Effects of Teacher Qualifications on The Performance of Secondary School Students in Physics at Malawi School Certificate of Education Examinations: A Case Study of Lilongwe Rural West

Ezrone Robert Mkandawire[1*], Rukia Ally Himu[2]

College of Education, Zhejiang Normal University, Jinhua, Zhejiang, China.

DOI: https://doi.org/10.47772/IJRISS.2026.100300264

Received: 15 March 2026; Accepted: 20 March 2026; Published: 03 April 2026

ABSTRACT

Student performance in physics at secondary school level remains a major concern in many developing countries, including Malawi. This study examined the effects of teacher qualifications on the performance of secondary school students in physics at the Malawi School Certificate of Education (MSCE) examinations in the Lilongwe Rural West. A quantitative descriptive survey research design was used in the study. The sample consisted of 99 participants (N = 99) drawn from five secondary schools, including 85 Form Four physics students, 9 physics teachers, and 5 head teachers. Stratified sampling was used to select the schools while purposive sampling was used to select teachers and head teachers.

Data was collected using structured questionnaires and analysed using descriptive statistics including frequencies, percentages, tables, and graphs using Microsoft Excel. The findings revealed that schools with teachers holding higher qualifications, particularly Bachelor of Science Education (BSc.Ed) in Physics, recorded better student performance in MSCE physics examinations compared to schools where teachers held Diploma qualifications in Education. Results also showed that Community Day Secondary Schools (CDSSs) recorded lower performance with pass rates between 40–50%, while Conventional Secondary Schools (CSSs) recorded better performance with pass rates between 71–74%. Furthermore, teachers in CDSSs predominantly used teacher-centred teaching methods, whereas teachers in CSSs used learner-centred approaches, which improved students' understanding of physics concepts.

The study concluded that teacher qualification level and teaching strategies significantly influence student performance in physics examinations. It recommends that the Ministry of Education increase the training and deployment of highly qualified physics teachers and promote professional development for teachers with lower qualifications.

Keywords-Teacher qualifications; physics education; student academic performance; MSCE examinations; teaching strategies; secondary school education; Malawi.

INTRODUCTION

Education plays a vital role in the social and economic development of any country. Science education in particular is essential for building the scientific and technological capacity necessary for national development. Physics, as one of the core science subjects taught in secondary schools, provides foundational knowledge for various scientific and technological disciplines such as engineering, computer science, environmental science, and medicine.

Despite its importance, student performance in physics has remained relatively low in many developing countries, including Malawi. Poor performance in physics has been attributed to several factors such as inadequate teaching and learning resources, lack of laboratory facilities, poor student attitudes towards science subjects, and shortage of qualified teachers. Among these factors, teacher qualification has been identified as a key determinant of effective teaching and student achievement.

Teacher qualification refers to the level of professional education and training attained by teachers. Teachers who possess higher academic qualifications and specialized training in their subject areas are generally considered more capable of delivering effective instruction. Research has consistently shown that teacher subject knowledge and pedagogical competence significantly influence student learning outcomes (Darling-Hammond, 2000).

In many developing countries, there is an unequal distribution of qualified teachers across schools. Well-resourced schools often attract more highly qualified teachers, while schools located in rural or disadvantaged areas tend to have fewer qualified teachers. This disparity can contribute to differences in student academic performance across schools.

In Malawi, the education system has undergone several reforms aimed at improving science education. Historically, science subjects were taught as general science, combining elements of biology, physics, and chemistry. Later, the curriculum introduced physical science, which combined physics and chemistry. In 2014, the curriculum was revised to separate physics and chemistry into distinct subjects to align with the primary school curriculum and improve specialization in science education (Chirwa & Naidoo, 2014).

Despite these reforms, student performance in physics at Malawi School Certificate of Education (MSCE) examinations remains a challenge. Reports have shown that Community Day Secondary Schools often record lower performance compared to Conventional Secondary Schools. One possible explanation for this difference is the variation in teacher qualifications and teaching practices between these school types.

This challenge is not unique to Malawi. Across Sub-Saharan Africa, the shortage of qualified science teachers is consistently cited as a barrier to achieving quality education in STEM fields. Studies in Tanzania (Mabula, 2012) and Nigeria (Thomas & Olugbenga, 2012) have similarly identified teacher qualifications and pedagogical strategies as central factors influencing student performance in physics. Globally, research by Darling-Hammond (2000) and Hattie (2009) has established teacher quality as one of the most significant school-based factors affecting student achievement. By situating this study within this broader context, the findings from Lilongwe Rural West can contribute to a growing body of evidence on the importance of targeted teacher preparation and deployment in resource-constrained environments.

Although several studies have examined factors affecting student performance in science subjects in Africa, limited research has specifically focused on the effects of teacher qualifications on physics performance in Malawi. This study therefore aimed to assess how teacher qualifications influence the academic performance of secondary school students in physics at MSCE examinations in the Lilongwe Rural West.

Problem Statement

In Malawi, the performance of students in physics at Malawi School Certificate of Education (MSCE) examinations has remained relatively low, especially in Community Day Secondary Schools. One major factor suspected to contribute to this problem is the qualification level of teachers teaching physics. Schools with teachers who have specialized training in physics may produce better academic results than schools where teachers have lower qualifications or limited subject expertise. However, limited research has specifically examined the effects of teacher qualifications on student performance in physics in the Malawi context. Therefore, this study investigated how teacher qualifications influence the academic performance of secondary school students in physics at MSCE examinations in the Lilongwe Rural West.

Significance of the Study

This study is important for several reasons:

It provides evidence on how teacher qualifications affect student performance in physics. Additionally, the findings may help the Ministry of Education develop policies for training and deploying qualified physics teachers. Furthermore, the study contributes to improving teaching strategies and science education quality in

secondary schools. And it provides useful information for school administrators and teachers on improving physics teaching and learning. The study was guided by the following research questions:

1. What qualifications do teachers teaching physics in secondary schools in the Lilongwe Rural West possess?

2. What teaching strategies are used by physics teachers in secondary schools in the Lilongwe Rural West?

3. How do teacher qualifications influence the performance of secondary school students in physics at Malawi School Certificate of Education (MSCE) examinations?

LITERATURE REVIEW

Teacher Qualifications and Student Academic Performance

Teacher qualifications have been widely recognized as an important factor influencing students' academic achievement. Teacher qualifications refer to the level of academic education, professional training, and subject specialization attained by teachers. Teachers who possess higher academic qualifications and specialized training in their subject areas tend to demonstrate stronger subject knowledge and pedagogical competence, which can improve the quality of classroom instruction.

Research has consistently shown that teacher quality is one of the most significant school-based factors affecting student learning outcomes (Darling-Hammond, 2000). Teachers with strong subject knowledge and professional preparation are better able to explain complex concepts, organize effective learning activities, and support students in developing deeper understanding of academic content.

In science education, teacher qualifications are particularly important because subjects such as physics require strong conceptual knowledge and the ability to apply scientific principles in practical situations. Studies have shown that students taught by teachers with higher qualifications often perform better in science subjects than those taught by less qualified teachers (Hattie, 2009). Teachers who have specialized degrees in science education are more likely to possess both content knowledge and pedagogical skills necessary for effective teaching.

Similarly, research conducted in African secondary schools indicates that shortages of qualified science teachers contribute significantly to poor performance in science subjects. For example, a study conducted in Malawi found that Community Day Secondary Schools often experience lower academic performance in science examinations partly due to the limited availability of highly qualified science teachers (Mlangeni & Chiotha, 2015). These findings suggest that improving teacher qualifications may contribute to better student performance in physics and other science subjects.

Teaching Strategies in Physics Education

Teaching strategies play a crucial role in determining the effectiveness of classroom instruction and students' understanding of scientific concepts. In physics education, the teaching methods employed by teachers significantly influence students' engagement, conceptual understanding, and academic performance.

Traditional teaching approaches in many secondary schools rely heavily on lecture-based instruction, where teachers present information while students passively receive knowledge. Although this method allows teachers to cover large amounts of content, it often limits students' active participation in the learning process. Modern science education therefore encourages learner-centred teaching approaches that actively involve students in constructing knowledge through discussions, experiments, and problem-solving activities.

Constructivist approaches emphasize that students learn more effectively when they actively engage with scientific concepts rather than memorizing information. Research in science education has shown that learner-centred teaching strategies improve students' conceptual understanding and academic achievement (Schipper et

al., 2024). Teaching methods such as laboratory experiments, inquiry-based learning, and collaborative problem-solving encourage students to explore scientific ideas and apply theoretical knowledge in practical contexts.

Studies conducted in secondary schools in Africa also highlight the importance of effective teaching strategies in improving science education. For example, Mabula (2012) found that heavy reliance on lecture-based teaching methods limits students' participation and negatively affects their understanding of science subjects. The study recommended the use of learner-centred instructional approaches to improve students' engagement and performance in science education.

Teacher Self-Efficacy in Science Teaching

Teacher self-efficacy refers to teachers' beliefs in their ability to organize and implement instructional practices that promote student learning. According to Bandura (1997), self-efficacy influences how individuals approach tasks, challenges, and goals. In the context of education, teachers with high self-efficacy are more confident in their teaching abilities and are more likely to adopt effective instructional strategies.

Teacher self-efficacy has been found to influence several aspects of classroom practice, including instructional quality, classroom management, and student engagement. Teachers who believe in their ability to teach effectively tend to demonstrate greater persistence when students experience learning difficulties and are more likely to experiment with innovative teaching methods.

Recent studies have shown that teacher self-efficacy plays an important role in improving teaching effectiveness and student learning outcomes. For example, Zhou et al. (2023) found that professional development programs significantly enhance teachers' self-efficacy and improve their ability to implement effective teaching strategies in STEM education. Similarly, Liu, Wang, and Pan (2025) reported that teachers who receive advanced professional training demonstrate higher levels of confidence in teaching complex scientific subjects.

In science education, teacher self-efficacy is particularly important because teaching subjects such as physics often requires confidence in explaining abstract concepts and conducting practical experiments. Research has shown that teachers with strong self-efficacy are more likely to create supportive learning environments that encourage student participation and improve academic achievement (Kim & Seo, 2025). Therefore, teacher qualifications and professional training may influence student performance indirectly through their impact on teachers' self-efficacy and instructional practices.

Theoretical Framework

This study was guided by Teacher Effectiveness Theory, Constructivist Learning Theory, and Teacher Self-Efficacy Theory. These theories help explain how teacher characteristics such as qualifications, teaching strategies, and confidence influence students' understanding and academic achievement in physics.

Teacher Effectiveness Theory

Teacher Effectiveness Theory suggests that teachers' characteristics such as their qualifications, subject knowledge, pedagogical skills, and teaching experience significantly influence students' learning outcomes. According to Darling-Hammond (2000), teacher quality is one of the most important factors that determine student academic achievement in schools. Teachers who possess strong academic qualifications and specialized training in their subject areas are more capable of delivering effective instruction that improves students' understanding.

In science education, teacher qualifications are particularly important because subjects such as physics require both strong conceptual understanding and the ability to apply scientific principles in practical situations. Teachers with higher academic qualifications usually have deeper subject knowledge and better pedagogical skills, which enable them to explain complex scientific concepts effectively.

Research conducted by Thomas and Olugbenga (2012) found that students taught by teachers with higher qualifications performed significantly better in physics examinations compared to students taught by teachers with lower qualifications. This suggests that teacher qualifications play a critical role in influencing students' academic performance in science subjects.

Similarly, studies conducted in African countries have shown that schools with highly qualified teachers tend to produce better academic results than schools with fewer qualified teachers. For example, Mlangeni and Chiotha (2015) reported that poor performance in science subjects in Community Day Secondary Schools in Malawi is partly associated with the shortage of highly qualified science teachers. This theory supports the current study because it explains how the qualifications of physics teachers may influence the academic performance of students in physics at Malawi School Certificate of Education (MSCE) examinations.

Constructivist Learning Theory

Constructivist Learning Theory was developed by Piaget (1972) and later expanded by Vygotsky (1978). The theory suggests that learning occurs when students actively construct knowledge through interaction with their environment rather than simply receiving information from teachers.

According to this theory, effective learning takes place when students actively participate in the learning process through activities such as discussions, experiments, problem-solving tasks, and collaborative learning. Teachers therefore act as facilitators who guide students in building their own understanding of concepts.

Constructivist approaches are particularly important in science education because subjects like physics require students to develop conceptual understanding through observation, experimentation, and practical activities. When students are actively involved in learning activities, they are more likely to understand scientific concepts and apply them to real-life situations.

Studies in science education support the effectiveness of constructivist teaching strategies. For example, Mabula (2012) found that many teachers rely heavily on lecture-based teaching methods, which limit students' participation in the learning process. The study suggested that learner-centred teaching approaches improve students' understanding and performance in science subjects.

Similarly, Mgani (2017) emphasized that teaching physics by connecting scientific concepts to real-life situations helps students understand the relevance of the subject and improves their academic performance. In relation to this study, Constructivist Learning Theory explains why teaching strategies used by physics teachers may influence students' understanding and performance in physics examinations.

Teacher Self-Efficacy Theory

Teacher Self-Efficacy Theory, developed by Albert Bandura (1997), refers to teachers' beliefs in their ability to organize and execute instructional practices that influence student learning outcomes. Teachers with high self-efficacy are more likely to implement effective teaching strategies, encourage student participation, and persist when students experience difficulties in understanding academic content. Recent studies have shown that teacher self-efficacy is strongly associated with instructional quality, classroom management, and the adoption of innovative teaching approaches (Zhou et al., 2023).

Teacher qualifications play a crucial role in shaping teachers' self-efficacy. Teachers who possess higher academic qualifications and specialized training in their subject areas are more likely to develop confidence in their teaching abilities. Professional preparation, subject specialization, and teacher training programs contribute significantly to the development of self-efficacy among teachers. Research in STEM education indicates that professional development and advanced academic preparation significantly improve teachers' confidence in implementing effective teaching practices (Liu, Wang, & Pan, 2025).

In science education, particularly in physics teaching, higher academic qualifications provide teachers with deeper conceptual understanding and pedagogical skills necessary to explain complex scientific concepts.

Teachers with stronger academic preparation are therefore more confident in conducting experiments, addressing students' misconceptions, and applying diverse teaching strategies. Studies have shown that teachers' self-efficacy is positively related to their ability to implement differentiated instruction and effective classroom practices that enhance learning outcomes (Schipper et al., 2024).

Furthermore, teacher self-efficacy has been found to influence student academic achievement through its impact on instructional practices and classroom engagement. A large meta-analysis involving multiple international studies found a significant relationship between teacher self-efficacy and student academic performance, suggesting that confident teachers tend to create more effective learning environments that promote better student outcomes (Kim & Seo, 2025).

Therefore, Teacher Self-Efficacy Theory supports the current study by explaining how teachers' academic preparation and professional training contribute to their confidence in teaching physics. Higher teacher qualifications can strengthen teachers' self-efficacy, which in turn influences the teaching strategies they employ and ultimately affects students' academic performance in physics examinations.

Conceptual Framework

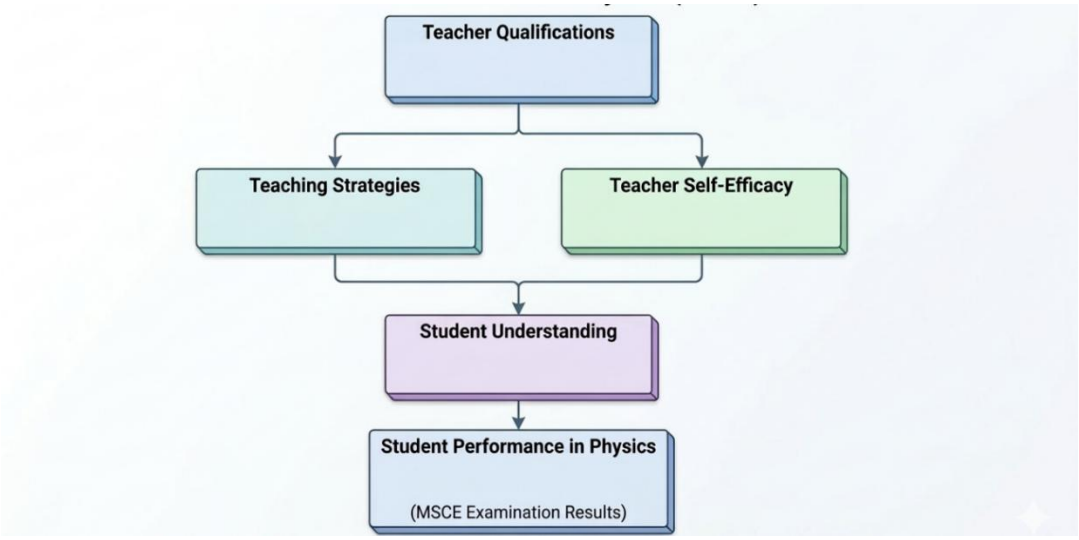

Figure 1:Conceptual framework: Impact of Teacher Qualification on Student Performance in Physics (MSCE)

The conceptual framework for this study illustrates the relationship between teacher qualifications, teaching strategies, teacher self-efficacy, student understanding, and student academic performance in physics.

Teacher qualifications represent the primary independent variable in the framework. Teachers who possess higher academic qualifications and specialized training in physics are more likely to demonstrate strong subject knowledge and pedagogical competence. Research has consistently shown that teacher preparation and professional training play an important role in improving instructional quality and student learning outcomes (Zhou et al., 2023).

Teacher qualifications influence both teaching strategies and teacher self-efficacy. Teachers with stronger academic preparation are more likely to adopt learner-centred instructional approaches such as inquiry-based learning, laboratory experiments, collaborative problem-solving, and interactive discussions. Such teaching approaches have been widely recognized as effective methods for improving students' understanding of scientific concepts and enhancing academic achievement (Schipper et al., 2024).

Teacher qualifications also contribute to the development of teacher self-efficacy. Teachers who receive advanced professional training often demonstrate higher levels of confidence in their ability to teach complex subjects, manage classroom learning activities, and motivate students. Studies in STEM education indicate that professional development significantly strengthens teachers' self-efficacy and instructional effectiveness (Liu et al., 2025).

Teaching strategies and teacher self-efficacy influence students' conceptual understanding of physics. When teachers employ effective instructional methods and demonstrate confidence in their teaching abilities, students are more likely to engage actively in the learning process and develop deeper conceptual understanding. Improved student understanding ultimately contributes to better academic performance in examinations such as the Malawi School Certificate of Education (MSCE). Evidence from recent meta-analyses shows that teacher self-efficacy has a measurable positive relationship with student academic performance across different educational contexts (Kim & Seo, 2025).

Therefore, the framework suggests that teacher qualifications influence student academic performance both directly and indirectly through teaching strategies, teacher self-efficacy, and students' conceptual understanding of physics.

METHODOLOGY

Research Design

This study utilized a quantitative research design to provide a structured and objective assessment of the variables under investigation. Specifically, a descriptive survey approach was adopted, which allowed for the systematic collection and description of data regarding teacher qualifications and student performance without manipulating the research environment. This design was deemed most appropriate as it facilitates the collection of quantifiable data from a diverse sample, enabling the researcher to identify patterns and generalize findings across different school categories in Malawi.

Research Setting and Population

The research was situated in the Lilongwe Rural West of Northern Malawi, a region characterized by a mix of educational institutions. The study targeted a population comprising Form Four physics students, their respective physics teachers, and school head teachers. This population was chosen to provide a multi-perspective view of the instructional and administrative factors influencing Malawi School Certificate of Education (MSCE) physics results.

Sampling Techniques and Sample Size

A total sample of 99 participants (N = 99) was selected to participate in the study, including 85 students, 9 teachers, and 5 head teachers. The sampling process employed two distinct techniques: stratified sampling was used to select five representative secondary schools to ensure a balanced comparison between Community Day Secondary Schools (CDSSs) and Conventional Secondary Schools (CSSs), while purposive sampling was applied to select teachers and head teachers based on their professional expertise and direct involvement in physics education.

Data Collection Instruments and Procedure

The primary data collection instruments were structured questionnaires designed with closed-ended items to facilitate the efficient gathering and coding of standardized data. These instruments were organized into distinct sections to measure demographic profiles, teacher qualification levels, instructional strategies, and self-efficacy. Data collection was conducted over a six-month period beginning in July 2025. Prior to participation, informed consent was obtained from all respondents, and the researcher ensured that the purpose of the study was clearly communicated to maintain transparency.

Validity, Reliability, and Data Analysis

To ensure the integrity of the findings, the instruments were developed based on established theoretical frameworks, including Teacher Effectiveness and Constructivist Learning theories, to ensure content and construct validity. Quantitative data were processed and analyzed using Microsoft Excel. Analysis involved descriptive statistical techniques, including frequencies, percentages, and tabular comparisons, which were used

to summarize the 2025 MSCE physics examination results in relation to teacher qualifications, instructional strategies, and self-efficacy.

This study employed descriptive statistics as the primary analytical approach due to the exploratory nature of the research and the sample size (N = 99), which was sufficient for descriptive analysis but limited the application of inferential statistical tests. Additionally, the study aimed to identify patterns and relationships within the specific context of Lilongwe Rural West rather than to establish causal generalizations. Future research with larger sample sizes and mixed-methods designs is recommended to enable inferential analysis and deeper exploration of the relationships identified in this study.

Ethical Considerations

The study adhered to strict ethical guidelines to protect the rights of the participants. Informed consent was a prerequisite for involvement, and all participants were assured of the voluntary nature of their contribution. To maintain confidentiality and anonymity, the data collection instruments did not require personal identifiers, and the gathered information was used exclusively for academic research purposes.

Limitations of the Study

This study has several limitations that should be considered when interpreting the findings. First, the sample was limited to five secondary schools in Lilongwe Rural West, which may limit the generalizability of the findings to other districts in Malawi. Second, the study relied on self-reported data from teachers and head teachers, which may introduce social desirability bias. Third, the analysis was limited to descriptive statistics; inferential statistical tests were not conducted due to the small sample size and the exploratory nature of the study. Finally, the study did not account for other potential factors influencing student performance, such as socioeconomic background, parental involvement, or availability of laboratory resources. Despite these limitations, the study provides valuable insights into the relationship between teacher qualifications and student performance in physics within the context studied.

FINDINGS AND DISCUSSION

Results

Table 1: Profile of Physics Teachers' Qualifications and Experience This section examined the professional levels and years of service of the physics teachers in the sampled schools.

Variable	**CDSS (%)**	**CSS (%)**
BSc. Ed (Physics)	40%	75%
BSc. Ed (Chemistry/Math)	20%	25%
Diploma in Education (Physics)	20%	0%
Diploma in Education (Chemistry)	20%	0%
Teaching Experience (2-5+ Years)	100%	100%

From the **Table 1**: the data indicates that there are no "unqualified" teachers (those with no teaching credentials at all), but there is a significant disparity in the level of qualification. CSSs have a much higher concentration of teachers with Bachelor's degrees, while CDSSs rely more heavily on teachers with Diplomas or those qualified in other sciences like Chemistry or Biology

ISSN No. 2454-6186 | DOI: 10.47772/IJRISS | Volume X Issue III March 2026

Table 2: Comparison of Instructional Strategies and Lesson Oversight This section shows details how on how physics is taught, comparing teacher-centered (lecturing) versus learner-centered (active participation) approaches.

Instructional Factor	**CDSS Observation**	**CSS Observation**
Dominant Teaching Method	Teacher-Centered (Lecturing)	Learner-Centered (Discussion)
Practical Activities Included	Yes (According to 100% of teachers)	Yes (According to 100% of teachers)
Connection to Real-Life Theory	100%	100%
Lesson Observation by Head Teacher	Infrequent/Not Done	Regularly Conducted
Appropriate Resource Usage	100%	50%

From the Table 2 show that while both school types use laboratories and claim to relate theory to real life, the fundamental pedagogy differs. CDSSs remain dominated by traditional lecturing. The lack of lesson observation by CDSS Head Teachers suggests a lack of pedagogical oversight, whereas CSS teachers are regularly monitored to ensure learner-centered methods are used.

Table 3: Teacher Self-Efficacy and Confidence Levels This section measured how confident teachers felt while delivering physics content.

Respondent Group	**CDSS Confidence (%)**	**CSS Confidence (%)**
Physics Students	96%	95%
Physics Teachers	100%	100%
Head Teachers	100%	100%

From the **Table 3,** it shows that confidence is high across both school types. This suggests that the poor performance in certain schools is not due to a lack of teacher self-belief or "anxiety," but rather relates back to the technical depth of their qualifications and the specific methods they use to teach.

Table 4: Student Academic Performance in 2025 MSCE Physics Examinations This section links the above factors to the actual examination results of the students.

Performance Metric	**Community Day Schools (CDSS)**	**Conventional Schools (CSS)**
Average Pass Rate Range	40% – 50%	71% – 74%
Primary Grade Levels	Pass (Grades 7-8)	Credit (Grades 3-6)
Overall Performance Rating	Poor	Good
Impact of Qualifications	Negative (Lower/Inadequate BSc)	Positive (Higher BSc Qualifications)

Table 4, shows that there is a direct correlation between higher teacher qualifications and student success. Students in CSSs, who are taught by Degree holders using learner-centered methods outperform CDSS students who are taught by Diploma holders using teacher-centered methods. The "poor" performance in CDSSs is

specifically attributed to the "inadequacy of teachers with higher qualifications" rather than a total lack of qualified staff.

DISCUSSION OF RESULTS

Teacher Qualifications and Student Performance

The findings reveal a direct correlation between teacher qualifications and student outcomes. Schools with a higher proportion of BSc. Ed-qualified teachers (CSSs) achieved significantly better MSCE results than schools relying on Diploma-holding teachers (CDSSs). This supports Teacher Effectiveness Theory (Darling-Hammond, 2000), which asserts that specialized subject knowledge is essential for effective instruction. These findings align with Thomas and Olugbenga (2012) in Nigeria, who similarly found that degree-level qualifications positively predict student achievement in physics.

Instructional Strategies and Constructivist Learning

The pedagogical divide observed, learner-centered methods in CSSs versus teacher-centered lecturing in CDSSs, explains the performance gap. Constructivist Learning Theory (Piaget, 1972; Vygotsky, 1978) emphasizes that active participation enhances conceptual understanding. The superior performance in CSSs corroborates Schipper et al. (2024), who found learner-centered strategies improve academic outcomes. Conversely, the reliance on lecturing in CDSSs reflects challenges identified by Mabula (2012) in Tanzanian secondary schools, were passive instruction limits student engagement.

Teacher Self-Efficacy as a Supporting Factor

Despite universally high teacher confidence (95–100%), student outcomes varied significantly. This suggests that self-efficacy alone is insufficient to overcome limitations in qualifications and pedagogical support. While Bandura (1997) links self-efficacy to effective teaching, the absence of regular lesson observations in CDSSs indicates that confidence without instructional oversight and advanced subject knowledge does not translate into improved performance. This finding extends Kim and Seo (2025), who noted that self-efficacy's impact on student outcomes depends on teachers' pedagogical skills and institutional support.

CONCLUSION

This study concludes that teacher qualifications and the associated choice of teaching strategies are critical determinants of student performance in MSCE Physics. The findings reveal a stratified system where the unequal distribution of degree-level teachers (75% in CSSs vs. 40% in CDSSs) directly contributes to a performance gap (71-74% pass rate vs. 40-50% pass rate). Furthermore, the study highlights those pedagogical approaches are stratified by qualification; teachers with higher qualifications are more likely to implement effective learner-centered methods, while those with lower qualifications default to passive lecturing. Importantly, the findings demonstrate that high teacher confidence is not a substitute for deep subject knowledge or consistent instructional oversight.

RECOMMENDATIONS

Based on the empirical evidence linking specific findings to outcomes, the following recommendations are proposed:

Targeted Deployment to Address Qualification Disparity: The Ministry of Education should develop a policy for the equitable deployment of teachers with Bachelor of Science Education (Physics) degrees. Given the finding that CDSSs have only 40% degree-holding teachers compared to 75% in CSSs, prioritizing the placement of new BSc. Ed graduates to CDSSs is essential to close the 31-percentage-point qualification gap.

Upgrading Pathways to Address Diploma Limitations: To address the specific finding that Diploma-holding teachers (40% in CDSSs) struggle to achieve student outcomes comparable to degree-holders, the Ministry

should establish subsidized in-service upgrading programs. These programs should aim to deepen subject mastery to the level associated with better student performance (71-74% pass rates).

Pedagogical Reform to Address Teacher-Centered Instruction: The study found that 100% of CDSS teachers used teacher-centered methods. Therefore, the Teacher Training Department must mandate and fund continuous professional development (CPD) focused specifically on learner-centered strategies (e.g., inquiry-based learning). This training is necessary to shift the dominant pedagogy away from lecturing, which correlates with lower performance (40-50% pass rates).

Strengthening Instructional Oversight: To counteract the finding that lesson observation is "infrequent or not done" in CDSSs, school administrators should implement a structured schedule for instructional supervision. Regular monitoring is necessary to ensure that the recommended learner-centered strategies are being implemented effectively, as was the case in CSSs where supervision correlated with higher performance.

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