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Research Article

Formative Assessment Strategies of Senior High School Physics Teachers in Selected Ashanti Region Districts, Ghana

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Abstract
The study examined the formative assessment strategies senior high school physics teachers in selected districts of the Ashanti Region practice in their classrooms. Using a descriptive survey design, the study purposively selected 108 physics teachers from 36 senior high schools across nine districts. Data were collected through a 21-item closed-ended questionnaire and an observation guide. Descriptive statistics such as mean, standard deviation, and percentage were used to analyse the research question, while an independent samples *t*-test was used to test the hypothesis at a significance level of ($\alpha = 0.05$). The results revealed that physics teachers in the Ashanti Region employ diverse formative assessment strategies to support students' learning. These include clarifying learning objectives, providing timely feedback, using varied assessment tasks, and offering suggestions for improvement. However, peer and self-assessment practices were found to be infrequently implemented. Furthermore, the study established a statistically significant difference between more experienced teachers (those with at least five years of service) and less experienced teachers (serving less than five years), with the former employing diverse formative assessment strategies. The findings suggest that teaching experience enhances teachers' ability to apply varied formative assessment approaches effectively. The recommendation for this study suggests that the Ghana Education Service should organize professional development programmes focused on formative assessment practices for less experienced teachers to strengthen their classroom assessment literacy and improve instructional quality. The study enhances the comprehension of subject-specific formative assessment practices and underscores the need for continuous professional learning to promote effective physics teaching and learning in senior high schools.

Keywords: Formative Assessment, Formative Assessment Strategies, Ghana, Physics Teachers, Senior High School

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1. INTRODUCTION

Quality physics education is essential for national development, providing the skills necessary for a literate and skilled workforce (Ahmad, 2020). Physics helps students to develop knowledge and skills that are essential foundations for other science disciplines and also serves as a foundation for students pursuing careers in technology and engineering (Agbele et al., 2020; Ukoh, 2025). Physics cultivates sustainable development values, preparing students to engage in responsible citizenship and environmental stewardship (Wang, 2024). Physics education encourages students to utilise theoretical knowledge to solve practical problems, fostering critical thinking and innovation (Rosales-Romero, 2023). The importance of physics education cannot be overstressed.

Assessment is a fundamental component of the educational process, as it provides essential information about students' knowledge, competencies, and skills. Teachers across all subject areas, including physics, rely on assessment as a tool for gathering information to evaluate the effectiveness of instruction and monitor students' learning progress. McMillian (2018) defines assessment as a systematic

process of collecting, interpreting, and using evidence of student learning to inform teachers' decision-making in diverse contexts. Similarly, assessment is applied in various settings, particularly in education, to guide decisions and improve learning outcomes (Lanham & Benson, 2018). Maki (2023) further explains that assessment involves obtaining information that supports decision-making about students, curricula, programmes, and educational policies.

Broadly, assessment can be categorized into summative and formative types. While summative assessment focuses on grading and ranking learners at the end of instruction, formative assessment emphasizes monitoring students' progress and guiding ongoing instruction (Kulasegaram & Rangachari, 2018). In this regard, Irons and Elkington (2021) describe formative assessment as a range of activities undertaken by teachers and students to gather information that serves as feedback for improving teaching and learning processes. Its primary purpose is to provide feedback that enables correction and adjustment during instruction. Similarly, Menéndez et al. (2019) view formative assessment as a process through which teachers and learners identify and respond to students' learning needs in order to enhance learning as it occurs.

Within the Ghanaian context, the assessment policy for physics education specifically promotes the use of 'varied and differentiated assessment approaches, including project work, practical demonstrations, performance-based assessment, skills-based assessment, class exercises, portfolios, and end-of-term examinations' (NaCCA, 2024, p. 1). This policy underscores the importance of balancing formative and summative assessment practices in the classroom. In particular, formative assessment enables students to learn from their mistakes, explore ideas more freely, and develop higher-order cognitive skills (Okyere et al., as cited in Osmani, 2021). Furthermore, one of its key strengths lies in its ability to provide timely and specific feedback, which creates awareness of students' strengths and weaknesses and helps them to take appropriate steps to improve their learning (Stevens & Levi, 2023).

Despite these policy directions and recognized benefits, concerns remain regarding students' performance in physics. Reports from the West African Examinations Council (WAEC) indicate that students' performance in physics declined in earlier years (WAEC, 2020; 2021). Although more recent reports show some improvement compared to previous years, many students still demonstrate limited understanding of physics concepts and encounter difficulties in solving mathematical problems (WAECE, 2023; 2024). Theall and Franklin (2010) argue that improving assessment practices can enhance teachers' instructional effectiveness and support students in achieving learning objectives. In addition, classroom assessment reveals essential feedback for both teachers and students, enabling the evaluation of knowledge gained and the identification of learning gaps (Faniyi, 2023). Effective formative assessment practices also support teachers in responding to students' learning needs and fostering a more conducive learning environment (Pastore, 2023). Moreover, formative assessment helps track students' progress and identify areas where they experience learning challenges (Yang, 2024).

Notwithstanding the increasing number of existing studies on formative assessment practices in Ghana (Adam et al., 2019; Amoako et al., 2019; Amoako, 2018; Gyamfi et al., 2023; Asare & Afriyie, 2023), which have largely focused on general educational contexts, with limited attention given to subject-specific areas such as physics. This gap in the literature is noteworthy, as formative assessment practices may vary across different disciplines. Therefore, there is a need to examine how physics teachers in the Ashanti Region implement formative assessment strategies to support student learning. In response to this need, the present study seeks to investigate the formative assessment practices of senior high school physics teachers in selected districts of the Ashanti Region. Specifically, the study addresses the following research question and hypothesis.

1) What are SHS physics teachers' formative assessment strategies?
2) H_0: There is no statistically significant difference between the less experienced (less than five years) and the more experienced (at least five years) physics teachers in terms of their formative assessment strategies.

1.2. Literature Review

1.2.1. Theoretical Review

Social Cognitive Theory (SCT), initiated by Albert Bandura in the 1960s, formed the foundation of this study. SCT is widely recognised in psychology and education, emphasising the interplay between cognitive, behavioural, and environmental factors in shaping human behaviour. Key constructs—observational learning, self-efficacy, and self-regulation—explain how individuals acquire and apply knowledge, particularly in social learning contexts (Bandura, 2023).

Observational learning, a central concept, posits that individuals acquire new behaviours by observing and modelling others. In classrooms, this suggests that students' learning can be enhanced through peer interactions, teacher demonstrations, and exposure to exemplars. Self-efficacy, the belief in one's ability to perform specific tasks, is another core SCT principle. High self-efficacy correlates with persistence, goal-setting, and improved academic outcomes (Mehmood et al., 2024), highlighting the importance of feedback-rich environments such as formative assessment.

Self-regulation, defined as the capacity to monitor and control cognitive, emotional, and behavioural processes to achieve goals (Usher & Schunk, 2018), is critical for effective learning. Research shows that self-regulated learners are more reflective, adaptable, and capable of adjusting strategies to improve outcomes (Napolitano, 2021). In formative assessment, SCT suggests that students benefit not only from teacher feedback but also from peer observation and self-reflection.

Critically, while SCT provides a robust framework for understanding how feedback and reflective practices support learning, it assumes active engagement and self-regulatory competence among learners. In real classroom contexts, these assumptions may not hold, particularly where teachers lack formative assessment literacy or fail to create structured opportunities for observation and feedback. Thus, SCT's practical application depends on the quality of teachers' pedagogical implementation.

1.2.2. Empirical Review

Empirical evidence on formative assessment reveals a mixed landscape characterised by awareness but inconsistent implementation. Amoako (2018) reviewed seven Ghanaian studies and reported that formative assessment is generally embraced across education levels. However, the reliance on a small number of online studies raises questions about representativeness, and the study did not critically examine the depth or quality of implementation.

Ntim et al. (2023) found that SHS teachers in Kumasi possess adequate knowledge but frequently neglect essential principles, highlighting the knowledge–practice gap in formative assessment. Similarly, Adam et al. (2019) reported discrepancies between questionnaire responses and interviews among Social Studies teachers, indicating superficial understanding and possible response bias. Although teachers recognised the theoretical value of formative assessment, their classroom practices did not consistently reflect this understanding.

Subject-specific studies reinforce these trends. Amoako et al. (2019) observed low formative assessment knowledge among SHS mathematics teachers, with higher knowledge correlating with more frequent implementation. In physics, Dah and Dognia (2022) noted frequent use of oral questioning for immediate feedback but rare application of student-centred approaches such as self- and peer-assessment. Akyina and Oduro-Okyireh (2019) similarly found that many teachers unknowingly applied formative assessment without conceptual understanding, suggesting a fragmented implementation that lacks strategic coherence.

Cross-context studies show similar challenges. Zubair and Nauman (2023) reported that Pakistani secondary teachers understand formative assessment theoretically but often lack consistent application. Egba and Osarumwense (2025) in Nigeria observed incomplete implementation of test construction skills due to limited knowledge, while Boadu et al. (2022) found Ghanaian teachers relied heavily on take-home assignments and lesson-time evaluation, emphasising exam preparation over holistic learning. Ombay et al. (2024) in Tanzania revealed minimal use of meaningful feedback and student-centred strategies despite theoretical knowledge of formative assessment.

Teacher characteristics influence practice but inconsistently. Awuah et al. (2024) found no correlation between educational qualification and assessment competence, suggesting that formal credentials alone do not ensure effective formative assessment. Kariri et al. (2022) reported that Saudi Arabian teachers held misconceptions, equating formative assessment with re-teaching or summative assessment, indicating the need for ongoing professional development.

Years of experience show mixed effects. Studies by Dayal (2021), Ayalon and Wilkie (2021), Panadero et al. (2019), and Yan and Cheng (2015) suggest that experienced teachers use a broader range of formative assessment strategies and implement them more effectively. Herppich et al. (2018) also found that experienced teachers demonstrate higher diagnostic competence. However, Deneen and Brown (2016), Roesken-Winter et al. (2021), and Yan et al. (2022) report that experience alone does not guarantee effectiveness; some less experienced teachers implement formative assessment more frequently. This suggests that factors like professional development, adaptability, and reflective practice may outweigh years of teaching in determining formative assessment competence.

Overall, the literature highlights three critical gaps: (1) a persistent disconnect between knowledge and practice, (2) a predominance of teacher-centred practices with limited student-driven approaches such as self- and peer-assessment, and (3) a lack of subject-specific research, particularly in physics, where abstract concepts and quantitative demands may necessitate specialized strategies. Addressing these gaps, this study examines the formative assessment practices of senior high school physics teachers in selected districts of the Ashanti Region, with attention to alignment with theoretical principles and support for student learning.

2. METHOD

2.1. Research Design

The descriptive survey research design was used for the study. Descriptive research helps to explain educational phenomena in terms of the conditions or relationships that exist, opinions that are held by students, teachers, parents, and experts, processes that are going on, the effects that are evident, or trends that are developing (Coleman & Cross, 2021). Descriptive survey research design is a method use to gather information about a population or a phenomenon by asking individuals to report their own perceptions, perceptions, beliefs, or behaviours (Pandey & Pandey, 2015) This type of research design is commonly used in social sciences, education, marketing, and other fields to provide a snapshot of a particular group or situation at a specific point in time (Babbie, 2020). A descriptive survey research design allows researchers to gather a large amount of data from a diverse group of individuals in a relatively short amount of time. This can be particularly useful when studying large populations or when trying to gather information from hard-to-reach groups (Bryman, 2016). A descriptive survey research design was appropriate for this study because it allowed the researcher to gather a large amount of data in a relatively short period of time.

2.2. Population, Sample, and Sampling Techniques

Sampling refers to the process of choosing a subset of individuals from the whole population to participate in a study (Creswell, 2014). The study area, which is the Ashanti Region of Ghana, has 43 district assemblies with 132 public SHSs. The study employed a multi-stage sampling process targeting districts, schools, and physics teachers in the Ashanti Region.

1) District Sampling: Nine out of 43 districts in the Ashanti Region were selected by the simple random sampling method.
2) School sampling: 36 SHSs were purposively sampled from 57 SHSs across the nine districts, based on their active physics departments and availability of physics teachers, representing 63.2% of SHSs in the selected districts.
3) Teacher sampling: From the 36 sampled schools, 108 physics teachers were purposively and conveniently sampled out of 151 available physics teachers, representing 71.5% of physics teachers in those schools. Teacher sampling was based on first, being a physics teacher, and second, their readiness and willingness to be part of the study. The sample of physics teachers consisted of 2 females and 106

males. Forty-three of the sample physics teachers served for less than five years, and 65 of the sample served at least five years. Table 1 summarises the stages of sampling.

Table 1. Summary of the Stages of Sampling

S/N	District	Number of Schools	Number of Schools Selected	Number of Physics Teachers	Number of Teachers Selected
1	Ejisu Juaben Municipal	5	4	17	12
2	Ejisu Juaben	2	2	8	6
3	Sekyere East	2	2	5	5
4	Sekyere central	3	2	9	7
5	Kumasi Metropolitan	27	13	65	40
6	Sekyere south	5	4	11	8
7	Kwabre East	6	4	16	14
8	Mampong Municipal	4	3	14	10
9	Ejura/Sekyeredumase	3	2	6	6
	Total	57	36	151	108

2.2. Data Collection Instruments

The study employed a closed-ended questionnaire and an observation guide to collect data. The questionnaire was divided into two sections, comprising a total of 21 items. Section A included two items: Item I captured respondents' gender, and Item II identified teachers' experience levels (less experienced versus more experienced). Section B consisted of 19 items assessing the formative assessment strategies employed by SHS physics teachers in their classrooms. The questionnaire was initially developed by the first author and reviewed and refined by the second author to ensure clarity and relevance. The observation guide focused on the formative assessment strategies used by teachers during classroom instruction. It served to validate the questionnaire responses and provided a more accurate depiction of actual teaching practices.

2.3. Validity and Reliability

Validity refers to the extent to which an instrument correctly measures what it is purposed to measure (Mohajan, 2017; Clark & Watson, 2019; Whiston, 2012). To ensure validity, both the questionnaire and observation guide were reviewed by the supervisors, who are experts in educational measurement and evaluation. The instruments were pretested, and the results were analyzed to confirm statistical appropriateness and alignment with the research questions. Recommendations from the supervisors were incorporated to refine the instruments. Expert evaluation and pre-testing enhanced the validity of the instruments, strengthening the credibility of the study findings (Khidhir & Rassul, 2023).

Reliability indicates the consistency and stability of the research instrument (Polit, 2014). Internal consistency was assessed using Cronbach's alpha via SPSS version 27. The questionnaire achieved a coefficient of 0.857, indicating strong reliability, as values above 0.70 are considered acceptable (Kilic, 2016).

2.4. Data Collection Procedures

A letter of introduction was obtained from the Department of Integrated Science Education, Akenten Appiah-Menka University of Skills Training and Entrepreneurial Development, explaining the study's purpose, participant requirements, and confidentiality measures. Permission was also sought from the headmasters/headmistresses of the selected schools. Teachers provided informed consent prior to participation, and no personal identifiers were collected to ensure anonymity. Following the administration of the questionnaire to 108 selected teachers, classroom observations were conducted with a purposive sample of 10 physics teachers. The observations focused specifically on the formative assessment strategies employed during instruction to support student learning and to corroborate the questionnaire responses.

2.5. Ethical Considerations

The research was conducted in an ethical and professional manner, adhering to all relevant guidelines and protocols. The data were treated with confidentiality and used solely for the research purpose. Participants were given a choice to be part of the research after some clarifications concerning the study, and were not forced to take part in the research. The respondents were not made to sign their names or provide any other personal information. Hence, their responses were kept confidential. The respondents were made to understand that they have the right to discontinue at any time if they are not interested in continuing in the study.

2.6. Data Processing and Analysis

Data were processed and analyzed using descriptive survey methods, summarizing findings with frequencies, percentages, means, and standard deviations (Cumpston et al., 2021; Tabachnick & Fidell, 2019). Responses were first edited, coded, and scored to ensure accuracy and completeness before entry into SPSS version 27. For research questions 1–4, responses were analyzed using means, percentages, and standard deviations. A four-point Likert scale ("Strongly Disagree" = 1 to "Strongly Agree" = 4) was used, with a criterion mean of 2.50 and 50% agreement set as thresholds for high responses. Scores above these thresholds were interpreted as high; scores below were considered low. To test the hypothesis regarding teaching experience and formative assessment practices, an independent samples t-test was conducted at a significance level of $\alpha = 0.05$. This analysis determined whether teachers with less than five years' experience differed significantly from those with at least five years' experience in the diversity and frequency of formative assessment strategies employed.

Table 2. Descriptive Results on Formative Assessment Strategies Used by the SHS Physics Teachers

S/N	Statement	N	Means	Sd.	PA	RMK
1	I share the learning intention before students start working in class.	108	3.37	.731	85.2%	High
2	I clarify what is valued for each assessment task.	108	3.56	.498	96.3%	High
3	I use various assessment activities in the classroom to check students' mastery of course content.	108	3.71	.494	98.1%	High
4	I always mark students' work promptly.	108	3.67	.512	98.1%	High
5	I give immediate feedback on students' questions while teaching and on their assigned tasks.	108	3.58	.495	94.4%	High
6	I hold planned and formal discussions with students on feedback from their assigned tasks.	108	3.43	.599	94.4%	High
7	I ask students to evaluate peers' work.	108	2.53	1.027	42.6%	Low
8	I ask students to provide feedback to help peers improve.	108	2.62	.914	43.5%	Low
9	I ask students to identify strengths and weaknesses in their own work.	108	2.60	.966	40.8%	Low
10	I ask students to identify strategies that will improve their own work.	108	2.53	.942	45.3%	Low
11	I use portfolio assessment to check students' learning.	108	3.30	.846	80.6%	High
12	I use observation to check students' learning.	108	3.55	.536	98.1%	High
13	I use class exercises to check students' learning.	108	3.58	.495	94.5%	High
14	I use group work to check students' learning.	108	3.53	.538	92.6%	High
15	I use role play/Presentation to check students' learning.	108	3.42	.532	98.1%	High
16	I use class discussion to check students' learning progress	108	3.36	.483	96.3%	High
17	I use homework to check students' learning progress.	108	3.41	.711	92.6%	High
18	I point out students' strengths and weaknesses in my feedback.	108	3.59	.494	96.3%	High
19	I provide suggestions for students to improve their performance.	108	3.68	.470	95.4%	High
	MM/MSd./ MPA	108	3.32	.650	83.3%	High

Key terms: M = Mean, MM = Mean of mean, MSd. = Mean of standard deviation, MPA = Mean of percentage agreement. PA = Percentage of agreement, RMK = Remark.

3. RESULTS

3.1. Answering the Research Question

The research question sought to find out SHS physics teachers in the Ashanti Region's formative assessment strategies. To answer this research question, the selected SHS physics teachers were made to rate their formative assessment strategy implementation on 19 items using Strongly Agree (SA)= 4, Agree(A) =3, Disagree(D) = 2, and Strongly Disagree (SD)=1. The criterion values (CV) of 2.50 mean and a 50% percentage of agreement (PA) were established for the scales. The formative strategies that scored a mean below 2.50 or a percentage of agreement (PA) below 50% are strategies that teachers hardly implement. PA was the summation of the percentage of strongly agree (SA) and agree (A). The strategies that have mean scores above 2.50 and PA above 50% represented formative assessment strategies which are actively implemented by physics teachers.

From Table 2, SHS physics teachers in the Ashanti Region employ a variety of formative assessment strategies. This was evident after the mean of means, and percentage of agreement (MM=3.32, MSd.=.650, MPA= 83.3%) were shown to be greater than the cut- off values (2.50 and 50%). The SHS physics teachers strongly emphasis on providing suggestions for students to improve their performance (M= 3.68, Sd. = .470, PA=95.4%), giving immediate feedback to students' questions while teaching and on their assigned tasks (M = 3.58, Sd. = .495, PA=94.4%), pointing out students' strengths and weaknesses in feedback (M= 3.59, Sd. = .494, PA =96.3%), always mark students' work promptly (M=3.67, Sd. = .512, PA= 98.1%) and clarify what is valued for each assessment task (M=3.56, Sd.= .498, PA= 96.3%). However, the majority of the participants do not encourage peer and self-assessment. From Table 1, all items measuring peer or self-assessment scored PA lower than 50%.

3.2. Testing the Hypothesis

This research hypothesis aimed to determine whether there is a significant difference between Senior High School (SHS) physics teachers who have served for less than five years and those who have served for five years or more in terms of their formative assessment strategies. Before conducting the independent samples t-test, the assumption of normality was tested. The data points approximately followed a straight line on the normal Q–Q plot, indicating a normal distribution (Jerginan, 2012). The normality assumption was therefore satisfied for both groups, teachers with less than five years of service and those with five years or above, since the data points in both cases aligned closely along a straight line. Following the normality test, Levene's test for equality of variances was conducted. Table 3 presents the results of Levene's test for equality of variances.

Table 3. Levene's Test For Equality of Variances

		F	Sig.
Formative assessment Strategies	Equal variances assumed	2.587	.111
	Equal variances not assumed		

From Table 3, Levene's test shows a significant value greater than 0.05. This suggests that variances are assumed to be equal within years of service. Therefore, the assumption of equality of variances was met. Following Levene's test for equality of variances, descriptive statistics for SHS physics teachers' formative assessment strategies were conducted. Table 4 presents the results of descriptive statistics for SHS physics teachers' formative assessment strategies.

Table 4. Descriptive Statistics for SHS Physics Teachers' Formative Assessment Strategies

	Years of Service	N	Mean	Std. Deviation	Std. Error Mean
Formative assessment strategies	Served less than 5 years	43	61.19	5.452	.831
	Served 5 years and above	65	64.18	6.600	.819

After the descriptive statistics, an independent samples t-test was used to check whether there is a significant difference between SHS physics teachers who have served less than 5 years and SHS physics

teachers who have served 5 years and above in terms of their formative assessment strategies at the 0.05 level of significance. Years served as an independent variable and formative assessment strategies as a dependent variable. Table 5 presents the results of the independent samples t-test for SHS physics teachers' formative assessment strategies.

Table 5. Independent Samples T-Test for SHS Physics Teachers' Formative Assessment Strategies

		Sig. (2-tailed)	Mean Difference	Std. Error Difference	t	df
Formative assessment strategies	Equal variances assumed	.015	-2.999	1.213	-2.472	106
	Equal variances not assumed	.015	-2.999	1.167	-2.570	100.759

From Table 5, the sig value is less than 0.05. Sig. (2-tailed) =.015; p = .015. The null hypothesis is rejected because $p < 0.05$. Therefore, there is a statistically significant difference between the SHS physics teachers who have served less than 5 years and those who have served 5 years and above in terms of their formative assessment strategies. From Table 3, the SHS physics teachers in the Ashanti Region who served 5 years and above employ diverse formative assessment strategies (M = 64. 18, SD = 6.600) better than the SHS physics teachers who served less than 5 years (M = 61.19, SD = 5.452).

From the observation, ten teachers were observed. Six out of the teachers observed served for more than 5 years, and four served for less than 5 years. From the observation, class discussion, observation, questioning, and answers were the common formative assessment strategies that were commonly used among the two-year groups. Two employed group work (1, 1), three encouraged peer and self-assessment (2, 1), four employed class exercises (2, 2), and one employed class test (0, 1). The numbers in the brackets indicate the more and the less experienced teachers, respectively. Based on the observation as a research instrument, there is no clear difference between the SHS physics teachers who served less than 5 years and those who served 5 years and above in terms of their formative assessment strategies, and this could be a result of the smaller sample size used for the observation. Additionally, the participants may not be able to employ all their common formative assessment strategies at the time of observation.

4. DISCUSSION

The findings of this study revealed that SHS physics teachers in the Ashanti Region employ a wide range of formative assessment strategies, with particularly strong emphasis on feedback practices, clarification of learning intentions, and the use of varied classroom assessment activities. The overall high mean score suggests that formative assessment is not only known but actively practiced by most teachers. This result contrasts with Kariri et al. (2022), who reported limited readiness and actual implementation of formative assessment among Saudi science teachers. It also contradicts Boadu et al. (2022), who found that many Ghanaian Social Studies teachers relied heavily on take-home assignments and examination-oriented evaluation. The present study suggests that physics teachers may be engaging more consistently in classroom-embedded formative practices, possibly due to the nature of physics instruction, which often requires continuous checking of conceptual understanding through problem-solving, demonstrations, and questioning.

However, a notable exception in the current findings is the low implementation of peer- and self-assessment strategies. This study agreed with the findings of Ntim et al. (2023), which revealed that SHS teachers in the Kumasi Metropolitan hardly apply peer and self- assessment. Items related to students evaluating their own work or that of peers scored below the acceptance threshold. Such reluctance may stem from concerns about reliability, classroom management, time constraints, or insufficient training in facilitating student-centered assessment.

The study also found a statistically significant difference between more experienced and less experienced teachers, with teachers who had served five years or more demonstrating higher use of diverse formative strategies. This supports Dayal (2021) and Ayalon and Wilkie (2021), who reported that experienced teachers tend to employ a broader repertoire of formative techniques. Experience may contribute to pedagogical confidence, classroom management skills, and exposure to professional development, all of which support more flexible assessment practices. At the same time, the contradiction

with Yan et al. (2022) and Roesken-Winter et al. (2021) suggests that experience alone is not universally predictive; contextual factors such as training systems, curriculum demands, and school culture likely mediate the relationship between experience and assessment practice.

4.1. Practical Implications

The findings carry important implications for multiple stakeholders. For physics educators, the strong emphasis on feedback and varied assessment activities is encouraging, but the low use of peer- and self-assessment suggests a need to intentionally cultivate learner involvement in assessment. Teachers can incorporate structured peer review protocols, reflective journals, and guided self-checklists to gradually build students' evaluative skills. Such practices can enhance metacognition and ownership of learning, which are essential in science education.

For teacher educators, the results point to the need for pre-service and in-service training programs that explicitly model how to implement student-centered formative assessment. Training should go beyond theory and include classroom simulations, lesson planning exercises, and mentoring support that demonstrate how peer and self-assessment can be integrated into physics instruction without sacrificing content coverage. For curriculum developers, the findings suggest that formative assessment guidelines should be embedded directly into physics curriculum materials. Providing sample assessment tasks, rubrics, and reflection prompts can support teachers in translating policy expectations into classroom practice. Clear alignment between curriculum standards and formative assessment strategies will help normalize these practices. For policymakers and school leaders, the experience gap observed in this study underscores the importance of targeted professional development for early-career teachers. Structured induction programs, peer coaching, and communities of practice can help novice teachers acquire assessment expertise more quickly.

5. CONCLUSION

In conclusion, the findings revealed that SHS physics teachers in the Ashanti Region employ diverse formative assessment strategies with a strong emphasis on providing immediate feedback and suggestions for students to improve their performance. However, the majority of SHS physics teachers in the Ashanti Region do not encourage peer and self-assessment. The findings further revealed that the SHS physics teachers who served five years or more employed more diverse formative assessment strategies than the SHS physics teachers who served less than five years.

5.1. Recommendations

To close the gap between the less and the more experienced teachers in terms of their formative assessment strategies implementation, the Ghana Education Service in the Ashanti Region should provide formative assessment practices in-service training for newly trained teachers in the region.

5.2. Limitations

The relatively small sample size of 108 SHS physics teachers in the Ashanti Region may limit the extent of generalizability of the findings to the population of SHS physics teachers in Ghana. Therefore, all the major conclusions made in this study are essentially only applicable to SHS physics teachers in the Ashanti Region and not to Ghana at large. Despite that, I have confidence and hope that these limitations would not affect the validity and reliability of the results obtained for the study and would be very essential to SHS physics teachers in Ghana because they can learn from the experiences of SHS physics teachers in the Ashanti Region.

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Data Availability Statement. All data can be obtained from the corresponding author.

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