaching. This mixed level of perceived ease of use points to the importance of tailored training and support efforts to make technology more accessible and intuitive for all educators.

The social influence dimension also reflects varied responses, with 34.3% of

teachers at a low level, 47.9% at a moderate level, and 17.9% at a high level of self-efficacy. These findings suggest that social factors, such as encouragement from peers or expectations from the education system, moderately influenced teachers' attitudes toward technology use. However, the relatively small percentage of teachers at a high level of social influence indicates that stronger social support mechanisms may be necessary to further motivate technology adoption in the classroom.

Finally, the support dimension shows a fairly even distribution of self-efficacy levels among teachers: 35.4% at the lower level, 34.6% at the moderate level, and 30.0% at the high level. This range implies that while some teachers felt adequately supported, a significant portion still perceived a lack of support, potentially hindering their effective use of technology. Adequate support whether in the form of resources, mentorship, or technical assistance—is critical to empowering teachers to integrate technology seamlessly into their instructional practices.

Research Question 2a: *What is the contribution of age on technological self-efficacy of teachers in implementing the SBC in Ghana*?

Table 4. Multivariate regression results on age against their technological self-efficacy in implementing SBC.

Dependent Variable	Parameter	B	SE	t	Sig.	LLCI	ULCI	f^2
Technological Self-Efficacy Composite	Intercept	0.53	0.40	1.32	0.188	−0.511	1.57	0.006
	Age	0.06	0.02	3.60	0.000	0.018	0.11	0.044
Performance Expectancy	Intercept	13.72	1.81	7.60	0.000	9.04	18.40	0.172
	Age	0.11	0.08	1.40	0.163	−0.096	0.32	0.007
Perceived Ease of Use	Intercept	10.16	2.16	4.70	0.000	4.55	15.76	0.074
	Age	0.22	0.096	2.30	0.022	−0.03	0.47	0.019
Social Influence	Intercept	6.48	1.39	4.67	0.000	2.88	10.08	0.073
	Age	0.21	0.06	3.37	0.001	0.048	0.37	0.039
Support	Intercept	9.29	2.08	4.46	0.000	3.88	14.70	0.067
	Age	0.23	0.09	2.54	0.012	−0.01	0.47	0.023

a. Computed using alpha = 0.01.

The results in Table 4 present the multivariate regression analysis examining the effect of age on various dimensions of technological self-efficacy in implementing SBC among teachers. Age was found to be a statistically significant predictor of the overall technological self-efficacy [$B = 0.06$, SE = 0.02, t = 3.60, $p < 0.000$)], indicating that as age increases, teachers' overall technological self-efficacy in implementing SBC also tends to increase. The effect size ($f^2 = 0.044$) suggests a small but meaningful effect of age on the composite measure. However, age did not predict the performance expectancy dimension of the teachers' tech-

nological self-efficacy [$B = 0.11$, SE = 0.08, t = 1.40, $p < 0.163$)]. This finding implies that teachers' expectations of their performance in implementing SBC when using technology was not strongly influenced by age. Furthermore, teachers' age significantly predicted perceived ease of use in implementing SBC [$B = 0.22$, SE = 0.096, t = 2.30, $p < 0.022$], indicating that as teachers grow in age, they perceived technology as somewhat easier to use. Although the effect size was small ($f^2 = 0.019$), it is statistically significant. Again, teachers' age was also a significant predictor of social influence in implementing SBC [$B = 0.21$, SE = 0.06, t = 3.37, $p < 0.001$)], suggesting that older teachers felt more influenced by social factors to adopt technology in their teaching. The effect size ($f^2 = 0.039$) indicates a small, but reliable effect of age on social influence. Finally, teachers' age had a significant positive effect on support in implementing SBC [$B = 0.23$, SE = 0.09, t = 2.54, $p < 0.012$), suggesting that as teachers grow in age, they perceived themselves as receiving more support for technology use. The effect size ($f^2 = 0.023$) indicates a small effect of age on perceived support.

Research Question 2b: *What is the contribution of gender on technological self-efficacy of teachers in implementing the SBC in Ghana*?

Table 5. Teachers' gender predicting their technological self-efficacy in SBC implementation.

Dependent Variable	Parameter	*B*	SE	T	Sig.	LLCI	ULCI	f^2
Technological Self-Efficacy Composite	Intercept	1.78	0.071	25.02	0.000	1.593	1.962	0.692
	Male_Dum	0.33	0.096	3.47	0.001	0.084	0.581	0.042
Performance Expectancy	Intercept	15.87	0.319	49.72	0.000	15.037	16.693	0.899
	Male_Dum	0.66	0.430	1.54	0.126	-0.455	1.777	0.008
Perceived Ease of Use	Intercept	14.30	0.381	37.59	0.000	13.315	15.288	0.836
	Male_Dum	1.42	0.513	2.77	0.006	0.088	2.750	0.027
Social Influence	Intercept	10.77	0.249	43.3	0.000	10.125	11.415	0.871
	Male_Dum	0.63	0.335	1.89	0.060	-0.237	1.503	0.013
Support	Intercept	13.67	0.366	37.31	0.000	12.717	14.617	0.834
	Male_Dum	1.58	0.494	3.20	0.002	0.299	2.861	0.036

a. Computed using alpha = 0.01.

The results presented in Table 5 show the influence of gender on various dimensions of technological self-efficacy in the context of Standard-Based Curriculum (SBC) implementation. Gender, represented by the male (Male_Dum), was a significant predictor of the overall technological self-efficacy in implementing the SBC [B = 0.33, SE = 0.096, t = 3.47, $p < 0.001$)]. This result suggests that male teachers reported higher levels of overall technological self-efficacy compared to their female counterparts. The confidence interval for the males ranged from

0.084 to 0.581, with an effect size ($f^2 = 0.042$) indicating a small but significant effect of gender on overall technological self-efficacy. Again, gender significantly predicted perceived ease of use in implementing the SBC [B = 1.42, SE = 0.513, t = 2.77, $p < 0.006$)]. Male teachers reported higher ease of use regarding technology integration in implementing the SBC. The effect size ($f^2 = 0.027$) shows a small but meaningful effect of gender on perceived ease of use. Furthermore, gender had a significant effect on Support [B = 1.58, SE = 0.494, t = 3.20, $p < 0.002$), with male teachers reporting higher levels of perceived support for technology use in implementing the SBC compared to female teachers. The effect size ($f^2 = 0.036$) indicates a small but significant effect of gender on perceived support for technology use.

However, gender was not a statistically significant predictor of performance expectancy in implementing the SBC [B = 0.66, SE = 0.430, t = 1.54, $p > 0.126$)]. This result implies that male and female teachers did not differ significantly in their expectations of how well they performed when using technology. Furthermore, gender was not statistical significance for social influence in implementing the SBC [B = 0.63, SE = 0.335, t = 1.89, $p > 0.060$)]. This result indicates that male and female teachers experience similar levels of social encouragement or expectations to use technology in implementing the SBC.

5. Discussion

The results bring forward valuable information regarding teachers' technological self-efficacy in delivering the Standard-Based Curriculum (SBC) while also highlighting the demographic characteristics that contribute to the observed results. Overall, teachers had a broad range of self-efficacy response levels (low, moderate, and high) and a substantial number reported low self-efficacy levels in using technology effectively. This is concerning since SBC requires the integration of technology and contrasts with findings that teachers' self-efficacy was positively related to their openness to integrating technology (Agormedah et al., 2022; Han et al., 2017; Xu et al., 2024). According to Bandura's Self-Efficacy Theory (1997), beliefs in people's capability to carry out an outcome is shaped from the four primary sources of self-efficacy, these four sources are: mastery experiences, vicarious learning, verbal persuasion, and physiological/emotional states. Considering Bandura's perspective, the low levels of technological self-efficacy evident in our study may be attributed to a lack of mastery experiences in using digital tools, and if teachers were provided any modelling or peer demonstration it may have been inconsistent. Teachers with lower levels of successful experiences engaging with technology are less likely to exhibit a sense of efficacy when considering how to incorporate ICT into their classroom. Further, if teachers did not feel supported by their peers (verbal persuasion), nor during the professional development sessions, teachers' sense of efficacy would decline and this may explain the mixed results on the social dimension of influence.

On the performance expectancy dimension, teachers reported similarly low lev-

els of self-efficacy. The finding is particularly striking. This outcome suggests that the teachers may not perceive technology as a meaningful tool for improving their instructional performance. One possible explanation lies in the misalignment between the Standard-Based Curriculum and available technologies. Many teachers may find that digital tools do not adequately support the content and pedagogical approaches demanded by the curriculum. Another likely factor is the lack of convincing evidence or visible success stories demonstrating the effectiveness of technology integration in their specific context. Teachers who have not observed tangible improvements in teaching or learning outcomes are less likely to view technology as performance-enhancing. Moreover, insufficient pedagogical training and professional support can diminish confidence in using digital tools effectively. When training focuses primarily on technical skills without addressing pedagogical integration, teachers may struggle to connect technology use with improved performance. Resource constraints such as unreliable electricity, limited internet access, and inadequate hardware also contribute to this low expectancy. These systemic barriers make technology use seem impractical or burdensome, further discouraging teachers from expecting positive outcomes. Collectively, these factors suggest that the low performance expectancy observed is not a reflection of resistance to innovation but rather a consequence of contextual and structural limitations that shape teachers' perceptions and behaviours. Furthermore, it appears majority of the teachers did not believe when using technology it would lead to successful learning. According to Bandura, a decline in efficacy beliefs about outcome expectations is taking place—the teachers may know how to use specific tools but believe that it will not lead to student achievement. This could be a result of limited professional development or unsuccessful experiences with technology in the past, as Apau (2021) stated that practical training is critical to efficacy belief.

With perceived ease of use, majority of teachers reported moderate self-efficacy. Bandura would consider this a partial mastery experience—while teachers have some knowledge of technology through training programs, moderate levels suggest a lack of continual reinforcement. Without further opportunities for practice, tentativeness rather than strength will be reflected in teacher self-efficacy. Social influence presented varied self-efficacy levels, but most teachers noted moderate levels of support. This suggests that some encouragement has been offered by peers and institutions; not a strong enough degree to engender a sense of readiness involving technology for the collective group. Bandura emphasizes vicarious experience and social persuasion, and this is important here, as teachers need some observed colleagues using ICT in effective ways and then continue being encouraged to build on teacher efficacy beliefs. The support dimension also indicated some level of distribution across low, moderate and high levels suggesting, at times, resources, mentorship and administrative support were not consistent. In Bandura's terms, external support systems could be in the role of foils of mastery experience and the fluctuation in support also means that efficacy belief would fluctuate.

Demographic analyses provided additional insight. Age significantly predicted overall technology self-efficacy and most dimensions. Older teachers stated having higher ease of use and stronger social influence and perceived support than younger teachers, which could be due to these teachers having gathered experience and exposure to a variety of potential innovations over the years (Dadzie et al., 2025). This finding sharply contradicts the assertion that younger teachers are more often ready to adopt technology as a result of their exposure during preservice training (Yushau & Nannim, 2020). Likewise, gendered responses played a role on some dimensions, as male teachers reported higher scores for overall technological self-efficacy, perceived ease of support use and perceived. This conforms with the notion raised by Kollias et al. (2023) that cultural perceptions of males being proficient with technology can enhance male teachers' efficacy beliefs. However, there was no difference in performance expectancy or social influence based on gender, suggesting that when it comes to relying on technology to perform, and feeling social pressure to continuing utilizing the technology, teachers share similar barriers.

6. Conclusion

The outcomes emphasise that teachers' technological self-efficacy is inconsistent and dependent on various factors of age, gender, institutional support, and past experiences. The experience of teachers indicated low performance expectancy which exposes an understanding of sceptics of the role of technology in achieving a successful experience, moderate ease of use, and social influence, illustrating a partial advance in teachers working toward feeling confident to absolutely using technology during instruction. From a Bandura's Self-Efficacy Theory, the educators' responses provide urgency from signalling for intervention to develop their mastery experiences, peer modelling, and continual support and institutional praise. The success of Ghana's SBC policy framework and reconciling the gaps in self-efficacy of teachers is essential for generating a sustainable path towards curriculum reform.

7. Implications for Policy and Practice

The study offers critical implications for policymakers, educational administrators, and curriculum developers within Ghana's education sector. Firstly, the findings emphasize the need for tailored professional development programmes that address age-specific and gender-specific challenges in technology adoption. Given the low self-efficacy observed among female and younger teachers, professional development initiatives should include targeted training that builds technology skills and confidence across all demographics, ensuring equitable access to resources and support. Additionally, this study suggests that support mechanisms such as mentorship programmes and collaborative networks should be strengthened to bolster social influence and encourage a culture of shared learning and peer support among teachers. Addressing these areas could foster a positive atti-

tude toward technology use, leading to a more successful and consistent implementation of the SBC. Moreover, the significant influence of technological self-efficacy on teachers' performance in SBC implementation underscores the importance of sustained investment in technological resources, making ICT tools more accessible and manageable within the classroom environment.

8. Limitations of the Study

While this study provides valuable insights into the relationship between demographic factors and technological self-efficacy, several limitations were acknowledged. First, the study's cross-sectional design restricts the ability to draw causal inferences between demographic variables and technological self-efficacy. Second, the study relies on self-reported information from teachers, which may introduce social desirability bias and affect the accuracy of responses. Additionally, the sample was limited to in-service teachers within one municipality in Ghana, which may limit the generalizability of findings to other regions or educational contexts. Despite these limitations, the study offers a foundation for future research and policy initiatives aimed at enhancing teacher efficacy and technology integration within Ghana's evolving educational landscape.

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Data Availability Statement

The authors will provide access to the raw data supporting the findings of this study upon reasonable request.

Conflicts of Interest

We declare that no commercial or financial relationships could be perceived as conflicts of interest in the article.

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