

Influence of teacher pedagogical skills and attendance on students' academic performance

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Abstract

Purpose: The study examined the impact of teacher pedagogical skills and teacher attendance on students' foundational literacy and numeracy performance in eight sampled basic schools across four districts in Northern Ghana.

Methodology/approach: Using a mixed-methods approach, a total of 216 school visits were conducted, with 120 lessons observed.

Results/findings: Results from the study revealed that most teachers in the Kumbungu district were rated either distinguishable or proficient, and the majority in Nanton, Savelugu, and Tolon were rated proficient. The mean scores showed that teachers in Tolon were lagging in some pedagogical skills. Regression analyses revealed that both teacher attendance and teacher pedagogical skills were significant determinants of students' academic performance, especially in facilitating learners to achieve excellent grades. The qualitative findings also revealed that teacher attendance influenced students' academic performance and attendance, which may eventually lead to a high rate of school dropout in the long run.

Conclusion: Teacher attendance and teacher pedagogical skills play significant roles in student academic performance in literacy and numeracy even though there may be other contributing factors. Essentially, all stakeholders in education should adopt holistic approaches in addressing identified obstacles to improving learning outcomes.

Limitations: The study considered only grades 1 to 3 teachers in eight schools and hence extending to other grades in these schools could have revealed diverse findings.

Contribution: The study advances knowledge on the impact of teachers' pedagogical skills and attendance on the academic performance of students and also inform policy makers to implement policies to address associated challenges.

Keywords: *Education Policy, Learning Outcomes, Student Performance, Teacher Pedagogy, Teacher Attendance*

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1. Introduction

According to the Global Monitoring Report, UNESCO (2005), basic literacy is defined as the ability to create, communicate, and explain meanings across various contexts and for diverse purposes. Numeracy, on the other hand, refers to the ability to understand and apply basic mathematical concepts in everyday activities. Foundational literacy and numeracy skills are key to academic achievement and lifelong learning. Such strong academic foundations set children apart in attaining success in education and boosting

their confidence in future academic achievements (Vasoya & Vansdadiya, 2023).

The United Nations Sustainable Development Goal 4 (SDGs) established the importance of foundational literacy and numeracy, indicating that all children should have equitable access to quality early childhood education that promotes these skills. To ensure that Institutions and Countries make urgent decisions to reduce Learning Poverty (worldbank, 2022), experts created a Commitment to Action on Foundational Learning. The draft was endorsed by the International Nonprofits at the Transformational Education Summit in 2022. Acknowledging the multiple variables that influence students learning, the role of teachers cannot be underestimated. Variables such as teachers' pedagogical skills and attendance play a crucial role in students' learning.

Critical to quality teaching is the teacher's pedagogical knowledge and skill in efficiently teaching students to grasp the knowledge that leads to lifelong learning (Muhammed, Dutsinma, Suleiman, & Ahmed, 2021; Sherman & Boukydis, 2023; Siswanto, Hariri, Sowiyah, & Ridwan, 2020). In line with this, Yalley, Armah, and Ansah (2021) opines that a teacher's pedagogical knowledge constitutes how the teacher structures his or her lessons and teaches students accordingly. Gregory and Boglarka (2019); Olayemi and Amosun (2024) summarize pedagogy as a teaching approach in which a facilitator chooses to match learners' needs. Findings from the research conducted by Piopiunik, Hanushek, and Wiederhold (2014) on the impact of teacher skills in numeracy and literacy on students' performance across 22 developed countries revealed that teacher skills and student performance have a strong relationship, even though the level of relationship differs from country to country.

Empirical research on teacher attendance is mostly skewed toward absenteeism. Findings from research conducted by Gershenson (2016) revealed increase in the rate of teacher absenteeism resulted in reduced student academic performance in literacy and numeracy. Teacher absenteeism has a major negative impact on a classroom's consistency and effectiveness (Gershenson (2016). Research has shown that several factors, including teacher attendance, significantly impact academic attainment. In recent years, governments and local educators have focused on holding teachers accountable for their students' learning and successful advancement through each grade level (Roby, 2013). Variables that influence students' academic performance have been studied in different contexts, from pedagogical content knowledge, teacher absenteeism, and tardiness to socioeconomic impact, among others. While these variables have been studied as independent variables, this study focused on both teachers' pedagogical skills and attendance and their influence on the foundational literacy and numeracy skills of primary school students in the Northern Region of Ghana.

1.2 Research Objectives

1. This study investigates the association between teacher attendance and the academic performance of students in literacy and numeracy in Northern Ghana's basic schools over an academic term.
2. This study evaluated the association between teachers' pedagogical skills and students' literacy and numeracy performance over an academic term in basic schools in Northern Ghana.
3. This study investigated the perceptions of students, teachers, and head teachers on the impact of teachers' pedagogical skills and attendance on literacy and numeracy outcomes in basic schools in Northern Ghana.

2. Literature Review

Time-on-task in an academic setting is crucial for quality learning and academic performance. For a teacher to be on task means that the teacher is present, prepared, and following the school's timetable; an adverse result of this is truncated learning. The "Teaching and Learning International Survey" report written by Büyüköztürk, Akbaba-Altun, and Yıldırım (2010) revealed that teachers' lateness in schools and absenteeism were among the factors that negatively influenced students' learning. Similarly, Akseer

and Játiva (2021) established that teacher absenteeism negatively influences the quality of education, reduces students' academic success, and distorts teaching and learning. In affirmation, Sezgin, Koşar, Kılınç, and Öğdem (2014) highlighted that teacher absenteeism results in a decline in students' academic success and an increase in student absenteeism. In a study in South Africa, Msosa (2020) revealed that the regular absence of teachers resulted in an incomplete syllabus, which influenced students' low grades during the study period. Additionally, a study conducted by Kporyi and Arko (2021) revealed that teacher absenteeism negatively affects students' performance, which could decrease their academic achievement. Similarly, teachers' continuous absence in school contributes to students' loss of interest in mathematics and their reading abilities, which contributes negatively to student's academic achievement (Bonsu, Adom, Adu-Agyem, & Adu-Mensah, 2023; Usman, Akhmadi, & Suryadarma, 2007).

According to research conducted in Ghana by Obeng-Denteh, Yeboah, Sam, and Monkah (2011), student performance was significantly impacted by teacher absenteeism. The data revealed that the students' mean score decreased as the teacher absenteeism rate increased. In essence, there is a correlation between student performance and teacher absenteeism. Additionally, in a study conducted by Akseer and Játiva (2021) on teacher attendance and time on task in Ghana, they defined teacher absenteeism in four different ways: (i) *absence from school*; (ii) *absence of punctuality (late arrival and/or early departure from school)*; (iii) *absence from the classroom (while in school)*; and (iv) *absence from teaching (i.e., reduced time on task while in the classroom)* (Akseer & Játiva, 2021).

This study defines teacher attendance as being physically present in a school and on time. Teacher absenteeism is defined in two specific categories outlined by Akseer and Játiva (2021). These are absence from school and absence of punctuality (late arrival and/or early departure from school). Shulman (1987) defined Pedagogical Content Knowledge (PCK) as the ability of the teacher to differentiate between content and pedagogy and use the knowledge to develop interactive content for students. Furthermore, PCK addresses students' misunderstandings and how they affect learning, as well as the teacher's perception of what supports or undermines the learning of a particular subject (Shulman, 1987).

Guimarães (2014) examined the impact of teacher content knowledge on student achievement in math, focusing on 4th graders in Brazil. They used data from a program that implemented value-added models that accounted for student background and other factors. The study found that teachers with higher content knowledge, measured by test scores, had students with higher math achievement. This effect was even stronger at the school level, suggesting a broader impact. In Mozambique, Holvio (2022) investigated the impact of teacher content knowledge on student achievement.

The study found no average effect because of student heterogeneity. However, teacher content knowledge benefits students whose first language is the country's official language, who attend urban schools, or who are well-matched with their teachers' knowledge level. The findings suggest that improving students' language skills and teacher-student matching could be more effective strategies than solely focusing on teacher content knowledge. Additionally, (Hill & Chin, 2018) investigated the importance of teachers' knowledge of their students (called teacher knowledge of students or TKS) for student achievement in math. The researchers created a metric to assess teachers' accuracy in judging students' understanding of math concepts.

They found that teachers with higher accuracy were more likely to engage in practices that benefit students, such as remediating misconceptions. Furthermore, teachers with higher accuracy had students with higher test scores. However, teachers' knowledge of specific student misconceptions (KOSM) was not consistently related to student outcomes. They highlighted the importance of TKS as a construct distinct from general teacher knowledge. This suggests that interventions designed to improve teachers' ability to understand their students' strengths and weaknesses may be beneficial for student learning. Bietenbeck, Piopiunik, and Wiederhold (2018) also examined the impact of teacher subject knowledge on student

achievement in Sub-Saharan Africa using data from sixth graders and their teachers. To isolate the effect of teacher knowledge, the researchers compared students' performance in math and reading taught by the same teacher. They found a modest positive effect of teacher knowledge on student achievement, but only in more economically developed African countries. Their study suggested that improving teachers' subject knowledge could be a beneficial strategy for improving education in the region as a whole. However, its effectiveness may vary depending on a country's economic development.

Bold et al. (2017) also conducted a study to examine the factors contributing to the "learning crisis" in Sub-Saharan Africa, where many children graduate from primary school without basic skills. Despite increased enrolment, actual learning is low due to deficiencies in teacher quality. The study found that teachers, on average, only provide instruction for half of the scheduled time and often lack subject-matter knowledge and basic teaching skills. However, using student-level data, the study showed that teachers with stronger content knowledge and pedagogy had a significantly positive impact on student achievement. In similar research, Bold, Filmer, Molina, and Svensson (2019) investigated the link between teacher subject knowledge and student achievement in primary schools in seven Sub-Saharan African countries. The authors propose a new method to estimate the impact of teacher knowledge on learning, even without data following students over time.

They found that weak teacher content knowledge is a major contributor to the "learning crisis" in the region, where students fall behind expectations. This emphasizes the need for research on improving teacher-training programmes. Their findings also suggested that policy interventions focused on ensuring teachers have strong subject knowledge and increasing instructional time could significantly improve student learning outcomes over time, potentially doubling them within 30 years. The study also highlighted the need to consider additional factors alongside content knowledge, such as teacher effort, when designing policies.

3. Research Methodology

3.1 Study Design and Approach

The study employed a mixed method approach using a prospective cohort study design to extensively assess the relationship between teacher pedagogical skills, teacher attendance, and students' literacy and numeracy academic performance. The rationale for using a prospective cohort study design was based on the idea of observing teachers described as cohorts over the stipulated period for the study. Generally, a methodological approach was used to assess the cause-effect relationship between teacher attendance, pedagogical skills, and students' performance in literacy and numeracy. The research consistently studied the cohort for the entire Ghanaian academic term, where emphasis was placed on periods where lessons were supposed to be taught, which elapsed for a period of nine weeks. During this period, teachers were studied by systematically observing them, recording their pedagogical skills during lessons, and assessing how these factors impacted students' performance.

3.2 Sampling and Participants

The study was conducted in four districts within the Northern Region of Ghana, namely Savelugu, Tolon, Kumbungu, and Nanton. A stratified sampling technique was used to select two schools from each of the four districts, totalling eight schools, to ensure diversity. Recognizing the role early childhood education plays in developing the essential foundational numeracy and literacy skills for academic success, the study purposively focused on students from grades 1 to 3, as well as teachers in these classes. The head teachers in these sampled schools were also considered for qualitative inquiries to complement the quantitative findings of the study. The Taro Yamane sample estimation formula was used to determine the sample size for this study. Given that the population of students in Basic Schools is 425,798 (africaeducationwatch.org, 2021), the calculated sample size was 400 students. Thus, 400 students from Basic 1 to 3 were included in the study, with 24 teachers observed over the study period.

n- the sample size
N- the population size
e- the acceptable sampling error

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{425,798}{1 + 425,798(0,05^2)} \approx 400$$

3.3 Data Collection Instruments

Following the adoption of the cohort study design as used in this study, six trained research assistants visited each school weekly and observed three teachers in each school over the nine-week observation period, totalling 216 visits. Out of these 216 visits, 120 lessons were observed, of which 55 were literacy-based and 65 were numeracy-based. Lessons were not observed in the rest of the visits made as the respective schools were either having extra-curricular activities or teachers were absent in school. In this regard, such visits were labelled as “Not Applicable” and hence not included in the analysis.

A structured observation rubric was developed to rate teachers’ pedagogical competencies based on a set of criteria developed through a review of the literature and other standardized criteria, including the Danielson Framework for Rating Teachers. This rubric served as the data collection instrument to measure the pedagogical skills of teachers and used a 4-point Likert scale.

1. Strongly Disagree
2. Disagree
3. Agree
4. Strongly Agree
5. Not Applicable (used when lessons were not in session).

In addition, a standardized assessment tool was developed from the Global Proficiency Framework; hence, the assessment tool was equally consistent with global standards. Numeracy and literacy test kits were used for all grades in the study. Effective supervision and invigilation were ensured to prevent the results from being compromised. Qualitatively, six respondents, including three teachers, two students, and one headteacher, were purposively interviewed across all the districts to gather their opinions and views on the relationship between teachers’ pedagogical skills and students’ academic performance.

3.4 Data Collection and Analysis

Data were primarily collected from observations and results from student assessments in Numeracy and Literacy. The data were further organized and analyzed using Excel and SPSS. In the analysis of teacher pedagogical skills, the 4-point Likert scale was coded as Strongly Disagree =1, Disagree = 2, Agree = 3, and Strongly Agree = 4. The mean score of each teacher was calculated and rated according to the Danielson Framework for Rating Teachers: Distinguished ≥ 3.5 , Proficient = 2.5–3.49, Basic = 1.5–2.49, and Unsatisfactory < 1.5 .

Table 2. Definitions of ratings (Danielson Framework) as used in study

Rating	Description
Unsatisfactory	The teacher often fails to deliver per the lesson plan and does not maximise time effectively. Resources for Teaching and Learning are rarely utilised, Group work or any form of interactive tasks that require participation by learners is seldom engaged. Little or no support is given to struggling learners and teacher has poor content mastery. Poor communication with learners, and poor questioning skills

	especially in checking for understanding. Teacher fails to assess learners at the end of the lesson.
Basic	The teacher follows the lesson plan but strays off course occasionally leading to inefficient time management. Teacher is inconsistent in using teaching and learning materials and also in engaging students in group related activities in classroom. Teacher demonstrates little understanding of the content of lesson and attempts to offer support to students but not consistent. Classroom communication is adequate but questioning skills of teacher during lesson and end of lesson evaluation is ineffective.
Proficient	The teacher follows the lesson plan and sees to it that time is used well for learning. Lesson delivery is enriched with effective use of teaching and learning materials. Students are actively involved in group work, games or projects etc. with a little to no direct instructions from teacher. The teacher demonstrates good content mastery of lesson and uses scaffolding and other strategies to support struggling students. Teacher's communication with learners is effective and clear with teacher using different questioning techniques to check for understanding. Teachers assesses lesson through verbal and written tests ensuring that lesson objectives are met.
Distinguished	The teacher effectively follows the lesson plan and maximises time efficiently to complete all tasks in lesson. Teacher uses teaching and learning materials effectively and creatively to enhance the comprehension of students in the subject matter. The teacher uses a variety of teaching and learning resources creatively to deliver lessons. Learners are actively engaged in group activities and other such interactive tasks that have been effectively incorporated into the lesson. The teacher uses innovative scaffolding supports and creative methods to provide necessary support for all students including those who are struggling while demonstrating very good mastery of the lesson content. Teacher uses variety of questioning strategies that encourages critical thinking among students and communicates clearly with students helping them complete tasks successfully. Evaluation of the lesson is done in both written and oral assignments by the teacher and corrections made to help students who fall short in the <u>assessments</u> .

The results from the numeracy and literacy assessments were also computed and categorized as follows: excellent $\geq 85\%$, good = 70%–84.99%, fair = 50%–69.99%, and poor = $< 50\%$. The results of each student were categorized using the above criteria. In determining the overall performance of each class, the median score was used to calculate the overall performance of the class, as it provides a more accurate and reliable measure of central tendency, especially in the presence of outliers and skewed distribution. This ensures a fair and dependable assessment of student outcomes. The median scores of the respective classes were aligned with the respective lessons and teachers for further analysis. While cross-tabulations and descriptive analyses were conducted using MS Excel, all inferential analyses were performed using SPSS.

The study employed the chi-square test to determine the association between teachers' pedagogical skills and students' literacy and numeracy academic performance. The attendance status of teachers was also recorded and categorized as Present, Absent and Late. The attendance statuses of teachers were also matched with the associated academic performance of the respective teacher, with the chi-square test used to determine their relationship. Multinomial logistic regression was also used to determine the degree of association among variables that showed significant associations in the chi-square analyses. The nature of the dependent variable, that is, having more than two categories, informed the choice of the multinomial logistic regression. Additionally, the qualitative data collected were transcribed based on the emerging themes in line with the study objectives and then used to support the findings of the quantitative analysis.

3.5 Ethical Consideration

The study adopted a series of systematic activities to protect the welfare, rights, and privacy of all participants in the study and to uphold the ethical integrity of this study. These included seeking permission from the Northern Regional Education Office. A letter was formally issued with the reference number SB.92/INTRO/GES/NR/VOL. 10, giving permission to conduct the research across all four districts. Additionally, consent was obtained from the headteachers and teachers of the schools sampled for the study. All participants were notified of the objectives of the study and its procedures, and were also notified that their participation was voluntary and that they could willingly opt out. The study adhered to strict confidentiality protocols, and all participants were assured of anonymity and that the data would not way going to be traced back to them, thereby ensuring their privacy and protecting their professional dignity. Finally, the study was conducted in such a way that it did not disrupt normal classroom activities, including teaching and learning.

3.6 Source of Funding

This research was funded by the Women Change Makers in Education. This organization seeks to empower women in the educational sector. Despite the organization funding the research, they did not influence the results of the study, thereby ensuring that the study was conducted independently.

4. Results And Discussions

4.1 School Visit Characteristics

This section summarizes the conditions and characteristics of the eight schools during the school visits. Table 3 reveals that a total of 216 visits/follow-ups were conducted across the four districts in the Northern Region. While schools in Tolon and Savelugu received 54 (25%) follow-ups each, schools in Nanton and Kumbungu received 55 (25.5%) and 53 (24.5%) follow-ups, respectively. Additionally, out of the 216 total school observations, 120 observations were recorded with lessons, representing 55.6% of the total school visits. In the remaining 96 (44.4%) observations, schools either had extracurricular activities or teachers in classes were absent, and hence lessons were not observed. Furthermore, Figure 1 represents the numeracy- and literacy-based lessons observed during scheduled weekly visits. It can be noted that schools in Kumbungu recorded 16 visits on literacy and 18 numeracy lessons, schools in Nanton district recorded 11 visits on literacy and 10 numeracy lessons, a total of 13 visits recorded literacy and 16 numeracy lessons for schools in Savelugu district while schools in the Tolon district recorded 15 and 20 visits with observed lessons on literacy and numeracy respectively.

In terms of teacher attendance, it was noted that out of the 216 follow-ups throughout the period of the study, the data revealed that teachers were present and punctual in classes in 122 visits, representing 56.4% of the total number of school observations. Additionally, (53) 24.5% of the total 216 school visits characterized the number of times teachers absented themselves from school, while (7) 3.2% and (6) 2.8% represented the number of times school visits recorded extra-curricular activities and lateness, respectively. Instances of teacher lateness were observed, with some teachers reporting to school between 9:30am and 10:30am. The Kumbungu District recorded the highest number of times teachers absented themselves from school with 18 (34.0%), while Tolon District had the most schools observing extra-curricular activities upon visits to the schools within the district. In 28 (13.0%) of the visits where teachers were present, it was observed that no effective teaching and learning took place.

Cumulatively, in most of the visits where learning was not taking place, teachers were either absent from school or were present in school with no effective teaching or learning taking place. Consistent with the findings of this study, Akseer and Játiva (2021) in a study on teacher attendance and time on task in Ghana found that teachers' consistent absence from school, lack of punctuality, and teachers expressing lack of will to teach were persistent challenges in the Ghanaian education system and hence demanded collective efforts to address them. These factors have an adverse impact on students' educational performance. In support of the findings, A Headteacher during the interview stated:

“Teacher absenteeism surely affects teaching and learning in school and also negatively affects learning outcomes and learners in general.” In another perspective, a teacher noted that, “Teacher attendance can help to improve learning among students and can as well lead to low student attendance and school drop-out if teacher is inconsistent. These statements support the findings of previous studies on the impact of teacher attendance on student learning outcomes.

Table 3. School Visit Characteristics

Districts	School Visit Characteristics															
	Absent		School visits		Visits with observations		Visits without observations		Extra-curricular activity		Present		Present but No Effective Teaching and Learning		Late	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Kumbungu	1	34	5	24	35	29.	1	17.	0	3	27	0.	1	14		
	8	.0	3	.5		2	7	7		4	.9	0		.3		
Nanton	9	17	5	25	21	17.	3	35.	0	3	24	1	57	0	0.	
		.0	5	.5		5	4	4		0	.6	6	.1	0		
Savelugu	1	30	5	25	29	24.	2	26.	0	2	20	9	32	4	57	
	6	.2	4	.0		2	5	0		5	.5		.1		.1	
Tolon	1	18	5	25	35	29.	2	20.	6	100	3	27	3	10	2	28
	0	.9	4	.0		2	0	8		.0	3	.0		.7		.6
Total	5	10	2	10	12	10	9	100	6	100	1	10	2	10	7	10
	3	0	1	0	0	0	6				2	0	8	0		0
			6								2					

Source: Field Work, 2024

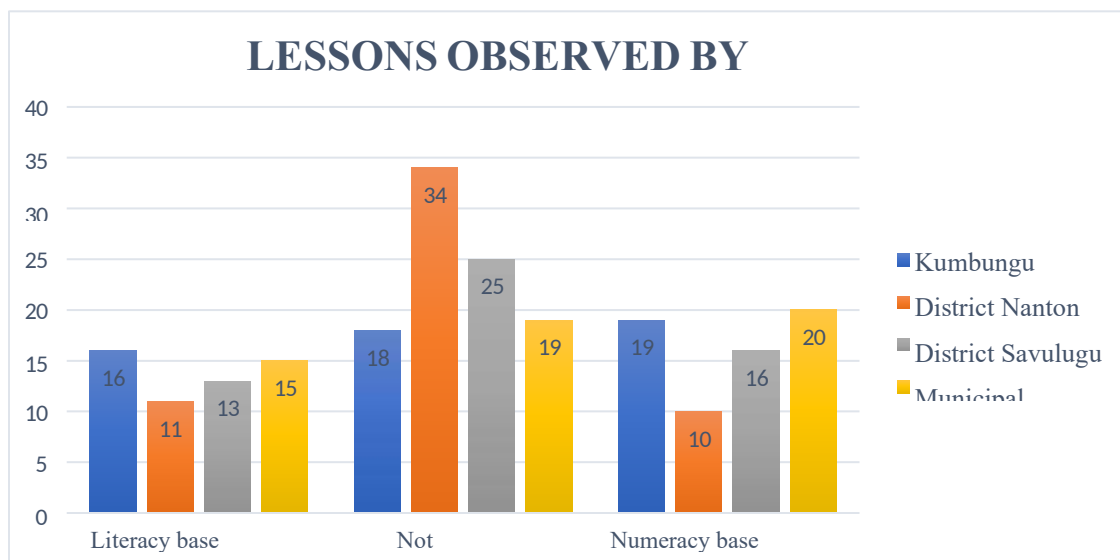


Figure 1. Lessons Observed by District Source: Field Work, 2024

4.2 Rating of Teacher Pedagogical Skills using Danielson Framework for Teaching

In analyzing the pedagogical skills of teachers, the study adopted the Danielson Framework for Teaching to rate teachers. According to Danielson (2015), the framework serves as an instrument for a cohesive

understanding of what characterizes good teaching. In Table 4, the study revealed that the majority of teachers (71.4 %) were rated as distinguished, with the remaining proportion (28.6%) rated as proficient. This points to the fact that most of the teachers in the Kumbungu District possess exceptional pedagogical skills, as no teacher was rated as Basic or Unsatisfactory. However, data from Nanton District revealed a relatively lower percentage (4.8%) of the teachers rated as distinguished, while the majority of the teachers (90.5%) were rated as proficient. The findings suggest that more teachers in Kumbungu were pedagogically skilled than those in Nanton. The data suggest that while many teachers in Nanton were capable, professional development sessions could be initiated to enhance the pedagogical skills of the few teachers with undesired ratings.

In the Savelugu Municipality, the data revealed that the majority of the teachers (48.3%) were rated as proficient, with a relatively significant proportion of 24.1% rated as distinguished. Nonetheless, the municipality recorded the highest number of teachers rated as basic and unsatisfactory, with 20.7% and 6.9%, respectively. This implies that the municipality has the most teachers who lack the requisite teaching pedagogical skills, which tends to have a trickle-down effect on learning outcomes in students. A significant proportion of teachers in the municipality possessing low pedagogical skills may imply that a proportion of students in the municipality may not be receiving the best tuition essential for optimal learning outcomes. In a study on the factors responsible for low academic performance among junior high schools in Ghana, Osei and Mensah (2018) found that teachers' inability to use teaching and learning materials as well as their low content knowledge accounted for low academic performance among students. Therefore, this study recommends the provision of continuous in-service training to teachers to enhance their capacity.

In the Tolon District, a greater proportion of teachers (57.1%) were rated as proficient, followed by those rated as distinguished (28.6 %). However, 14.3% of the teachers were rated as basic, with no teacher rated as unsatisfactory. In the Tolon District, even though a significant proportion of the teachers demonstrated effective teaching practices during observations, a significant proportion would need complementary support to enhance their capacity to match their counterparts. Collectively, most of the teachers observed in the four districts possessed effective and good teaching practices, as the majority of them were rated as distinguished or proficient, especially in Kumbungu. Similarly, Kporyi and Arko (2021) found that most teachers demonstrated effective pedagogical competencies and hence accounted for the academic achievement of junior high school students in Ashaiman, Ghana. In affirmation to the findings of this study, a teacher indicated,

“When a teacher has good pedagogical knowledge, he is able to break complex lessons and concepts into smaller bits for students to understand, which will help them excel in their performances”.

In another conversation, a Headteacher noted that

“Teacher pedagogical knowledge is very important in teaching and learning as it helps learners to understand better when teachers have good pedagogical knowledge”.

These statements are in tandem with the findings of this study and are similar to the findings of numerous studies. However, the existence of teachers rated as basic and unsatisfactory in some districts points to the need for targeted professional development programs in these districts.

Table 4. Teachers' Pedagogical Skills using Danielson Framework for Teaching

Rating Of Teachers' Pedagogical Skills Using Danielson Framework for Teaching	Absent		School visits		Visits with observations		Visits without observations		Total
	N	%	N	%	N	%	N	%	
Basic	0	0.0	1	4.8	6	20.7	5	14.3	12
Distinguished	25	71.4	1	4.8	7	24.1	10	28.6	43

Proficient	10	28.6	19	90.5	14	48.3	20	57.1	63
Unsatisfactory	0	0.0	0	0.0	2	6.9	0	0.0	2
Total	35	100	21	100.0	29	100.0	35	100.0	120

Source: Field Work, 2024

4.3 Pedagogical Skills of Teachers in Literacy And Numeracy

Figure 2 and 3 demonstrate the pedagogical skills of teachers in both Literacy and Numeracy in all four districts. In Kumbungu, out of the 16 literacy lessons observed, the majority of the teachers (68.8%) were rated as distinguished, implying that this category of teachers followed the guide effectively, supported struggling students, and employed various innovative strategies to ensure that students were actually learning in the classroom. However, more teachers possessed good pedagogical skills in numeracy (71.4%) than in literacy. As demonstrated in figure 4, 19 numeracy lessons were observed in Kumbungu, with 26.3% rated as proficient in numeracy lessons. In all the literacy lessons observed during school visits in all districts, Kumbungu district had the highest number of teachers who were rated as distinguished, followed by 33.3% of 19 literacy observations in Savelugu municipality with 15.4% of 13 observations for Tolon and Savelugu districts, respectively. Additionally, no teacher was rated as unsatisfactory in literacy lessons, with most teachers rated as proficient.

In Numeracy lessons, as demonstrated in figure 3, all the districts demonstrated some level of distinction, with 73.7%, 10.00%, 31.3%, and 25.0% for Kumbungu, Nanton, Savelugu, and Tolon districts, respectively. The findings from the study suggest that most teachers were rated at distinguish levels in numeracy lessons than in literacy, demonstrating good mastery in teaching lessons in terms of content, use of lesson plan, adequate time management, use of teaching and learning resources, clear communication with learners, and adopting different questioning skills in numeracy curriculum-based subjects than in literacy. However, 12.50% of teachers during the numeracy observations were rated as unsatisfactory. This implies that although a greater proportion of teachers in all districts possessed effective teaching skills and practices in numeracy, a significant number of them lacked the requisite skills to teach students effectively in numeracy. The variability in the data regarding the pedagogical skills possessed by teachers in both numeracy and literacy indicates the type of professional development sessions demanded in each context.

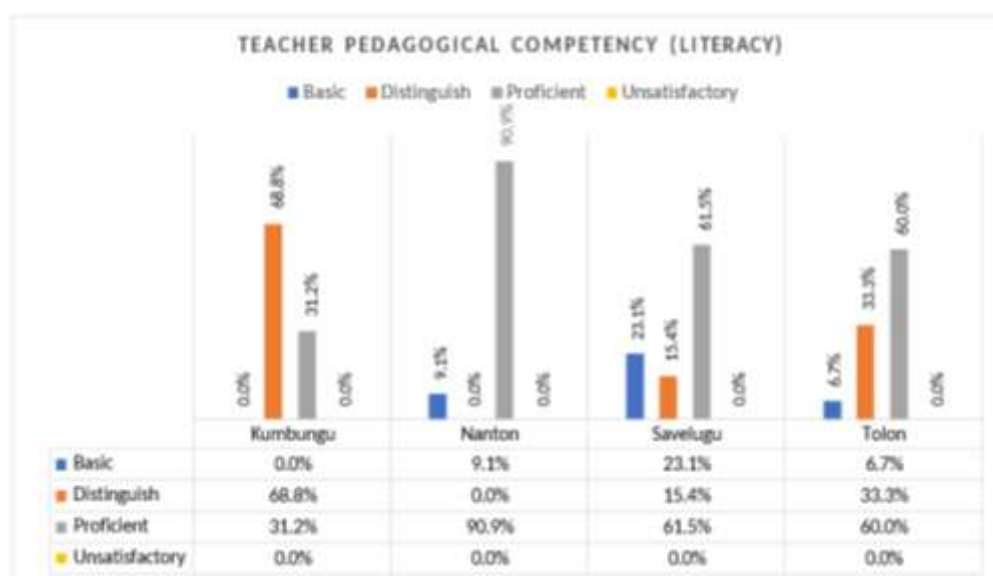


Figure 2. Teacher Pedagogical Competency on Literacy

Source: Field Work, 2024

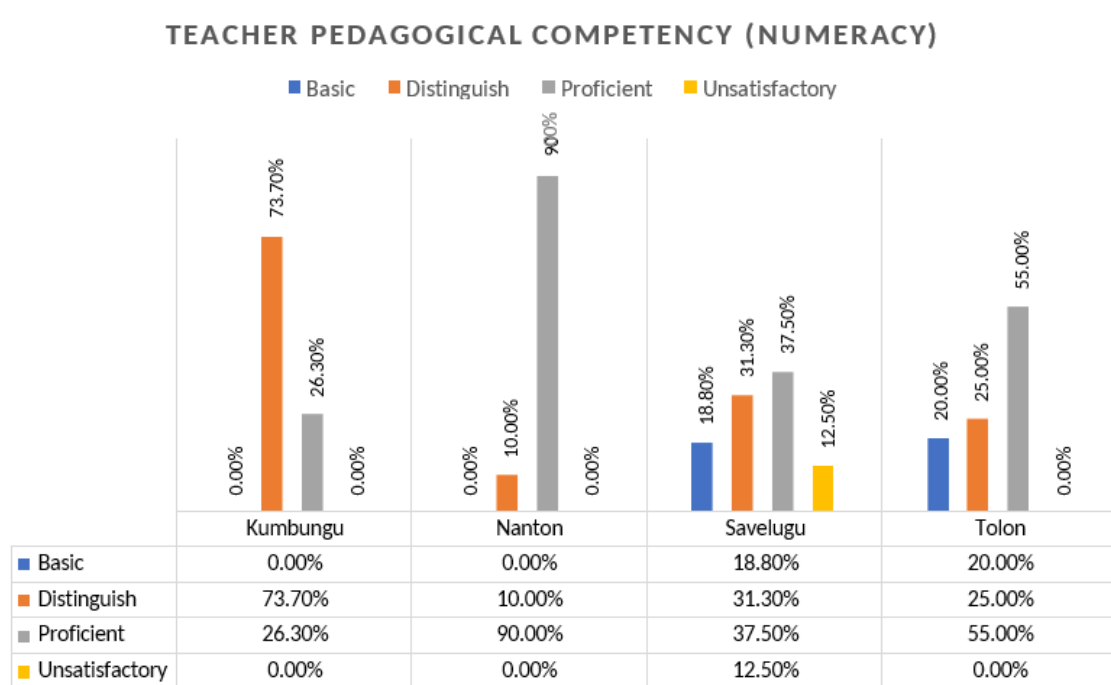


Figure 3: Teacher Pedagogical Competency in Numeracy
Source: Field Work, 2024

4.4 Teacher Pedagogical Skills During Observation Periods

Table 5 presents the mean scores for various pedagogical competencies of teachers across all districts. In terms of teachers following the lesson plan, the study found that teachers in Kumbungu ($M = 3.19$, $SD = 0.82$) and Nanton ($M = 3.16$, $SD = 0.81$) were more proficient in following their lesson plans than their counterparts in Savelugu ($M = 3.13$, $SD = 0.84$) and Tolon ($M = 3.13$, $SD = 2.82$). Generally, the majority of the teachers observed were effective in using their lesson plans during lesson delivery and followed through, which is proven to help in improving the academic performance of students. However, Tolon had a higher standard deviation than the other districts, indicating variabilities in how teachers in the district adhered to lesson plans in the delivery of lessons in the classroom during observations. A lesson plan is an essential tool in the delivery of lessons in the classroom; hence, adherence to these plans helps improve learning outcomes and maximizes time on tasks in the classroom (Farhang, Hashemi, & Ghorianfar, 2023; Ocan, 2024).

In the efficient use of time in the classroom by teachers, the study found that all four districts had similar mean scores and standard deviations with ($M = 2.90$, $SD = 0.90$) for Kumbungu, ($M = 2.85$, $SD = 0.90$) for Nanton, ($M = 2.81$, $SD = 0.91$) for Savelugu, and ($M = 2.82$, $SD = 0.90$) for Tolon district. Although the mean score indicates that most teachers in all four districts were proficient in optimizing time in their lessons, they did not adhere to the lesson plan. Additionally, the study found that the use of teaching and learning materials in lesson delivery was generally high in all four districts, with Kumbungu ($M = 3.36$, $SD = 0.65$), Nanton ($M = 3.32$, $SD = 0.66$), Savelugu ($M = 3.31$, $SD = 0.69$), and Tolon ($M = 3.30$, $SD = 0.68$) districts. This implies that most teachers observed in all four districts proficiently integrated the use of teaching and learning materials into their lessons and ensured that students made good use of these resources. All four districts recorded low standard deviations, implying that teachers consistently used teaching and learning resources in their lessons, which is an essential component of effective lesson delivery.

Consistent with the findings of this study, Bietenbeck et al. (2018) found a positive relationship between teachers' subject knowledge and students' academic achievement, revealing that school and teaching resources play a significant role in ensuring this impact, highlighting the importance of teaching and learning resources in improving learning outcomes.

Table 5 also revealed that while teachers engaging learners in group or project activities were consistent and proficient across all four districts, teachers using scaffolding and other innovative strategies to support struggling students was relatively lower with Kumbungu ($M = 2.98$, $SD = 0.83$) and Nanton ($M = 2.97$, $SD = 0.80$) demonstrating similar patterns, followed by Savelugu ($M = 2.91$, $SD = 0.84$) and Tolon ($M = 2.91$, $SD = 0.83$). Even though the mean scores implied that teachers were effective in providing support to struggling students, this was relatively lower in terms of other competencies, as this helps struggling students to catch up with their colleagues who might have understood the day's lesson. Any ineffective effort that does not help these struggling students to understand the subject matter may further push them into a lost state, thereby affecting the performance indicator of that particular lesson.

In teachers demonstrating mastery of the content/subject matter, the study found that teachers in all four districts had similar mean scores, with Kumbungu having ($M = 2.98$, $SD = 0.98$) followed by Nanton ($M = 2.95$, $SD = 0.98$) and ($M = 2.91$, $SD = 1.00$) and ($M = 2.91$, $SD = 0.99$) for Savelugu and Tolon districts, respectively. The study implied that most teachers demonstrated proficient knowledge in the subjects they treated, with mean scores ranging from 2.91 to 2.98. However, both Savelugu and Nanton recorded slightly higher standard deviations of 1.00 and 0.99, respectively, in the variabilities in teachers' content knowledge. This implied that while some teachers demonstrated effective and good mastery of the content, others struggled. Even though, Holvio (2022) found no relationship in a study on the impact of teacher content knowledge on student achievement in Mozambique, Hill and Chin (2018) revealed that teachers who had good mastery of the subject matter or content positively impacted in the academic performance of their students.

In communicating clearly and effective with learners, the study also found that teachers were very effective in their communication to learners. This included the manner in which they gave instructions to students and how clearly the students understood these instructions. This aspect recorded low standard deviations across all districts, that is, 0.75 for Kumbungu, Nanton, and Savelugu, while Tolon had a standard deviation of 0.74, indicating consistency in communicating effectively to learners. In the measure of teachers evaluating the lesson using verbal or written assessment and ensuring its effective implementation, the study found that teachers demonstrated proficient levels, with mean scores ranging from 3.29 to 3.33 and standard deviations from 0.66 to 0.67 across all districts. While the mean scores showed proficiency throughout the four districts, the standard deviations showed the highest consistency of teachers evaluating their lessons during observations.

Table 5. Teacher pedagogical skills during observation periods

Competencies	Kumbungu District (N=120)		Nanton District (N=120)		Savelugu Municipal (N=120)		Tolon District (N=120)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
The teacher follows the lesson plan accordingly	3.19	0.82	3.16	0.81	3.13	0.84	3.13	2.82
The teacher uses time efficiently to maximise learning	2.90	0.90	2.85	0.90	2.81	0.91	2.82	0.90
The teacher uses teaching and learning materials in	3.36	0.65	3.32	0.66	3.31	0.69	3.30	0.68

lesson delivery								
The teacher engages learners in group activities during the lesson delivery	3.23	0.78	3.16	0.81	3.17	0.80	3.14	0.82
The teacher engages learners in other activities during the lesson delivery (games, turn and talk, work on a project etc)	3.03	0.82	2.98	0.83	2.95	0.84	2.95	0.82
The teacher uses a scaffolding approach or other strategies to support learners who are struggling to understand the lesson	2.98	0.83	2.97	0.80	2.91	0.84	2.91	0.83
The teacher demonstrates mastery of the content/subject matter	2.98	0.98	2.95	0.98	2.91	1.00	2.91	0.99
The teacher communicates clearly and effectively with learners	3.23	0.75	3.21	0.75	3.19	0.75	3.18	0.74
The teacher uses different questioning skills (open-ended/probing)	3.05	0.87	3.05	0.83	2.98	0.89	2.98	0.87
The teacher evaluated the lesson using verbal or written assessment	3.33	0.66	3.32	0.67	3.30	0.67	3.29	0.67

Source: Field Work, 2024

4.5 Academic Performance Of Students Assessed In All Districts

The study used a sample size of 400 students across all districts to assess learners on both numeracy and literacy using a standardized exam toolkit from the Global Proficiency Framework to enhance the reliability of this toolkit and meet global standards. Using a criterion of: Excellent $\geq 85\%$, Good = 70% - 84.99%, Fair = 50% - 69.99% and Poor = $< 50\%$. The results of the learners were graded based on this criterion. Out of the 400 students assessed, 122 were from Kumbungu, 109 from Nanton, 88 from Savelugu, and 81 from Tolon. In Figure 4, the study revealed that out of the 122 students who were assessed in numeracy, a greater proportion of the students performed abysmally as 30.3% had poor implying, they had aggregate below 50% with only 1.60% scoring above 85%. Contrary to numeracy, students performed better in literacy, as approximately 12.3% of the students scored excellent grades.

However, the number of students who scored poor grades increased by 9% compared to numeracy, indicating that a significant number of students performed poorly in both numeracy and literacy in the districts. In terms of teachers' pedagogical skills, the Kumbungu district had the highest number of teachers rated as distinguished and proficient. However, this is not reflected in the academic performance of the students in the district. Findings from the study of Akseer and Játiva (2021) point to the fact that a couple of factors contribute to good student performance, highlighting teacher competence, teacher attendance, community-related factors, and national factors. This points to the idea that numerous factors, aside from

teachers' pedagogical skills, could have accounted for the poor performance of the students.

In the Nanton District, of the total students assessed for literacy and numeracy, while 22.9% achieved excellent grades in literacy, 6.4% scored excellent grades in numeracy. Comparatively, students who had poor grades in literacy and numeracy were almost the same, with 36.7% in numeracy and 33.9% in literacy. Additionally, a significant number of students (34.9%) scored good grades in numeracy compared to 17.4% in literacy. Collectively, more students performed better in numeracy in the Nanton district than in literacy, as 66.3% of the students gained scores graded as fair and above compared to 66.1% in literacy. In Savelugu and Tolon Districts, the data also revealed that the majority of students failed abysmally in literacy, as 52.3% and 49.4% scored poor grades in Savelugu and Tolon, respectively. Even though most of the teachers in these districts demonstrated higher levels of proficiency in pedagogical competencies, it was realized that most of the students had challenges in reading and comprehension in some aspects of the assessment paper, which could have resulted in poor performance. In numeracy, more students achieved excellent grades (37.0%) than students in Savelugu with 8.0%. Generally, the study revealed that more students performed well in numeracy in both districts than in literacy, with 65.9% and 77.8% of students in Savelugu and Nanton scoring fair to excellent grades, respectively (Figure 4). Academic performance of students by districts Source: Field Work, 2024

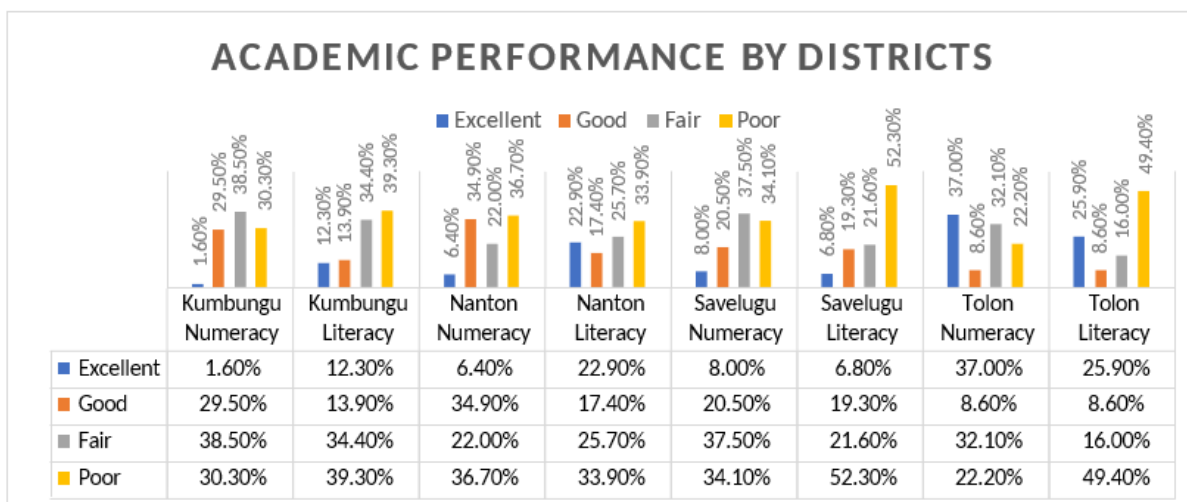


Figure 4. Academic performance of students by districts
Source: Field Work, 2024

4.6 Teacher Attendance And Student Performance

The study adopted the chi-square test with Monte Carlo simulation to assess the relationship between teacher attendance and student numeracy and literacy academic performance. Upon initial usage of Chi-square tests, the test failed to meet the necessary assumptions of normality as the number of cells with expected frequencies less than 5 exceeded the threshold of 20%. In this regard, Monte Carlo simulations were employed for their robustness against such assumptions, allowing for the distribution of data that the chi-square test failed to meet. According to Wall (1997), Monte Carlo covers the limitations inherent in chi-square analysis, thereby making the results of the analysis more reliable and valid.

In Table 7, the association between teacher attendance and students' numeracy performance showed a chi-square (χ^2) of 11.289 and a p-value of 0.199. The outcome of the analysis suggests that there was no significant association between teacher attendance and student performance in numeracy, since the p-value of 0.199 is greater than 0.05. This suggests that teacher attendance may not have been the only factor influencing students' numeracy performance and that other factors come into play.

Nonetheless, the study found a significant association between teacher attendance and students' literacy

performance, as it showed a chi-square value (χ^2) of 14.104 and a p-value of 0.046. A p-value of less than 0.05 demonstrated a significant association. This finding suggests that teacher attendance plays an essential role in influencing students' academic performance in literacy. In measuring teacher attendance, three categories were considered: teacher presence, teacher absence, and teacher lateness. The findings of this study confirm that all these measures of teacher attendance are likely to influence students' academic performance. Despite the lack of a significant association between teacher attendance and student performance in numeracy, the significant association between teacher attendance and student performance in literacy implies that consistent teacher attendance improved the literacy skills of students in the study. Asserting to this finding, another Headteacher stated that,

"Teachers are not able to cover the scheme of learning when they are always absent from school and because of that, learning becomes ineffective".

In another interview, a student noted that, *"when we come to school and our teachers are not present, we are most likely not to come the next day."*

These statements underscore the disruption teaching and learning activities face as a result of inconsistent teacher attendance, which eventually affects students' academic performance. In affirmation, Obeng-Denteh et al. (2011) in a study in Ghana revealed that teacher attendance significantly affected student performance and that the performance of students dwindled as teacher absenteeism increased.

Table 7. Bivariate Analysis Of Teacher Attendance And Student Performance

Variables	Student Performance (Numeracy)				Student Performance (Literacy)			
	χ^2	df	p-value	Interpretation	χ^2	df	p-value	Interpretation
Teacher Attendance	11.28	9	0.1	11.289	9	0.1	11.28	9

4.6.1 Multinomial Logistic regression on Teacher attendance and Students' performance in Literacy

In Table 8, following the use of the chi-square test, the study employed the multinomial logistic regression analysis to explore the degree of association between teacher attendance and students' performance in literacy. With student literacy performance categorized as Excellent, Poor, Good and Fair, Excellent was used as the reference category for this analysis. Results from the analysis revealed that, comparing poor literacy performance to excellent literacy performance, there was a positive coefficient for teacher attendance ($B=0.078$) and a p-value of 0.728. At a 95% confidence interval, the relationship is not statistically significant because the p-value ($p=0.728$) is greater than 0.05. This implies that there is no evidence that teacher attendance affects the probability of a student falling into the poor literacy performance category relative to students performing excellently.

Contrary to this finding, the test demonstrates a negative coefficient for teacher attendance ($B = -1.244$) when comparing good to excellent literacy performance. This implies that with teachers being consistently present in school, it reduces the likelihood of a student achieving grades categorized as good rather than an excellent literacy performance. The p-value shows a statistically significant relationship between the variables, as $p = 0.033$ is less than 0.05, showing a statistically significant relationship. This implies that consistent teacher presence in school is likely to reduce the number of students in the Good category than in the Excellent category. Literally, students are more likely to gain excellent grades than good grades when the teacher is consistently present in school. The odds ratio ($Ex(B) = 0.288$) further affirms this finding,

illustrating that with increased teacher presence in school, the probability of students gaining grades categorized as good reduces by 71.2% compared to those gaining excellent grades.

Furthermore, when comparing fair to excellent literacy performance, there was no statistical relationship ($p = 0.300$) at a 95% confidence interval, and the negative coefficient ($B = -0.255$) demonstrated a possible reduction in the probability of students gaining grades categorized as fair rather than excellent performance with consistent teacher presence. However, since there was no significant relationship, there was no evidence that teacher attendance influences the odds of students gaining grades classified in the Fair category compared to those in the Excellent category. The results from this analysis point to the importance of teacher attendance in influencing the academic performance of students in literacy, especially in gaining excellent grades. Consistent with the findings of this study, Sezgin et al. (2014) revealed that regular absenteeism of teachers from school adversely impacted the grades of students. In support, Msosa (2020) noted that as a result of teacher absenteeism, lesson syllabi were always incomplete, thereby affecting students' performance. These studies highlight that while teacher absences negatively impact students' academic performance, consistent teacher presence is associated with improved student academic performance, which is in line with the findings of this study.

Table 8. Multinomial Logistic regression of Teacher attendance on Students' performance in Literacy

Literacy Performance Category	Coefficients B	Std. Error	Wald	Sig.	Odds Ratio	95% Confidence Interval for Exp(B)
Reference Category: Excellent						
Poor	0.078	0.223	0.121	0.728	1.081	0.698 - 1.674
Good	-1.244	0.582	4.562	0.033	0.288	0.092 - 0.903
Fair	-0.255	0.246	1.072	0.300	0.775	0.478 - 1.256

4.7 Teacher pedagogical skills and student academic performance

Chi-square analysis using Monte Carlo simulations was again used to establish the relationship between teachers' pedagogical skills and student academic performance. In this analysis, the median grade performance was used against the pedagogical skills of teachers observed in the study. The results of the tests revealed a chi-square value of 24.239 and a p-value of 0.003. Since the p-value is less than 0.05, this implies a significant association between teachers' pedagogical skills and students' academic performance. Several studies have pointed out that the quality of teachers' pedagogical skills positively impacts students learning and achievement. Bold et al. (2017) confirmed that teachers with quality and good pedagogical skills significantly improved students' academic performance. Similarly, Bietenbeck et al. (2018) compared the impact of teachers' content mastery and students' performance in math and reading and found that teachers with good mastery of content of subjects taught significantly enhanced students' academic attainment in both subjects and that teachers' who lacked these skills and knowledge also determined the outcome of the performance of their students. These findings align with the study's results that teachers pedagogical skills are strongly related to students' educational success.

Table 9. Teacher pedagogical skills and student academic performance

Variables	Student Performance			Interpretation
	χ^2	df	p-value	
Teacher Pedagogical skills	24.239 ^a	9	0.003	Significant Association ($p < 0.05$)

4.7.1 Multinomial Logistic regression on Teacher pedagogical skills and Students performance

Owing to the significant association between teachers' pedagogical skills and students' academic performance in the chi-square analysis, the multinomial logistic regression was extended to examine the relationship between these variables. With student academic performance categorized as Excellent, Poor, Good and Fair, Excellent was used as the reference category for this analysis. The regression results showed a negative coefficient ($B = -0.116$) for teacher pedagogical skills when poor academic performance was compared with excellent performance. This implies that there was a potential reduction in the probability of students receiving poor grades as teachers' pedagogical skills improved. However, the relationship is statistically insignificant ($p = 0.719$); thus, there is not enough evidence that teachers pedagogical skills significantly influence the likelihood of students performing poorly compared to those with excellent grades.

Additionally, in comparing good academic performance to excellent, there is a negative coefficient ($B = -0.848$) for teacher pedagogical skills. This indicates that as teachers' pedagogical skills improve, the likelihood of students gaining "Good" grades compared to Excellent performance decreases. The regression also demonstrated a threshold statistical significance ($p = 0.050$), indicating marginal significance. In this regard, the likelihood ratio test was used to determine the level of significance between teachers' pedagogical skills and students' academic performance.

The findings from the analysis revealed an odds ratio of 0.428 and a negative coefficient of -0.848, suggesting that with improvement in teachers' pedagogical skills, there is a reduction in the probability of students gaining good performance by 57.2% as compared to students excelling. These findings indicate that as teachers' pedagogical skills improve, students are more likely to attain excellent grades than good grades. Additionally, the analysis revealed that, in comparing fair academic performance to excellent, the relationship was not statistically significant ($p = 0.231$); hence, there was no significant association between the variables considered. The findings of this study reiterate the importance of teachers' pedagogical skills in improving students' academic performance, especially in terms of excellent performance. According to Kporyi and Arko (2021), the quality of a teacher's pedagogical skills is likely to determine the educational outcome of students; hence, ineffective pedagogical skills are likely to result in poor academic performance, and good pedagogical skills are most likely to result in improved academic performance.

Table 10. Multinomial Logistic regression between Teacher pedagogical skills and Students' performance

Student Performance Category	Coefficients B	Std. Error	Wald	Sig.	Odds Ratio	95% Confidence Interval for Exp(B)
Reference Category: Excellent						
Poor	-0.116	0.321	0.130	0.719	0.891	0.475 - 1.671
Good	-0.848	0.432	3.852	0.050	0.428	0.184 - 0.999
Fair	0.372	0.310	1.435	0.231	1.451	0.789 - 2.666

5. Conclusion

This study examined the relationship between teacher attendance, teacher pedagogical skills, and students' academic performance in literacy and numeracy assessments in four sampled districts in the Northern Region of Ghana. This study adopted a mixed method approach employing chi-square and multinomial logistic regressions to examine the relationships between these variables. The results from school visits and observations revealed diverse findings across all four districts, which significantly influenced the effectiveness of teaching and learning activities in these districts. The results revealed that while there were

more teachers in Kumbungu with pedagogical skills rated as distinguished and proficient, students' academic performance did not truly reflect their pedagogical levels, as most students performed abysmally in literacy. In contrast, the Nanton district recorded better academic performance of students even when they had a lower proportion of teachers rated as distinguished. The inferential analysis also revealed that teachers pedagogical skills were strongly associated with students' academic performance and significantly influenced the probability of students attaining excellent grades.

The findings of the study illustrated the essential role of teacher attendance and pedagogical skills in influencing students' academic performance. However, owing to disparities in some contexts, the impact is further influenced by other factors, as highlighted in the qualitative findings. Additionally, the inconsistencies observed in some districts regarding teachers' pedagogical skills highlight the need for targeted capacity-building programs in these districts to enhance teachers' pedagogical competencies. Based on the findings of this study, there is a need to adopt interventions that seek to address teacher attendance in schools, as it was found to be associated with student educational outcomes, and to adopt various incentive measures to motivate teachers. The study concludes that while teacher attendance and pedagogical competencies affect student performance, there is a need to adopt holistic approaches that seek to address all obstacles hindering improvements in educational outcomes.

5.1 Recommendations

Based on the findings and conclusions of this study, the study makes the following recommendations are made:

1. The Ghana Education Service and other educational authorities should ensure the consistent monitoring and supervision of teachers' activities in schools. This should include supervision of lessons taught, teacher attendance, and quality of teaching practices. The effectiveness of this supervision will improve teacher attendance at schools and the quality of teaching and learning practices in these schools, which will eventually improve student learning outcomes.
2. Regular and effective professional development programs should be organized for teachers to ensure continuous improvement in their pedagogical skills. The Ghana Education Service, in collaboration with other organizations, can ensure the effectiveness of these programs at the district level.
3. Teaching and learning resources are essential for effective teaching and learning. In this regard, the study recommends that the government ensure the provision of essential materials, including textbooks, across all districts.

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