

Assessment of Mathematics and Science Teachers' Knowledge and Practice of Feed-back System in Junior High Schools in Hohoe, Ghana

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Abstract

Aim: Teachers' knowledge of feedback systems encompasses their understanding of the purpose and types of feedback, as well as their knowledge of how to design and implement effective feedback processes. The practice of feedback systems refers to the extent to which they implement feedback processes in the classroom. This includes the frequency and quality of feedback provided to students, as well as the use of feedback to guide instructional decisions. Assessing teachers' knowledge and practice of feedback systems in junior high schools is important because effective feedback practices are essential for promoting student learning and academic achievement. This study aimed to assess mathematics and science teachers' Knowledge and Practice of feedback systems in junior high schools in Hohoe, Ghana.

Methods: A survey research design was used to collect data from 104 mathematics and science teachers using a self-administered questionnaire. Descriptive statistics, Mann-Whitney U test, and Pearson's correlation coefficient were used to analyze the data.

Results: The results showed that the mean Knowledge score of mathematics and science teachers was 3.12, indicating a majority agreement level of knowledge of feedback system. The mean practice score was 2.12, indicating a majority disagreement level of practice of feedback system in the classroom. There was no significant difference in knowledge and practice scores between male and female teachers. However, an inverse correlation was found between knowledge and practice scores, indicating that teachers with higher knowledge of feedback systems may not necessarily be effective at implementing those systems in practice.

Conclusion: It was observed that majority of the participants do not practice feedback in their teaching.

Recommendations: There is need for professional development programs and policies that support effective feedback practices in the classroom. Further research is needed to identify the contextual factors that influence teachers' feedback practices and their understanding of feedback purposes in Ghana.

Keywords: *Feedback, teachers, knowledge, practice, basic schools.*

INTRODUCTION

One of the most challenging but important tasks for a teacher is to provide effective feed-back that is appropriate for the students' level of knowledge. Giving such feed-back is a unique act that facilitates learning and progress in specific subject areas (Svanes & Skagen, 2017). This suggests that teacher's knowledge on the feedback system, thus, feed-up, feed-back and feed-forward will influence their classroom practices and inevitably improve performance in Mathematics and Science.

Feed-back system (FS) is an important factor in teaching and learning. According to Fisher and Frey, (2009) there are three components of FS due to its complexity: Feed-up clarifies the learning objectives and also motivates students before teaching and learning occur; feed-back provides personalized responses to learners' work; feed-forward aids in the assessment of challenges students encounter during learning in order to modify future learning. Van Der Kleij and Adie (2020) opine that a vital requirement for efficient feed-back uptake is students' understanding of the intended and perceived purpose, meaning, and value of feed-back. The value ascribed to feed-back is reflected in the feed-back's design and correctness, as well as the affective qualities of how the message is presented and received. They also argued that there are varied types of feed-back used in the classroom depending on the teachers' knowledge, belief, teaching approaches and the curriculum goals.

Uribe and Vaughan, (2017) also conducted a study titled "Facilitating student learning in distance education: a case study on the development and implementation of a multifaceted feed-back system" in an American University. The study had three objectives which focussed on functions and values, implementation and instructional strategies of feed-back in the classroom. In all, 89 participants were used for the study. It was indicated in the study that the use of varied feed-back (corrective, formative, evaluative, interactive and descriptive) had a positive effect on students' learning. The study further suggests the effective use of formative assessment and various feed-back strategies as means of attaining learning outcomes. Leibold and Schwarz (2015) also outlined some feedback strategies such as written word, facial cues, audio file, video recording, praises, pre-set automated feedback, and live web-based conferencing. These are evidence of providing feedback in a blended learning environment. They added that personalised, frequent and immediate feed-backs enable critical thinking, promote self-regulated learning, improve learning outcomes and effective communication in learners as well as develop teacher-learner relations.

The success of Ghana's new educational reform depends on teachers and their ability to use recommended assessment strategies effectively (Senyefia et al., 2020). They investigated the use of the assessment as learning strategy among basic school teachers in Ghana. The survey included a 7-item Likert scale that was reliable with a coefficient of 0.995. A sample size of 100 was randomly selected from the population with a 95% confidence interval. The results showed significant differences in the use of the assessment as learning strategy based on teaching division, teaching experience, and gender. Class teachers had higher skills in assessing students through self and peer assessment and providing a safe environment for students to take chances compared to their subject teacher counterparts. Teachers with at least four years of teaching experience also demonstrated greater skills in providing for the development of independent learners. Female teachers were found to have greater skills in developing independent learners compared to their male counterparts. The study indicated that the teachers' performance in using the Assessment as Learning strategy was 57%. The findings suggest that the Ghana Education Service should provide in-service professional learning

training to enhance teachers' knowledge of formative assessment, ultimately improving students' learning and achievement.

Performance assessment requires students to showcase their mastery of specific skills and competencies by performing a task that demonstrates their capabilities. Unlike traditional tests where students select an answer from a list, performance assessment requires them to perform an activity, providing them with an opportunity to apply their knowledge and skills from multiple areas to demonstrate their ability to achieve a learning target and create their own solution. This approach differs from traditional assessments and provides better evidence of effective instructional activities, is more engaging for students, and better reflects the criterion performances that matter beyond the classroom. For instance, while scores on a multiple-choice mathematics exam indicate whether a student chose the correct answer (product), they do not directly show the problem-solving strategies used to reach the answer (process) (Arhin, 2015).

Mathematics, science and technological knowledge are an indispensable tool in modern society, serving as a means of overcoming daily challenges. As a result, mathematics, science and technology are core subjects in the school curriculum. The attitude towards these subjects plays a vital role in the teaching and learning process and influences students' achievement in the subjects. The mode of assessment and teaching method are contributing factors to the attitudes formed towards mathematics. Arhin (2015) used a quasi-experimental research project to examine the impact of performance assessment-driven instructions on the attitudes and achievement in mathematics of senior high school students in Ghana at Ghana National College in Cape Coast. Two classes were randomly selected for the study and were assigned as the experimental and control groups, with 42 and 40 students, respectively. Data was collected through an open-ended mathematics test and a 15-item Likert-type questionnaire on students' attitudes towards mathematics. The independent samples t-test was used to analyze differences between the groups. The experimental group showed significant improvement in post-test scores compared to the control group. The study revealed that performance assessment-driven instruction enhanced students' problem-solving abilities and boosted their confidence in mathematics. Students' attitudes towards mathematics were generally positive according to the Likert-type questionnaire. The findings of the study suggest that the Ghana Education Service should provide in-service training for mathematics teachers on the use of performance assessment-driven instructions, and that mathematics teachers integrate performance assessment-based tasks into their students' assessment.

The quality of learning should not only be measured in terms of student learning achievement or success, but also in the effectiveness of the instruction that takes place in the classroom. As a result, an effective formative assessment system is seen as a necessary feature of distance education instruction, which can help to identify weaknesses and improve the student learning process through permanent feedback. Assessments are an important tool in education used to track student performance and determine whether learning goals have been achieved. Amoako, (2018) opined that formative assessment helps teachers make important decisions about daily instruction, while assessment information assists in interpreting and monitoring student progress, giving constructive feedback, and improving both student learning and teaching methods. The study examines the approaches and findings of prior studies conducted between 1990 and 2016, regarding formative assessment practices among educators across all levels of education in Ghana. The study indicates that there was limited documentation of formative assessment studies in Ghana, the literature review used encompassed 10 research articles, abstracts, and electronically accessed or printed materials that were gathered for reading purposes. After analyzing the literature review, seven studies were chosen for meta-analysis

based on their exploration of formative assessment implementation. The studies comprised 5 qualitative case studies and 2 mixed studies. The results of the meta-analysis revealed that formative assessment is widely accepted and implemented by educators at all education levels in Ghana. The methods employed in previous studies on formative assessment practices in Ghana were deemed reliable, as they examined different aspects of formative assessment practices.

During the learning process, knowledge is created. The idea of performance-based assessment in the classroom is inspired by students discovering knowledge for themselves rather than simply receiving it. It is becoming increasingly clear that assessment is an essential part of the teaching and learning process. Assessment as explained in literature is used to provide information about students' likely performance, describe their strengths and weaknesses, and provide feedback on which items they got right or wrong. Assessment improves the effectiveness of instructional strategies. Literature argues that teachers need to know what their students are capable of doing in order to plan effectively, highlighting the importance of formative assessment for both instructors and learners. In Ghana, research has been conducted on the assessment practices of teachers, with a focus on various forms assessment practices among pre – tertiary school teachers and their impact on student learning and the strategies they use in the country.

Despite the numerous advantages suggested by the literature on assessment practices among teachers in Ghana, there is a lack of records on the feedback system knowledge and practices of Mathematics and Science teachers. This specific problem highlights the need to investigate the feedback system knowledge and practices of mentors (Mathematics and Science teachers) in our partnership schools in Hohoe Township. Additionally, there is no study on teachers' knowledge and practices of the feedback system in the study areas. The effective use of formative assessment practices, such as feedback systems, can significantly improve student learning outcomes in Mathematics and Science education. However, there is a lack of understanding regarding the knowledge and practice of feedback systems among Mathematics and Science teachers in Junior High Schools in Hohoe, Ghana. This lack of knowledge and practice can lead to ineffective feedback, which can negatively impact student learning outcomes. Therefore, there is a need to assess the knowledge and practice of feedback systems among Mathematics and Science teachers in Junior High Schools in Hohoe, Ghana, to identify areas for improvement and enhance the quality of education in these critical subjects.

Aim and Objectives

The aim of the study was to assess the knowledge and practices of Junior High School (JHS) Mathematics and Science teachers on feedback systems (FS) in the classroom. Based on this aim, the following specific objectives were designed to determine:

1. Mathematics and Science teachers' knowledge on the feedback system.
2. Mathematics and Science teachers' practice of feedback system.
3. The difference between male and female teachers' knowledge and practices of feedback system relationship between mathematics and science teachers' knowledge and practice of the feedback system.

Research Questions

1. What is Mathematics and Science teachers' knowledge on the feedback system?
2. What is Mathematics and Science teachers' practice of the feedback system?

3. What is the difference between male and female teachers' knowledge and practices of feedback system?
4. What is relationship between mathematics and science teachers' knowledge and practice of feedback system

LITERATURE REVIEW

Theoretical Review

Feedback theory

The theory was developed by educational psychologist Hattie and Timperley. It emphasizes the importance of feedback as an essential component of effective teaching and learning (Hattie & Timperley, 2007). They stated that feedback involves providing information about the learner's current understanding or performance in relation to specific goals or criteria, along with suggestions for improvement. They further expressed that the Feedback theory consists of three key components: Feedforward, feedback, and feed-up. Feedforward refers to setting clear learning goals and providing explicit expectations and criteria to guide students' efforts. It involves clarifying the desired outcome or standard before students begin their work. Feedback is the information provided to students about their performance or understanding in relation to the set goals or criteria. It can be given during or after an assessment or task. Effective feedback should be specific, timely, and focused on the task or learning goal. It should highlight both strengths and areas for improvement, and provide guidance on how to close the gap between the current and desired performance. Feed-up is the information given to students about their progress towards the learning goals and the next steps they need to take to achieve those goals. It helps students understand where they are in their learning journey and provides them with a clear path forward. As examined by Harks et al. (2014) the effects of two types of written feedback on changes in mathematics achievement, interest, and self-evaluation were compared. It was demonstrated that process-oriented feedback (feed – up and feedforward) was viewed as more helpful than grade-oriented feedback and that changes in achievement and interest were positively impacted by feedback's perceived usefulness. In line with this, process-oriented feedback's perceived usefulness had a stronger positive indirect influence on changes in mathematics achievement and interest than grade-oriented feedback.

Lipsch-Wijnen and Dirkx (2022) argued that an educational intervention that supports learning is effective feedback. They highlight the three distinct functions and four distinct degrees of feedback as defined in Hattie and Timperley's feedback model. The study opined that despite the model's widespread use in educational practice, little is known about its application in the classroom or the best way to distribute the many sorts of feedback. The findings indicate that task-oriented feedback makes up the majority of the feedback provided by lecturers, and that present feedback methods might be strengthened by putting greater emphasis on the combination of feedup, feedback, and feedforward. The results also show that it is harder to predict in advance which level of feedback will be given (task, process, self-regulation, or person) and that it should be suited to the learning objective.

Empirical Review

Teachers knowledge and practice of feedback system

Lee (2008) indicates that research on L2 teacher feedback has mostly been conducted in the United States, with advanced students in process-oriented classrooms. However, there is a lack

of published research on how EFL school teachers respond to student writing, particularly regarding why they provide feedback in certain ways and whether their practices align with recommended principles. Lee conducted a study to address the identified gaps by analyzing the written feedback given by 26 Hong Kong secondary English teachers to 174 student texts, and conducting interviews with 6 of the teachers to understand the factors that influenced their feedback practices. The results show that teachers provided primarily error-focused feedback in single-draft classrooms, which goes against the principles outlined in local curriculum documents. The interview data revealed four important issues that contribute to teachers' feedback practices: accountability, beliefs and values, exam culture, and lack of teacher training. These findings suggest that teachers' feedback practices are influenced by a range of contextual factors, including their beliefs, values, and knowledge, as well as cultural and institutional contexts. The study highlights the importance of understanding the complex factors that shape teachers' feedback practices in EFL contexts, and underscores the need for greater support and training for teachers.

EFL teachers' beliefs and decision-making processes have become a crucial area of research. Wei and Cao (2020) study focuses on teachers' beliefs regarding the strategies they use when providing corrective feedback on students' writing. Using Ellis's typology of written corrective feedback and Borg's teacher cognition theory, the survey investigated the self-reported strategy use of 254 university EFL lecturers in Thailand, China, and Vietnam. The findings showed that the teachers employed different types of feedback strategies, including high-demand (requiring students to respond to feedback), low-demand (correcting all errors), and no-demand feedback, depending on their students' proficiency levels. The use of high-demand feedback was associated with their pre- and in-service professional training experiences, contextual factors such as local cultural influences and limited resources, while the use of no-demand and low-demand feedback was linked to their prior language learning experiences and classroom teaching practices. The study also revealed an inconsistency between teachers' understanding about feedback provision and their reported feedback strategy use.

Although feedback can improve teacher-student relations and enhance academic involvement, performance, and self-regulation, research suggests that teachers may not always use feedback effectively (Fonseca et al., 2015). To address this issue, it is important to promote teachers' appropriate use of feedback in the classroom. The study describes a long-term workshop designed to enhance teachers' knowledge and skills in using feedback strategies and their appreciation of feedback's importance. Twelve teachers participated in the workshop, which spanned an entire school year and included reflective sessions intertwined with classroom application work. Observations and teacher reports indicated that participation in the workshop improved teachers' involvement, knowledge, competencies, and positive feelings about feedback strategies. The study suggests that a workshop with specific objectives on feedback strategies and a long-term duration can effectively promote participants' involvement, knowledge, and competencies in using feedback, as well as their appreciation of these strategies' importance.

The idea that knowledge of past performance can impact future performance is often referred to as "closing the gap" (Murtagh, 2014). Feedback is a recognized method of influencing teaching and learning, and the current trend of assessment for learning globally may reflect it. Murtagh (2014) examined the feedback strategies used by two experienced literacy teachers in England, utilizing field observations, interviews, and documentary sources. The research reveals that although teachers may claim to effectively use some feedback strategies to support student learning and motivation, there is no empirical evidence to support these claims. The

study also finds that some teachers mark every written assignment for perceived motivational benefits, but this can actually harm intrinsic motivation and lead to a culture of over-dependence on the teacher.

Educational institutions worldwide are promoting the provision of constructive feedback by teachers to facilitate student learning. However, it remains unclear whether teachers possess the ability to differentiate between constructive and non-constructive feedback, and whether they consider certain pedagogical practices, such as rubrics, as forms of feedback. Previous research has not adequately addressed these questions from the perspective of university teachers (Chan & Luo, 2022). They attempted to fill this research gap by conducting ten teacher training workshops at a university in Hong Kong to enhance teachers' assessment and feedback skills. The study employed Poll Everywhere to survey 248 teachers on whether they recognize six common pedagogical practices as forms of feedback. The results revealed that teachers' perceptions of these practices as feedback varied, possibly due to their differing understandings of the purpose of feedback. The study provides valuable insights into teachers' perceptions of feedback practices and how they can be improved.

METHODOLOGY

The study employed quantitative approach by narrowing to the use of analytical survey design. The study took place in Hohoe Township. A population of 188 mathematics and science teachers were estimated, of this, one hundred and five (104) participants were sampled using simple random sampling techniques. A questionnaire was used to elicit information from participants. Both the knowledge level and practice rating ranges from strongly disagree = 1 to strongly agree = 4. The instrument was faced and content validated by a three-member team. The members include STS coordinator and two senior members in the Mathematics and Science department from two Colleges of Education. The instrument was reliably tested using Cronbach alpha which was 0.882. This explained the internal consistency of the instrument. Data was analysed using descriptive and inferential statistics. The descriptive included frequency count means and standard deviation while inferential include independent sample t-test and Pearson Moment correlation analysis using Jamovi statistical software package.

RESULT AND FINDINGS

Table 1: Frequencies of gender of participants

Gender	Counts	% of Total
Female	25	24.0 %
Male	79	76.0 %

Table 2: Mean and reliability distribution of teachers' knowledge on feedback system

Mathematics and science teachers' knowledge on feedback system	Grand mean=3.12; SD=0.503; N=104			Overall α = 0.819
Overall decision: Agree	Mean	SD	Item-rest correlation	Cronbach's α
1. I am familiar with the concept of feedback in the classroom.	3.01	0.919	0.3927	0.816
2. I understand the importance of feedback in assessing pupils' learning.	3.05	0.688	0.0554	0.841
3. I am aware of the different types of feedback that can be used in assessing pupils' learning.	3.14	0.886	0.6509	0.785
4. I know how to provide effective feedback that helps pupils improve their learning.	3.21	0.889	0.6527	0.785
5. I am confident in my ability to give feedback that is specific, constructive, and timely.	3.22	0.788	0.6871	0.783
6. I am familiar with the use of rubrics and other assessment tools that provide feedback to pupils.	3.2	0.716	0.4971	0.804
7. I believe that feedback is an essential part of the assessment process.	2.64	0.975	0.2688	0.832
8. I have received training in how to provide feedback to pupils.	3.39	0.547	0.72	0.791
9. I am able to use feedback to inform my teaching and improve my pupils' learning.	2.94	0.912	0.5407	0.799
10. I believe that feedback helps to motivate pupils and improve their engagement in the learning process.	3.35	0.734	0.7265	0.781

Mean Scale for decision: 1-1.75 = Strongly disagree, 1.76-2.50 = Disagree, 2.56-3.25 = Agree, 3.26-4.0 = Strongly agree.

The reliability coefficient (α) of the measure of teachers' knowledge on feedback system in the classroom is 0.819, this suggests a high internal consistency or reliability. The grand mean of 3.12 indicates that, on average, teachers tend to agree with the statements about their knowledge on feedback system in the classroom, as 3.12 represents fall within the agreement on a Likert scale where 1 represents "strongly disagree" and 4 represents "strongly agree". The standard deviation of 0.503 suggests that there is relatively little variability in teachers' knowledge about feedback system in the classroom, with most teachers having similar levels of knowledge.

Table 3: Mean and reliability distribution of teachers practices of feedback system

Mathematics and science teachers' practices of feedback system	Grand mean = 2.12; SD=0.611; N=104			Overall $\alpha=0.847$
Overall decision: Disagree	Mean	SD	item-rest correlation	Cronbach's α
1. I provide feedback to students on their assessments	2.02	1.005	0.428	0.844
2. I provide specific and actionable feedback to help students improve their learning	2.66	0.705	0.575	0.833
3. My feedback is effective in helping students to understand their strengths and weaknesses in the subject matter.	2.04	1.004	0.518	0.836
4. My involvement pupils feedback process help them through self-evaluation as well as peer assessment	1.77	0.978	0.528	0.835
5. I always communicate the purpose of feedback to pupils, such as its role in enhancing their learning and progress	2.13	0.996	0.708	0.817
6. I give clear and understandable feedback to pupils, without causing confusion or misunderstandings	2.37	0.935	0.457	0.841
7. I adapt the feedback to meet the individual needs and learning styles of each student.	2.07	0.862	0.14	0.865
8. I am consistent and fair in providing feedback to all pupils regardless of their academic abilities or backgrounds.	2.13	0.996	0.758	0.812
9. I use feedback as a tool for motivation, encouragement, and positive reinforcement to pupils.	2.12	0.928	0.61	0.827
10. I use feedback as an opportunity for reflection, assessment and improvement of their own teaching practices.	1.93	0.968	0.771	0.811

Mean scale for decision: 1-1.75 = Strongly disagree, 1.76-2.50 = Disagree, 2.56-3.25 = Agree, 3.26-4.0 = Strongly agree.

Based on the result provided, it appears that the majority of the Mathematics and Science Teachers (N=104) do not practice a feedback system in the classroom, as the grand mean is 2.12 with a standard deviation of 0.611, which falls under the "disagree" category on a Likert scale where 1 represents "strongly disagree" and 4 represents "strongly agree". The grand mean indicates the overall average response to the statements regarding the practice of a feedback system in the classroom, with a value of 2.12 suggesting that most of the teachers disagreed

with the statements. The standard deviation of 0.611 indicates that the responses were relatively tightly clustered around the grand mean, with relatively little variation in the responses.

Table 4: Descriptive statistics of teachers' knowledge and practices of feedback system based on gender

Variables	Group	N	Mean	Median	SD
Teachers Knowledge	Female	25	3.06	3.1	0.485
	Male	79	3.13	3.0	0.510
Teachers Practice	Female	25	2.11	2.2	0.633
	Male	79	2.13	2.2	0.608

From table 4, the study assesses the knowledge of female and male teachers regarding feedback systems in the classroom, using a four-point Likert scale where 1 represents "strongly disagree" and 4 represents "strongly agree." The sample size for female teachers is 25, and their mean score on the knowledge assessment is 3.06, while the sample size for male teachers is 79, and their mean score on the same assessment is 3.13. The findings suggest that both female and male teachers had relatively high knowledge scores regarding feedback systems in the classroom, as the mean scores for both groups are above the midpoint of the scale (2.5), indicating their agreement level of having knowledge of the feedback system. However, male teachers had a slightly higher mean score than female teachers, suggesting that male teachers may have had slightly more knowledge about feedback systems in the classroom than female teachers in this study.

This study also assessed the practice of female and male teachers regarding feedback systems in the classroom, using a four-point Likert scale where 1 represents "strongly disagree" and 4 represents "strongly agree." The sample size for female teachers is not specified, but their mean score on the practice assessment is 2.11. The sample size for male teachers is 79, and their mean score on the same assessment is 2.13. The findings suggest that both female and male teachers had relatively low practice scores (disagree) regarding feedback systems in the classroom, as the mean scores for both groups are below the midpoint of the scale (2.5). However, the difference in mean scores between female and male teachers is small and may not be statistically significant.

The given data reports the results of Levene's test for homogeneity of variances for two groups: one for knowledge and one for practice. The Levene's test is used to determine if the variances of the two groups are equal. A non-significant result ($p > .05$) indicates that there is no significant difference in variances, and the assumption of homogeneity of variances is met. For the knowledge group, Levene's test resulted in $F(1, 102) = 0.723$, $p = 0.397$. Since the p-value is greater than 0.05, it can be concluded that there is no significant difference in variances between the two groups on the knowledge variable. Therefore, the study assumes that the variances of the two groups are equal, and this assumption is met. For the practice group, Levene's test resulted in $F(1,102)=0.274$, $p=0.602$. Since the p-value is greater than 0.05, indicating that there is no significant difference in variances between the two groups on the practice variable. Therefore, the variances of the two groups are equal, and this assumption is met which is a necessary assumption for conducting certain statistical tests such as t-tests.

The Shapiro-Wilk test is a statistical test used to determine whether a dataset follows a normal distribution. For the "Knowledge" dataset, the test statistic is $W=0.962$ and the p-value is $p=0.005$, which is less than 0.05. Therefore, conclude that the "Knowledge" dataset is not

normally distributed. For the "Practice" dataset, the test statistic is $W=0.935$ and the p-value is $p<.001$, which is also less than 0.05. Therefore, conclude that the "practice" dataset is not normally distributed. In summary, both datasets fail the normality test (Shapiro-Wilk) and are not normally distributed.

Based on the normality assumption violation, the Mann-Whitney U test was conducted to compare the scores on the knowledge and practice measures between female and male participants. For the knowledge measure, the results show a Mann-Whitney U statistic = 938 and a $p = 0.708$. This indicates that there is no statistically significant difference between the knowledge scores of female and male participants at a significance level of 0.05. The mean knowledge score for female participants was 3.06, and the mean knowledge score for male participants was 3.13. While the difference between the means is small, it is not statistically significant. Therefore, there is no difference between the knowledge scores of female and male participants. For the practice measure, the results show a Mann-Whitney U statistic = 966, $p = 0.872$. This indicates that there is no statistically significant difference between the practice scores of female and male participants at a significance level of 0.05. The mean practice score for female participants was 2.11, and the mean practice score for male participants was 2.13. Again, while the difference between the means is small, it is not statistically significant. Therefore, it was concluded that there is no difference between the practice scores of female and male participants. The independent analysis of knowledge and practice between female and male participants using the Mann-Whitney U test indicates that there is no statistically significant difference between the scores of the two groups.

Relationship between mathematics/science teachers' knowledge and practices of feedback system

Table 5: Correlation matrix between participants knowledge and practice

		Knowledge
Practice	Pearson's r	-0.309
	df	102
	p-value	0.001

The correlation between mathematics/science teachers' knowledge and practice of feedback system was analyzed using Pearson's correlation coefficient. The results show a Pearson's r of -0.309 and a p-value of 0.001. The negative Pearson's r value indicates that there is an inverse association between knowledge and practice of feedback system, meaning that as knowledge of feedback system increases, Practice of feedback system decreases, and vice versa. The strength of the negative correlation is moderate, as the absolute value of r is between 0.3 and 0.5. The p-value of 0.001 indicates that the observed correlation is statistically significant at a significance level of 0.05, which means that it is unlikely that the observed correlation is due to chance. Therefore, there is a significant inverse correlation between mathematics/science teachers' knowledge and practice of feedback system. In summary, the analysis indicates that there is a moderate negative correlation between the knowledge and practice of feedback system among mathematics/science teachers in Hohoe, Ghana. This implies that teachers with higher knowledge of feedback systems may not necessarily be effective at implementing those systems in practice.

DISCUSSION

The knowledge of the participants reveals that the majority of them have a good knowledge of the feedback system. However, participants lack the application (practices) of the feedback system. This finding is in support of the finding of (Svanes & Skagen, 2017; Van Der Kleij & Adie, 2020) who also argued that the majority of teachers demonstrate good knowledge of the feedback system during teaching and learning. Similarly, Uribe and Vaughan (2017) also stated that teachers' knowledge of various feedback may have a positive effect on students' learning, and also promote self-regulated learning as well as healthy student-teacher relationship.

In addition, the results indicate that there is no statistically significant difference between female and male Mathematics/Science teachers' knowledge and practices of feedback in Hohoe. Meanwhile, it is expressed that male teachers' feedback achieves its intended purpose than other subjects (Van Der Kleij et al., 2020; Leibold & Schwarz, 2015). This study serves as a contribution to the knowledge gap of Mathematics/Science basic school teacher's gender regarding feedback knowledge and practices in the classroom.

Finally, the study found an inverse relationship between basic school mathematics/science teachers' knowledge and practice of feedback system in Hohoe. Contrary to this study, Lee (2008) found that teachers' feedback practices are influenced by their beliefs, values, understandings, and knowledge. For example, teachers who believe that feedback should be specific and actionable may provide more effective feedback than those who believe that feedback should be general and non-specific. Similarly, teachers with more knowledge and understanding of feedback processes may be more effective at providing feedback than those with less knowledge and understanding. Chan and Luo (2021) found that teachers' varied perceptions of feedback practices are related to their varied understandings of feedback purposes. Teachers who view feedback as a tool for improving student learning may provide more effective feedback than those who view feedback as a tool for evaluation or judgement. Additionally, teachers who understand the importance of student agency and self-regulation may be more effective at providing feedback that promotes these qualities.

CONCLUSION

In conclusion, the study highlights the importance of knowledge of the feedback system and its influence on mathematics/science teachers in Hohoe feedback practices to achieve the intended feedback purposes. By taking these into account, educators and policymakers can work to create professional development programs and policies that support effective feedback practices in the classroom. This is important as the study suggests that the teachers demonstrate good knowledge, but have poor practice traits. As indicated in the theory of feedback, many teachers have wild hearing of feedback in learning but its application rarely felt during teaching and learning.

RECOMMENDATION

Teachers should practice feedback since they have demonstrated good knowledge by:

1. Developing a growth mindset both for themselves and their students,
2. adopting a positive attitude towards feedback will encourage you to seek it out and use it effectively and establish clear and specific learning goals for your students,
3. aiming to provide feedback in a timely manner, preferably soon after the completion of a task or assessment,

4. providing feedback; teachers should be specific about what was done well and what areas need improvement. Also, use clear and concise language to highlight specific strengths and weaknesses,
5. experimenting with different feedback formats to cater to diverse student needs. Written comments, verbal discussions, peer feedback, and self-reflection exercises are just a few examples,
6. encouraging open and honest communication between you and your students. Create a classroom environment where students feel comfortable asking questions, seeking clarification, and sharing their thoughts on the feedback they receive. Actively listen to students' perspectives and engage in meaningful dialogue to deepen their understanding.

Area for Further Studies

Further investigation may be needed to understand the reasons for the low practices of feedback system and also the inverse correlation and identify ways to improve the implementation of feedback systems in practice among basic school teachers.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the paper.

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