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Evaluation of *Assessment as Learning* Teaching Strategy among Basic School Teachers in Ghana

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Teachers are the pivot of Ghana's new educational reform and their expertise in the use of the recommended assessment strategies need to be evaluated from time to time to enhance teaching and learning. This survey research approach sought to measure the use of *Assessment as Learning* strategy among basic school teachers in Ghana. The features, strategies and principles underpinning *Assessment as Learning* strategy formed the basis of the construction of 7 item likert scale with a reliability coefficient of 0.995. A sample size of 100 was computed at 95% confidence interval and randomly selected from the population. With respect to the use of *Assessment as Learning* strategy, significant differences were found for teaching division, teaching experience and gender. From the findings, the mean difference of 1.281 explains that class teachers demonstrated greater skills (M:3.75, SD:.436) with respect to assessing students in ways that make them reflect on their own work on regular basis through self and peer assessment, than their subject teacher counterparts(M:2.47, SD: 0.507). Also, with a mean difference of 1.526,class teachers (M: 3.59,

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SD: .496) exhibited higher skills of providing safe environment and support for students to take chances, than their subject teacher counterparts(M:2.06, SD: .246).Again, the absolute mean difference of 1.085 explains that teachers with at least 4 years of teaching experience (M:3.82, SD:.389)demonstrated greater skills with respect to providing for the development of independent learners than their counterparts(M:2.73, SD:0.447) with lesser years of teaching experience. Female teachers (M: 3.90, SD: .303) demonstrated greater skills with respect to providing for the development of independent learners than their male counterparts (M: 2.76, SD: 0.431)with a mean difference of 1.140.The overall performance of the teachers with regards to the *Assessment as Learning* strategy was found to be 57% using the grand mean as the threshold criterion. The findings provide a basis for Ghana Education Service to provide in-service professional learning training aimed at enhancing teachers' knowledge of formative assessment with the ultimate goal of enhancing students' learning and achievement.

Keywords: Assessment as learning; formative assessment; basic school; Ghana; curriculum; evaluation.

1. INTRODUCTION

Assessment as Learning is a student-centered strategy that lays more emphasis on the fact that learners have knowledge of their own thought processes. This strategy sees teaching as far beyond the mere transfer of knowledge from a teacher to a student. It views students as active members of the teaching process who experience new ideas by interacting with one another through the restructuring of cognitive experience. To this end, learners become the live wire that connects assessment and learning. It is crucial for teachers to actively engage students in creating their individual understanding [1,2]. They should learn to be critical assessors in order to be able to make sense of information, relate the information to prior knowledge so as help in new learning. The *Assessment as Learning* regulates the process of metacognition. To this end, students become adept where they individually monitor what they learn and utilize the new knowledge to make adjustments, adaptations, and even major changes in their thinking [1,3].

The use of *Assessment as Learning strategy* does not only facilitate research in the way learning happens, but also lays bare the characteristics that students exhibit when they reflect on their own learning. This way, they are able to make adjustments for in-depth understanding. *Assessment as learning* enables students to acquire cognitive habits and skills, that instills in them metacognitive awareness with increasing level of independence. This form of assessment explicitly focuses on fostering students' capacity over time to be their own best assessors. However, teachers are required to begin the process by presenting and modeling external, structured opportunities for students to assess themselves. In spite of the high level of participation of students in this learning strategy, it does not rule out the responsibilities of teachers in the learning process. Rather, the roles of teachers are extended to include the design of instructions and assessment that permits all learners to think about, and monitor their own learning [1,4].

Assessment as Learning is based on the principle that when students are guided or provided with the needed tools, they will adapt, do independent learning and make decisions on their own [5]. Students attain independence when they develop high level of combination of skills, attitudes and dispositions. Metacognitive awareness is a complex set of skills that requires modeling and teaching by the teacher; and practice on the part of the students [1,6]. Since self-monitoring and evaluation are complex skills that takes time to develop quickly and spontaneously, it is imperative to assess the use of this assessment strategy by Ghanaian basic school teachers.

2. LITERATURE REVIEW

In the past decade, the studies of relationship between demographic variables of basic school teachers and their professional expertise in diverse areas such as assessment have shown some interesting outcomes. The role of teachers does not just involve merely delivering the curriculum but developing, defining and reinterpreting it. To this end, it is what the teachers think or believe and do at the classroom level that ultimately shapes the kind of learning that the young people get [7]. Generally speaking, classroom assessments can be

summative, diagnostic, or formative. However, none in itself is a sufficient tool to maximize students' learning. In other words, they complement each other in any educational curriculum across the world. *Assessment as Learning* is a form of formative assessment [8]. Ghana's new curriculum emphasizes the integration of *Assessment as Learning*, for learning and of learning into the teaching and learning processes, and as an accountability strategy [9]. Buhagiar et al. [10] explored the extent to which teachers are knowledgeable about their students' learning of mathematics and the implications that this has for their classroom practices. The findings revealed that the teachers had limited information about the characteristics of the learning of students under their tutelage. This flaw tends to inhibit effective teaching and offers complete evidence that the teachers lacked some knowledge of assessment strategies.

Asamoah et al. [11] investigated gender difference in formative assessment knowledge of Senior High School teachers in the Upper West Region of Ghana. Their findings revealed a significant difference in the formative assessment knowledge of male and female senior high school teachers, and that male senior high school teachers do better in their formative assessment knowledge than their female counterparts. Deluca et al. [12] studied to find if there were any significant differences between demographic variables of teachers (such as teaching division career stage, teachers experience and previous assessment) and their professional learning priorities. ANOVAs were used to determine whether or not differences existed between demographic variables (i.e. career stage, teaching division and previous assessment education) and teachers' professional learning priorities and preferences for Part Three. Significant differences were found for career stage, teaching division and assessment education. Integrating and Communicating Assessment Practices was a significantly greater priority for less experienced teachers (0–4 years) ($F (2, 401) = 3.14$, $p = .046$) vs. teachers with 5–10 years of experience, for P/J vs. I/S teachers ($F (1, 402) = 5.15$, $p = .024$), and for teachers with previous assessment education vs. no previous assessment education ($F (1, 402) = 4.938$, $p = .027$. Jonson [13] did a similar study and found that, in terms of professional learning preferences, significant differences exist based on career stage, teaching division and previous assessment education. Less experienced teachers preferred One-on-One Learning more than their experienced counterparts – a finding that is aligned with research advocating mentoring models of professional learning for early career teachers.

2.1 Statement of the Problem

Most studies in the past decade, [14-16] have concentrated on improving the academic achievement of learners. These studies however assumed that lower achievement of learners originates from the learners' own attitude or behavior towards learning. Although this assertion might be true to some extent, it is also possible that the difficulties that learners encounter in learning could be due to the teachers' lack of expertise to adequately use a teaching or learning strategy. It is against this backdrop that this study will evaluate teachers' use of *Assessment as Learning* teaching strategy. A study by Bosson-Amedenu [17] found that senior high school students perceived some topics in the mathematics syllabus as difficult due to how such topics were taught to them at the Junior high school level.

3. METHODS

The study used the survey approach. The features, strategies and principles underpinning *Assessment as Learning* formed the basis of the construction of the seven text items used in the questionnaire in this study. The study involved a population of 132 basic school teachers from all regions of Ghana. A sample size of 100 was computed at 95% confidence interval and randomly selected from the population. The questionnaire consisted of a four-point likert scale; strongly agree (SA), Agree (A), Disagree (D) and Strongly Disagree. These likert were weighted 4, 3, 2 and 1 respectively. The reliability of the items was assessed with Cronbach's Alpha. Normality assumption for the dependent variables was tested for each category of independent variable. Independent sample t tests were used to determine whether or not differences existed among demographic groupings such as teaching division, teaching experience and gender. After developing these instruments, the content and face validity was done by experts in the Quality Assurance department of the Holy Child College of Education to determine the appropriateness of the instruments. Participants gave their consent for their responses to be used for the purpose of research. The duration for responding to the items was 2 hours. Since the respondents were

guided to provide answers item by item, there were no missing data. There were 50 male and 50 female participants. The Questionnaire was composed of two parts. The first part consisted of open and closed ended questions. These questions required respondents to provide information on their sex, age, teaching division (class teacher or subject teacher), class size and years of teaching experience. The second part required the teachers to indicate their use of each feature of *Assessment as Learning* using a four-point scale. SPSS and Microsoft Excel were used for the data analysis.

3.1 Sample Size Determination

The size of sample was computed at 95% confidence interval using the following model:

$$n = \frac{N}{1 + Ne^2}$$

Where;

$n =$ Sample size,

$N =$ Population,

$e = error = 0.05$

$$n = \frac{132}{1 + (132)(0.05)^2} \approx 100$$

3.2 Distribution Characteristics

Before the conduct of the analysis, assumptions that underlie the conduct of independent t-test were fulfilled. Prominent among these assumptions were normality and homogeneity of variance. Specifically, the normality assumption was checked. The visual inspection of Q-Q plots and box plots showed that the *Assessment as Learning* items were approximately normally distributed across the category of independent variables such as teaching division, teaching experience and gender such that the skewness z- values (which were computed by dividing the skewness measure by its standard error) were within the range of ± 1.96; an indication of the data being approximately normally distributed [18].

3.3 HYPOTHESES

Hypothesis 1:

H_0: There is no statistically significant difference in basic school teaching division (Class or subject teacher) with respect to the use of *Assessment as Learning* teaching strategy in Ghana.

H_1: There is a statistically significant difference in basic school teaching division (Class or subject teacher) with respect to the use of *Assessment as Learning* teaching strategy in Ghana.

Hypothesis 2

H_0: There is no statistically significant difference in basic school teaching experience (4 and above years or below 4 years) with respect to the use of *Assessment as Learning* teaching strategy in Ghana.

H_1: There is a statistically significant difference in basic school teaching experience (4 and above years or below 4 years) with respect to the use of *Assessment as Learning* teaching strategy in Ghana.

Hypothesis 3

H_0: There is no statistically significant difference in the gender of teachers with respect to the use of *Assessment as Learning* teaching strategy in Ghana.

H_1: There is a statistically significant difference in the gender of teachers with respect to the use of *Assessment as Learning* teaching strategy in Ghana.

3.4 RESEARCH QUESTIONS

- How do basic school teachers' approaches to *Assessment as Learning* differ based on teaching division, teaching experience and gender?
- What is the overall percentage performance of Ghanaian basic school teachers with respect to the *Assessment as Learning* strategy using the grand mean as a threshold criterion?

4. RESULTS AND ANALYSIS

It can be inferred from Table 1 that the test is significant (for ASA30), and that the null hypothesis (H_0) is rejected. This is because considering t(98) = 12.999, p = .000 < .05 under equal variance assumed, it is evident that a significant difference exists in the means of the class teachers and subject teachers with respect to assessing students in ways that make them reflect on their own work on regular basis through self and peer assessment. The expertise of class teachers and subject teachers in their

use of *Assessment as Learning* strategy, with respect to teaching division is displayed in the descriptive statistics which is presented in Table 2. From the descriptive statistics that is shown in Table 2, it is clear with respect to this item that class teachers had the highest mean of 3.75 with a standard deviation of .436, whereas subject teachers had a mean of 2.47 with a standard deviation of 0.507. The mean difference is 1.281 explains that, class teachers demonstrated greater skills with respect to assessing students in ways that make them reflect on their own work on regular basis through self and peer assessment than their subject teacher counterparts.

It is also evident from Table 1 that the test is significant (for ASA 34), and that the null hypothesis (H_0) is rejected. This is because considering t(98) = 12.999, p = 0.000 < 0.05 under equal variance assumed, it is evident that a significant difference exists in the means of the class teachers and subject teachers with respect to providing safe environment and support for students to take chances. The difference between class teachers and subject teachers in their use of *Assessment as Learning* strategy with respect to providing safe environment and support for students to take chances is displayed in the descriptive statistics which is presented in Table 2. From the descriptive statistics that is shown in Table 2, it is clear that class teachers had the highest mean of 3.59 with a standard deviation of .496 whereas Subject teachers had a mean of 2.06 with a standard deviation of 0.246. The mean difference is 1.526 explains that, class teachers exhibited higher skills of providing safe environment and support for students to take chances than their subject teacher counterparts.

It can be inferred from Table 3 that the test is significant (for ASA32), and that the null hypothesis (H_0) is rejected. This is because considering t (98) = 15.290, p = .000 < .05 under equal variance assumed, it is evident that a significant difference exists in the means of the female and male teachers with respect to providing for the development of independent learners. The difference between female and male teachers in their use of *Assessment as Learning* strategy with respect to providing for the development of independent learners is displayed in the descriptive statistics which is presented in Table 4. From the descriptive statistics that is shown in Table 4, it is clear that with respect to this item, female teachers had the highest mean of 3.90 with a standard deviation of .303 whereas male teachers had a mean of 2.76 with a standard deviation of 0.431. The mean difference 1.140 explains that, female teachers demonstrated greater skills with respect to providing for the development of independent learners than their male counterparts.

From Table 3, the test is significant (for ASA32), and the null hypothesis (H_0) is rejected. This is because considering t (98) = 12.965, p = .000 < .05 under equal variance assumed, it is evident that a significant difference exists in the means of category of teaching experience with respect to providing for the development of independent learners. The difference between more experienced (at least 4 years) and less experienced (less than 4 years) teachers in their use of *Assessment as Learning* strategy with respect to providing for the development of independent learners is displayed in the descriptive statistics which is presented in Table 5. From the descriptive statistics that is shown in Table 5, it is clear that with respect to this item teachers with at least four years of teaching experience had the highest mean of 3.82 with a standard deviation of .389 whereas teachers with less than 4 years of teaching experience had a mean of 2.73 with a standard deviation of 0.447. The mean difference is 1.085 (absolute value of -1.085) explains that, teachers with at least 4 years of teaching experience demonstrated greater skills with respect to providing for the development of independent learners than their counterparts with lesser years of teaching experience.

Table 7 shows the coded responses of the respondents with their corresponding mean and mean ranks. It can be observed that the basic school teachers performed better where mean values exceeded the grand mean. Out of seven items they were being evaluated for, they have performed well in 4 items (representing approximately 57 %).The first four items that characterized basic school teachers in Ghana with regards to *Assessment as Learning* are: (a) assessing students in a way that make them learn about themselves as learners and become aware of how they can learn (b) assessing students in a way that helps them take responsibility for their own learning and monitoring future directions (c) assessing students in a way that makes them reflect on their own work on regular basis through self and peer assessment , and (d)providing assessment that requires students to ask questions about

Table 1. Independent t-test for differences in use of *Assessment as Learning* with respect to teaching division (Class Teacher or Subject Teacher)

Independent Samples Test										
		Levene's test for equality of variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% confidence interval of the difference	
									Lower	Upper
ASA30	Equal variances assumed	10.031	.002	12.999	98	.000	1.281	.099	1.086	1.477
	Equal variances not assumed			12.311	53.365	.000	1.281	.104	1.073	1.490
ASA34	Equal variances assumed	147.603	.000	16.450	98	.000	1.526	.093	1.342	1.710
	Equal variances not assumed			20.563	97.671	.000	1.526	.074	1.378	1.673

Table 2. Descriptive statistics showing a difference in the means of teacher's responses with respect to teaching division (Class or Subject Teacher)

Group statistics					
	T divison	N	Mean	Std. deviation	Std. error mean
ASA30	class teacher	68	3.75	.436	.053
	Subject teacher	32	2.47	.507	.090
ASA34	class teacher	68	3.59	.496	.060
	Subject teacher	32	2.06	.246	.043

Table 3. Independent t-test for differences in use of *Assessment as Learning* with respect to gender

Independent samples test										
		Levene's test for equality of variances		t-test for equality of means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	95% confidence interval of the difference	
									Lower	Upper
ASA32	Equal variances assumed	15.651	.000	15.290	98	.000	1.140	.075	.992	1.288
	Equal variances not assumed			15.290	87.888	.000	1.140	.075	.992	1.288

Table 4. Descriptive statistics showing a difference in the means of teacher's responses with respect to gender

Group statistics					
	Sex	**N**	**Mean**	**Std. deviation**	**Std. error mean**
ASA32	Female	50	3.90	.303	.043
	Male	50	2.76	.431	.061

Table 5. Independent t-test for differences in use of *Assessment as Learning* with respect to teaching experience

Independent samples test										
		Levene's test for equality of variances		**t-test for equality of means**						
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Difference**	**Std. Error Difference**	**95% confidence interval of the difference**	
									Lower	**Upper**
ASA32	Equal variances assumed	4.062	.047	-12.965	98	.000	-1.085	.084	-1.251	-.919
	Equal variances not assumed			-12.786	87.925	.000	-1.085	.085	-1.253	-.916

Table 6. Descriptive statistics showing a difference in the means of teacher's responses with respect to teaching experience

Group statistics					
	Teaching Exp	**N**	**Mean**	**Std. deviation**	**Std. error mean**
ASA32	below 4 years	45	2.73	.447	.067
	4 years and above	55	3.82	.389	.052

Table 7. General performance of teachers in use of *Assessment as Learning* strategy

SA	**A**	**D**	**SD**	**Mean**	**Mean rank**
260	75	30	8	93.25	1
244	108	9	1	90.5	3
220	126	9	8	90.75	2
224	126	6	0	89	5
212	126	15	1	88.5	6
200	135	12	1	87	7
236	114	9	1	90	4
				Grand mean= 89.85714	

SA means Strongly Agree; A means Agree; D means Disagree and SD means Strongly Disagree

Table 8. Coding points (weighting values)

Strongly agree	**Agree**	**Disagree**	**Strongly disagree**
4	3	2	1

their learning. Basic School teachers however performed below the grand mean threshold value of 89.9 in the following items: (e) providing the development of independent learners (f) providing regular and challenging opportunities to practice, to improve confidence, (g) providing safe environment for students to take chances and where support is readily available. Table 8 shows the weight assigned to each likert.

8. DISCUSSION

The study found significant differences in demographic variables (i.e teaching division, teaching experience and gender) and the use of *Assessment as Learning* strategy. In relation to teaching division, a significant difference was found; where class teachers demonstrated greater skills with respect to assessing students in ways that make them reflect on their own work on regular basis through self and peer assessment than their subject teacher counterparts. Another finding with respect to teaching division was that class teachers exhibited higher skills of providing safe environment and support for students to take chances than their subject teacher counterparts. These findings are similar to that of Deluca et al. (2016) who found significant difference in the use of assessment strategies with respect to teaching division.

A significant difference was found for the teaching experience and the use of assessment of learning strategy. Teachers with at least 4 years of teaching experience, demonstrated greater skills with respect to providing for the development of independent learners, than their counterparts with lesser years of teaching experience. These findings are similar to that of Johnson (2008) who found significant difference in the use of assessment strategies with respect to teaching experience.

With regards to the gender demographic variable, significant difference was found in the use of *Assessment as Learning* strategy by male and female teachers. Female teachers demonstrated greater skills with respect to providing for the development of independent learners than their male counterparts. However, these findings are contrary to that of Asamoah et al. (2019) who found that male senior high school teachers do better in their formative assessment knowledge than their female counterparts.

The grand mean was used as a reference criterion for determining the threshold for good

performance or poor performance. To this end, mean values that exceeded this threshold (grand mean value of 89.9) was an indicator for good performance with respect to the effective use of the *Assessment as Learning* strategy by teachers. However, a mean value below this threshold of 89.9 were deemed low performance. From the analysis, the overall performance of the teachers with regards to the *Assessment as Learning* strategy was found to be 57%. This is an indication that Ghanaian basic school teachers require more training in the use of the *Assessment as Learning* strategy. The four items that characterized basic school teachers in Ghana with regards to *Assessment as Learning* are: (a) assessing students in a way that makes them learn about themselves as learners and become aware of how they can learn (b) assessing students in a way that helps them take responsibility for their own learning and monitoring future directions (c) assessing students in a way that makes them reflect on their own work on regular basis through self and peer assessment and (d) providing assessment that requires students to ask questions about their learning. There were areas of the *Assessment as Learning* that fell below the grand mean value of 89.9.The areas which require improvement by the teachers included: (a) providing the development of independent learners (b)providing regular and challenging opportunities to practice to improve confidence and (c)providing safe environment for students to take chances and where support is readily available. The study recommends continuous workshops to strengthen the use of *Assessment as Learning* strategy among basic school teachers in Ghana.

9. CONCLUSION

Assessment as Learning strategy allows students the opportunity to use assessment to further their own learning. With respect to the use of *assessment as Learning* strategy, significant differences were found for teaching division, teaching experience and gender. From the findings, the mean difference of 1.281explains that class teachers demonstrated greater skills (M:3.75, SD:.436) with respect to assessing students in ways that make them reflect on their own work on regular basis through self and peer assessment, than their subject teacher counterparts(M:2.47, SD:0.507).Also, with a mean difference of 1.526, class teachers(M:3.59, SD:.496) exhibited higher skills of providing safe environment and support for students to take chances than their subject teacher counterparts (M:2.06, SD:.246).Again, the absolute mean difference of 1.085 explains that teachers with at least 4 years of teaching experience (M:3.82, SD:.389) demonstrated greater skills with respect to providing for the development of independent learners, than their counterparts(M:2.73, SD:0.447) with lesser years of teaching experience. Female teachers (M:3.90, SD:.303) demonstrated greater skills with respect to providing for the development of independent learners, than their male counterparts (M:2.76, SD:0.431) with a mean difference of 1.140. The study identified the strengths and weaknesses of Ghanaian basic school teachers with regards to the use of *Assessment as Learning* strategy. The overall performance of the use of this strategy with respect to Ghanaian basic school teachers was found to be 57%.

10. LIMITATION AND IMPLICATION FOR FURTHER STUDY

This study focused on the teachers who teach from grades 1 to 9. Future studies can focus or extend it to grade 12. The population can be extended to allow for higher sample size at 95% confidence interval.

11. RECOMMENDATIONS

The findings provide a basis for Ghana Education Service to provide in-service professional learning training aimed at enhancing teachers' knowledge of formative assessment with the ultimate goal of enhancing students' learning and achievement.

CONSENT

Participants gave their consent for their responses to be used for the purpose of research.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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