
Advancing Mathematics Instruction through Professional Development: Effects on Teaching Strategies and Technology Integration in SHSs within Volta Region

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Abstract

The surge in Professional Development (PD) programs initiated by the Ghana Education Service since 2020 has spurred numerous empirical investigations. The study assessed the effectiveness of Professional Development programs on Teaching Strategies and Technology Integration in SHSs within Volta Region. The study was limited to the districts in the central middle belt of the Volta region of Ghana. Thus, 21 public SHS or SHTS with a total permanent mathematics teaching staff strength of 252 was used as the population of study. The study targeted sample size of 155 was determined using the Yamane Taro's sample size determination approach. Sampling was done using stratified sampling method combined with purposive sampling. Data was collected using questionnaires and of which 150 completed questions were retrieved. The empirical model used was the ordered logistic model due to the ordered nature of the dependent variable (low, moderate and high effectiveness). Interpretations were done using the odd-ratios. The study result indicates that participation in professional development programs exerts significant effects on surveyed mathematics teachers' instructional strategies improvement and integration of educational technological tools in lesson delivery. The results further expand the constructivist viewpoint by showing that organized, proactive involvement in PD programs improves both instructional strategies and information technology application, while providing a contrasting perspective to Cognitive Load Theory within professional teacher development. The novelty of the study is that it delivers a thorough and robust analysis through a precise modeling technique, with reference to

the characteristics of the dependent variable. This method creates a distinct and strong analytical framework for upcoming research exploring comparable constructs. The results highlight the significance of policies that encourage ongoing and consistent involvement of mathematics educators in professional development initiatives.

Keywords: Teachers Professional Development, Instructional Strategies, ICT Tools

1. Introduction

Globally, teacher Continuing Professional Development (CPD) is recognized as a key mechanism for improving teacher quality, student learning, and overall educational outcomes (Osei-Owusu, 2022). CPD encompasses all structured learning experiences and planned activities that directly or indirectly benefit individuals, groups, and schools, thereby contributing to educational quality in the classroom (Benning, 2019). It involves systematic efforts to enhance educators' professional knowledge, skills, and attitudes, ultimately improving student learning (Adams et al., 2023). Despite these intentions, sustaining change remains a persistent challenge, as many CPD initiatives fail to produce lasting transformations in classroom practice (Adams et al., 2023). This research is unique in its dual exploration of how the professional development programs of the National Teaching Council (NTC) affect both the instructional strategies of mathematics teachers and their use of educational technology in the central middle belt of the Volta Region. In contrast to earlier studies that mainly concentrated on student performance, this research offers empirical data connecting the frequency of teachers' involvement in workshops, in-service training, online sessions, peer mentoring, and professional learning communities to tangible enhancements in teaching practices and ICT integration. The study further expands the constructivist viewpoint by showing that organized, proactive involvement in PD programs improves both instructional strategies and information technology application, while providing a contrasting perspective to Cognitive Load Theory within professional teacher development. The research utilizes a suitable model that effectively fit the data and corresponds with the characteristics of the dependent variable. It delivers a thorough and robust analysis through a precise modeling technique, with reference to the characteristics of the dependent variable. This method creates a distinct and strong analytical framework for upcoming research exploring comparable constructs. The study highlights the significance of policies that encourage ongoing and consistent involvement of math educators in professional development initiatives.

2. Problem Statement, Hypothesis Development and Theoretical Underpinnings

The move towards a thorough professional development program for teachers has been lauded by members of academia as supporting the notion that teaching is a profession. For instance, in 2020, the National Teaching Council (NTC) and the Ministry of Education (MoE) released a national framework for professionalizing teacher preparation (NTC, 2020). Participating in Professional Development (PD) activities and maintaining up-to-date records are now requirements for promotions and retaining a teacher's position as a professional in Ghana under the new NTC framework. Teachers are responsible for enhancing their professional abilities. The number and effectiveness of Professional Development (PD) programs attended over the specified period are used to determine the cut-off credit point that licensed instructors must obtain within a three-year period (Bornaa et al., 2023; Osei-owusu, 2022). The National Teaching Council announced a few chosen programs and the relevant criteria under which they would be accepted as contributing to the Professional Development (PD) of teachers in order to avoid placing instructors across the nation on suspension while looking for suitable Professional Development (PD) programs. The efficacy of Ghana's initiative to elevate teacher quality through mandated professional development programs remains uncertain (Abakah et al., 2022). While it aims to bolster teaching practice, questions linger about whether it will genuinely enhance pedagogical content knowledge and instructional methods or merely serve as a box-ticking exercise for career advancement within the education sector (Adams et al., 2023; Osei-owusu, 2022).

The surge in Professional Development (PD) programs initiated by the Ghana Education Service since 2020 has spurred numerous empirical investigations (e.g. Abakah, 2023; Adams et al., 2023; Osei-owusu, 2022). However, these studies have predominantly offered broad examinations covering all subjects, with only a sparse focus on mathematics. Existing research on mathematics Professional Development Activities (PDA), such as those by Adams et al., (2023), Benning, (2019) and Borna et al., (2023) has been confined to specific schools or regions, making it challenging to generalize findings across all Senior High Schools (SHS) in Ghana. Moreover, many studies have primarily concentrated on their impact on classroom delivery (e.g. Borna et al., 2023), student knowledge and performance (e.g. Osei-owusu, 2022) and technological pedagogical content knowledge (e.g. Adams et al., 2023), neglecting a comprehensive assessment of mathematics teachers' Instructional Strategies, Techniques, and Use of Educational Technologies.

Notwithstanding the above empirical gap, theoretically, constructivism highlights active learning through experiences, interactions, and reflection, emphasizing Professional Development (PD) programs that foster engagement, collaboration, and reflection (Osei-Himah & Adu-Gyamfi, 2022). Conversely, Cognitive Load Theory warns that overwhelming teachers with excessive information or complex strategies can lead to cognitive overload, hindering effective learning. This indicates mixed assertions regarding Professional Development (PD) programs by the two theories. The above empirical and theoretical gap necessitates a focused investigation aimed at rigorously evaluating the effectiveness of various National Teaching Council

(NTC) Professional Development (PD) programs in enhancing mathematical teachers' Instructional Strategies, Techniques, and Use of Educational Technology in Selected SHS in the Ho Municipality.

The study tested the following null hypotheses:

H₁: NTC professional development programs have no significant impact on mathematics teachers' instructional strategies in selected Senior High Schools in the central middle belt of the Volta Region.

H₂: Participation in NTC professional development programs does not significantly affect mathematics teachers' integration of educational technology in teaching in selected Senior High Schools in the central middle belt of the Volta Region.

3. Methodology

3.1. Population, Sample Size and Sampling

The study was limited to the districts in the central middle belt of the Volta region of Ghana. This classification of the region into enclaves is consistent with report from the World Food Programme, (2022). In all, there are 4 administrative districts or municipalities in the central middle belt of the Volta region of Ghana with a total of 21 public SHS or SHTS based on 2025 published list. A total permanent mathematics teaching staff strength of 252 was used as the population of study. This number was used as the population of study. The study targeted sample size was determine using the Yamane Taro's sample size determination approach: $n = N \div i + Ne^2$

n = the unknown sample size

N = Population of the study; Mathematics teachers at the SHS within the central middle belt of the Volta region

e = Significance level = 0.05

i = 1 which is a theoretical constant

Hence, sample size (n) = $\frac{252}{[1+252(0.05)^2]} = 155$ approximately.

The study employed a combination of the purposive and stratified sampling technique. The purposive sampling technique is appropriate for the study as the targeted individuals for the study captures SHS mathematics teachers in the public SHS within the central middle belt of the Volta Region. For stratified sampling, the study divided the number of participants among the 4 districts and hence ensured that at least 5% of the sample size (7 mathematics teachers) were sampled per district.

3.2. Data gathering Instruments, Variable definition and Empirical Model Specification

The questionnaire items were designed on a three-point Likert scale and administered via Google Forms to facilitate easy distribution and data collection.

3.3. Variable Definition

Table 1. Measurement, Empirical Validation of Main Variables and Model

Variable	Construct	Description	Empirical Validation (Abakah et al., 2023; Goka et al., 2023; Mensah et al., 2023)
Professional Development Programs	Workshops/Seminars (WkSem)	1-3 indicating levels of participation/attendance (low, moderate and high).	(Abakah et al., 2023; Goka et al., 2023; Mensah et al., 2023)
	In-service Training (InServ)	1-3 indicating levels of participation/attendance (low, moderate and high).	(Abakah et al., 2023; Goka et al., 2023; Mensah et al., 2023)
	Online Training (Online)	1-3 indicating levels of participation/attendance (low, moderate and high).	(Abakah et al., 2023; Goka et al., 2023; Mensah et al., 2023)
	Mentorship (Mentor)	1-3 indicating levels of participation/attendance (low, moderate and high).	(Abakah et al., 2023; Goka et al., 2023; Mensah et al., 2023)
	Professional Learning Community (PLC)	1-3 indicating levels of effectiveness or improvement (low, moderate and high)	(Amemasor et al., 2025; Lochmiller, & Russell, 2022)
Instructional Strategies	Instra	1-3 indicating levels of effectiveness or improvement (low, moderate and high)	(Lochmiller, & Russell, 2022)

Educational Technology usage	EduTech	1-3 indicating levels of effectiveness or improvement (low, moderate and high)	(Lochmiller, and Russell, 2022)
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Authors' Construct, 2025

The empirical model used is as below:

$$Y_i = Wksem_i + Inservi_i + Online_i + Mentor_i + PLC_i + Gender_i + Age_i + Qual_i + Exper_i + \epsilon_i$$

Where Qual=Level of Qualification of the individual, and, Exper= years of experience.

And Y_i = Instructional Strategies (Intra) or Educational Technology usage (EduTech)

The empirical model used is the ordered logistic model. This was used because the dependent variables are ordered (low, moderate and high effectiveness).

$$\text{Thus: } Y_i = \begin{cases} 1, \text{ low effectiveness} \\ 2, \text{ moderate effectiveness} \\ 3, \text{ high effectiveness} \end{cases}$$

The result interpretations were done using odd ratios, which captures the exponent of the various coefficients. This was necessitated because the coefficients of ordered logistics are odd values and demands their relative ratios for interpretation purposes.

3.4. Validity and Reliability of Test Items

The questions were adapted from empirical studies and aligned with the National Teaching Council's (NTC) Professional Development (PD) Framework goals (2020), with input from a team of local PDA coordinators in South Dayi. These steps ensure the instrument's validity. Statistically, the study used Kaiser-Meyer-Olkin test (KMO) and Cronbach's alpha test to test for validity and reliability of test items respectively. The outcome is as shown below:

Table 2. Validity and Reliability Test

Construct / Variables	Item	Bartlett's square (df=10)	Chi- KMO	Cronbach's Alpha (α)
Professional Development (PD)	5	243.217***	0.826	0.8238
Instructional Strategies (STRA)	5	984.303***	0.692	0.9517
Educational Technology Integration (EduTech)	5	1057.641***	0.655	0.9632

Field Study, 2025

*** indicates $p < 0.01$ for Bartlett's test.

Outcome from Table 2 indicates a Bartlett's Chi-square values which is significant for all the three main constructs (Professional development, Instructional strategies and educational technology integration) of 243.217, 984.303 and 1057.641 respectively, all of which are statistically significant at 1 percent level. The results show Kaiser-Meyer-Olkin test (KMO) values ranging from 0.655 to 0.826 indicating adequate sampling adequacy as values are above the threshold consideration ($KMO > 0.6$) for sampling adequacy. All the Cronbach's alpha values are above the minimum threshold for good internal consistency ($\alpha > 0.7$).

Table 3. Multicollinearity Diagnostics Using Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
Gender: (Ref: Male)		
Female	1.560	0.642
Age	1.610	0.622
Qualification (Ref: First Degree)		
Masters	1.320	0.756
Years of Experience	1.450	0.690
Workshop and seminars (Ref: Low attendance)		
Moderate attendance	2.130	0.469
High/Frequent attendance	3.230	0.310
In-service Training (Ref: Low attendance)		
Moderate attendance	1.430	0.701
High/Frequent attendance	2.390	0.419
Online Training (Ref: Low attendance)		
Moderate attendance	2.120	0.472
High/Frequent attendance	3.010	0.332
Peer Mentorship		

(Ref: Low attendance)		
Moderate attendance	2.150	0.465
High/Frequent attendance	3.040	0.329
Professional Learning Community (PLC)		
(Ref: Low attendance)		
Moderate attendance	1.790	0.558
High/Frequent attendance	3.090	0.324
Mean VIF	2.170	

Field Study, 2025

The variance inflation factor test shows ranges from 1.32 for Master’s degree qualification level (a control variable) to 3.23 (high attendance of workshops). The overall mean VIF shows 2.170 which is within the acceptable range (VIF<10) indicating no multicollinearity issue.

Table 4. Descriptive Statistics

Variable	Category / Statistic	Frequency	Percent	Mean (SD)
Gender	Male	105	70.0	
	Female	45	30.0	
Qualification (Qual)	First Degree	90	60.0	
	Master’s Degree	60	40.0	
Age	Mean	—		39.08(7.877)
Teaching Experience	Mean	—		16.7(7.222)

Field Study, 2025

The retrieval rate for completed questionnaires distributed was 96.8 (150 out of 155). More than two-thirds (70%) of the respondents are males, while the minority (less than one-third; 30%) are females. Three-fifths (60%) of the respondents are first degree certificate holders while two-fifths (40%) hold master degrees. The average years of experience was 39 years while average years of teaching experience was 16.7 years.

Table 5. Descriptive Statistics of the various Professional Development Programs

Professional Development Programs	Obs	Mean	Std. Dev.	Min	Max
Workshops / Seminars (wksem)	150	2.033	0.814	1	3
School-based in-service training (Inserv)	150	2.147	0.937	1	3
Online training / Webinars (Online)	150	2.033	0.855	1	3
Peer mentoring / Coaching (Mentor)	150	2.313	0.761	1	3
Professional Learning Communities (PLCs)	150	2.140	0.803	1	3

Field Study, 2025

Table 5 outcome indicates that the minimum mean value recorded was 2.03 (for workshop and online training) and the highest mean was 2.33 (for peer mentoring). These values indicate a moderate level of participation in the various professional development programs by the surveyed mathematics teachers.

Table 6. Descriptive Statistics of Improved Instructional Strategies

Instructional Strategy Indicator	Obs	Mean	Std. Dev.	Min	Max
Improved ability to use diverse instructional strategies in mathematics	150	2.287	0.915	1	3
Enhanced classroom management techniques	150	2.193	0.981	1	3
Improved ability to adapt teaching to different student learning styles	150	2.020	1.000	1	3
Increased confidence in applying innovative teaching strategies	150	2.187	0.972	1	3
Improved ability to assess and evaluate students’ understanding	150	2.313	0.906	1	3
Mean	150	2.193	0.880	1	3

Field Study, 2025

Table 6 shows that the mean values for responses for Improved Instructional Strategies ranges from 2.020 to 2.313 for improved ability to adapt teaching to different student learning styles and Improved ability to assess and evaluate students’ understanding, respectively. The overall mean improved instructional strategies shows a mean value of 2.193 (with standard deviation of 0.880) indicating a moderate level of rating for improved instructional strategies.

Table 7. The use of Educational Technology (Descriptive Statistics)

Educational Technology Indicator	Obs	Mean	Std. Dev.	Min	Max
Increased use of digital tools (e.g., projectors) in teaching mathematics	150	2.233	0.937	1	3

Improved ability to integrate educational software and applications in teaching mathematics	150	2.213	0.959	1	3
Enhanced confidence in using technology for mathematics instruction	150	2.160	0.970	1	3
Increased use of online platforms for student assignments and feedback	150	2.293	0.938	1	3
Increased application of technology-based strategies in mathematics teaching	150	2.333	0.917	1	3
Mean	150	2.247	0.882	1	3

Field Study, 2025

Table 7 outcome indicates an average use of educational technologies (all indicators) or 2.247 with a standard deviation of 0.882. The respective indicators recorded mean values ranging from 2.160 to 2.333. These outcomes indicate a moderate use of educational technology tools for instructions or lesson delivery among surveyed participants.

Table 8. Ordered Logistic Regression (Odd-Ratios): Effects of NTC PDs on Instructional Strategies and Educational Technology Integration/usage

Variable	Model 1: (Instructional Strategies)			Model 2: (Educational Technology Usage)		
	<i>Odd-ratios</i>	<i>S.E</i>	<i>p-value</i>	<i>Odd-ratios</i>	<i>S.E</i>	<i>p-value</i>
Gender (Ref: Male)						
– Female	0.155*	1.071	0.081	0.269	0.885	0.137
Age	0.946	0.059	0.339	0.971	0.046	0.515
Qualification (Ref: First Degree)						
– Masters	1.732	1.025	0.592	2.073	0.789	0.355
Years of Experience	1.365***	0.118	0.008	1.120	0.074	0.125
Workshop & Seminars (Ref: Low attendance)						
– Moderate attendance	15.27**	1.113	0.014	1.118	0.808	0.890
– High/Frequent attendance	94.24***	1.434	0.002	15.61**	1.172	0.019
In-service Training (Ref: Low attendance)						
– Moderate attendance	19.05**	1.224	0.016	8.41**	0.915	0.020
– High/Frequent attendance	27.73***	0.955	0.001	6.12***	0.637	0.004
Online Training (Ref: Low attendance)						
– Moderate attendance	0.619	0.935	0.607	2.34	0.808	0.292
– High/Frequent attendance	69.84***	1.306	0.001	23.71***	1.127	0.005
Peer Mentorship (Ref: Low attendance)						
– Moderate attendance	10.40**	0.961	0.015	6.97**	0.771	0.012
– High/Frequent attendance	20.80**	1.187	0.011	15.51***	0.895	0.002
Professional Learning Community (PLC) (Ref: Low attendance)						
– Moderate attendance	44.54***	1.045	0.000	5.41***	0.644	0.009
– High/Frequent attendance	105.80***	1.399	0.001	13.47**	1.048	0.013

Field Study, 2025

Significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

4. Discussion

Result from Model 1 shows that surveyed mathematics teachers who moderately attend educational workshops and seminars have 15.27 times higher odds of using improved instructional strategies compared to those with low attendance. Similarly, teachers with frequent attendance have 94.24 times higher odds of using improved instructional strategies relative to those with low attendance. Both results are statistically significant, with moderate attendance significant at the 5% level and high attendance at the 1% level. Furthermore, the odd ratio of surveyed mathematics teachers that moderately attend in-service training of adopting improved instructional strategies is 19.05 times higher odds relative to those with low attendance. However, the odd ratio increased to 27.73 for those with high attendance rate relative to low attendance. Both results are statistically significant, with moderate attendance significant at the 5% level and high attendance at the 1% level. From the table, surveyed mathematics teachers who frequently attend online educational training sessions have 69.84 times higher odds of using improved instructional

strategies compared to those with low attendance. The result is statistically significant at the 1% level. Similarly, the odd ratio of surveyed mathematics teachers that moderately participate in educational peer mentoring, of adopting improved instructional strategies is 10.40 times higher odds relative to those with low participation. In contrast, the odd ratio increased to 20.80 times higher for those with high participation rates relative to low attendance. Both results are statistically significant at the 5% level. Also, surveyed mathematics teachers who moderately attend professional learning community introduced by National Teacher's Council, have 44.54 times higher odds of using improved instructional strategies compared to those with low attendance. Nevertheless, teachers with frequent attendance have 105.80 times higher odds of using improved instructional strategies relative to those with low attendance. Both results are statistically significant at the 1% level. For control variables, females have higher odds (0.155 odds) of using improved instructional strategies relative to males. This outcome is statistically significant at 10% level. Addition years of experience as a mathematics teacher increases the odds of reporting improvement in the use of instructional strategies increase by 1.3665 odds. This outcome is statistically significant at 1% level.

From Model 2, high attendance in educational workshops and seminars by surveyed mathematics teachers increases the odds ratio of integrating educational technology into lesson delivery by 15.61. The outcome is statistically significant at the 5% level. Also, moderate participation in in-service training activities by surveyed mathematics teachers increases their odd ratios of integrating educational technology into lesson delivery by 15.61. In contrast, the odds ratio reduced to 6.12 higher odds for those with higher level of in-service training activities. Both results are statistically significant, with moderate attendance significant at the 5% level and high attendance at the 1% level. Furthermore, high or frequent participation in online educational training activities by surveyed mathematics teachers increases their odd ratios of integrating educational technology into lesson delivery by 23.71, relative to those with lower participation in online educational training activities. The result is statistically significant at the 1% level. Similarly, moderate participating in educational peer mentoring programs or activities increases the odd ratios of integrating educational technological tools into lesson delivery by surveyed participants by 6.97 odds. In contrast, the odd ratio increased to 15.51 times higher for those with higher peer mentoring participation rates relative to those with lower participations. Both results are statistically significant at the 5% and 1% levels respectively. Also, surveyed mathematics teachers who moderately attend professional learning community introduced by National Teacher's Council, have 5.41 times higher odds of using integrating educational technological tools into lesson delivery compared to those with low attendance. Nevertheless, the odd ratio increased to 13.47 times higher for those with higher PLC participation rates relative to those with lower participations. Both results are statistically significant at the 1% and 5% levels respectively.

The study result indicates that participation in professional development programs exerts significant effects on surveyed mathematics teachers' instructional strategies improvement and integration of educational technological tools in lesson delivery. However, it is evident that the relative magnitude of impact is higher for those with frequent or higher participation rates. This underscores the importance of policies that ensure frequent participation of mathematics teachers in the surveyed areas to warrant effective and efficient instructional lesson delivery and integration of ICT tools into lessons. The result is in harmony with empirical conclusions of (Goka et al., 2023) with a study limited to Keta Municipality in Volta Region. It further conforms to study findings of Benning, (2019) and Yankah et al., (2022) though their focus was purely on students achievements. The result further conforms to the theoretical underpinning of constructivism that active learning through experiences, interactions, and reflection (such as Professional Development (PD) programs) foster enhanced instructional practice and technology integration (Osei-Himah & Adu-Gyamfi, 2022). The trend of observations contradicts the assertions of the Cognitive Load Theory that warns that overwhelming teachers with excessive information or complex strategies can lead to cognitive overload, hindering effective learning.

The findings lend stronger support to constructivist principles emphasizing experiential and reflective learning, suggesting that professional development grounded in these practices effectively translates into classroom innovation. The limited evidence of cognitive overload indicates that, in this context, professional learning was appropriately paced and relevant.

5. Conclusion

In conclusion, the research highlights the pivotal influence of professional development on enhancing mathematics teachers' teaching methods and use of technology. The research enriches constructivist insight by demonstrating that intentional professional development promotes teaching innovation and technological skills, while providing a different perspective on Cognitive Load Theory. Its thorough, context-driven analytical framework also establishes a solid basis for forthcoming studies on teacher growth and educational enhancement.

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Appendix: Questionnaire

Introduction

This questionnaire collects information on professional development (PD) programs and their effects on mathematics teaching. Responses are confidential and will be used for academic purposes only.

Section A: Bio-data

- 1. Gender: Male Female
- 2. Age: years
- 3. Academic Qualification: Bachelor’s Degree Master’s Degree PhD
- 4. Teaching Experience: years
- 5. Rank: Principal Superintendent (PS) Assistant Director II (ADII) Assistant Director I (ADI) Deputy Director (DD)

Section B: Frequency of Attendance at PD Modes

Instruction: For each PD mode below, tick the number that best describes how frequently you attend.
Scale: 1 = Low (Never/Rarely), 2 = Moderate (Sometimes), 3 = High (Often/Very Frequently)

Item code	PD mode (statement)	1	2	3
Wksem	Attendance at workshops / seminars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Inserv	Attendance at school-based in-service training	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Online	Attendance at online training / webinars	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mentor	Participation in peer mentoring / coaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLC	Participation in professional learning communities (PLCs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section C: Effects of NTC PD on Instructional Strategies

Instruction: Indicate the level of effect of PD programs on your instructional strategies.
Scale: 1 = Low, 2 = Moderate, 3 = High

Item code	Statement	1	2	3
STRA1	Improved ability to use diverse instructional strategies in mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

STRA2	Enhanced classroom management techniques	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STRA3	Improved ability to adapt teaching to different student learning styles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STRA4	Increased confidence in applying innovative teaching strategies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
STRA5	Improved ability to assess and evaluate students' understanding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Section D: Influence of PD on Use of Educational Technology

Instruction: Indicate the level of effect of PD programs on your use of educational technology.

Scale: 1 = Low, 2 = Moderate, 3 = High

Item code	Statement	1	2	3
EduTech1	Increased use of digital tools (e.g., projectors, interactive boards) in teaching mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EduTech2	Improved ability to integrate educational software and applications in teaching mathematics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EduTech3	Enhanced confidence in using technology for mathematics instruction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EduTech4	Increased use of online platforms for student assignments and feedback	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EduTech5	Increased application of technology-based strategies in mathematics teaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>