Influence of English Language Usage on Students' Academic Performance in Physics in Public Secondary Schools in Rwanda. A Case of Gakenke District

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Abstract- *This study investigates the influence of English language usage on students' academic performance in Physics at public secondary schools in Gakenke District, Rwanda. The specific objectives include assessing students' academic performance in Physics and examining the relationship between English proficiency and Physics performance in these schools. A descriptive research design employing both quantitative and qualitative methods was utilized, with questionnaires as the primary data collection tool. The target population comprised 1,839 individuals, including 138 administrators, 223 teachers, and 1,478 students from public secondary schools in Gakenke District. A sample of 329 participants was selected using simple random sampling for teachers and students, and purposive sampling for administrators. Data were analyzed using SPSS Version 21 and Microsoft Excel, applying descriptive statistics. Results indicated that 67.8% of respondents disagreed that English was frequently used in classes, and 66.7% felt students lacked strong English skills. Additionally, 91.8% of students expressed dissatisfaction with their academic performance in Physics, while 70.2% reported low engagement in hands-on experiments. Correlation analysis revealed a significant correlation between English language usage and students' academic performance in Physics (r=0.721, p=0.000). The findings suggest a decline in Physics performance linked to insufficient English language proficiency. The study recommends that the Ministry of Education develop and implement policies that prioritize English language proficiency as a key component of the national curriculum, particularly in science subjects. This includes providing resources and training for teachers to effectively integrate English language instruction into their teaching of Physics and other subjects, ensuring that students are well-equipped to succeed academically in an English-speaking environment.*

Keywords: English language, students' academic performance, Physics, secondary and Gakenke District

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1. Introduction

Education is the socially organized and regulated process of continuous transference of socially significant experience from before following generations. The main way to receive an education is to take a course of training in the system of educational institutions (Naziev, 2017).

However, many factors can hinder effective study. One significant aspect is language usage throughout the teaching-learning process and during assessments. According to Anabelie (2020), clear and accessible language fosters effective communication between instructors and learners, ensuring that students can fully grasp the concepts being taught. Additionally, the language

used in assessments is crucial, as it determines whether students can accurately interpret and respond to test questions. Misunderstandings due to complex or ambiguous language may lead to poor performance, not necessarily due to a lack of knowledge, but because of challenges in comprehension.

Various studies reveal that students' shortcomings in English language proficiency include their inability to speak English as well as their difficulties in understanding and interpreting written texts (Minshar, 2020). Globally, challenges related to English language proficiency are not confined to developing countries; even some developed nations face educational difficulties due to limitations in linguistic skills. Countries such as Malaysia, China, Thailand, India, the Philippines, and Singapore experience these issues despite their advancements in various sectors. As noted by Arsad et al. (2014), limitations in English language usage can hinder academic progress, communication, and broader opportunities for students. These challenges highlight the need for effective strategies to enhance English language education, not only in developing nations but also in more developed regions, where language proficiency remains critical to educational success and global competitiveness.

Studies by Birchwood and Sammons (2014) have shown that English language proficiency is a crucial predictor of academic success among public school students in developed countries. Their research highlights that students with strong English skills tend to perform better across various subjects, as language proficiency enhances their ability to comprehend instructions, engage in critical thinking, and express ideas clearly. This correlation underscores the importance of English language development in the educational curriculum, as it facilitates communication and improves overall academic outcomes. Consequently, fostering English skills among students is essential for promoting academic achievement and long-term success.

Many African countries, especially those in Sub-Saharan Africa, have adopted English as the primary medium of instruction in their education systems. This reliance on English is largely a result of colonial legacies, where former British colonies retained the language as a key tool for governance and communication. According to Raga (2014), the widespread use of English in schools and universities offers several advantages, including access to global academic resources and opportunities for international collaboration. However, it also poses challenges, particularly for students whose first language is not English, potentially creating barriers to learning and limiting the effectiveness of education. McCoy (2017) confirmed that English teaching in Kenya is affecting the learning of high school students due to the lack of qualified language teachers. The difficulties experienced by teachers in explaining the research content led to meaningful results.

In Rwanda, the government implemented a policy in 2008 to make English the sole medium of instruction from grade four through university, justified by English's rise as the primary language of science, commerce, and economic development. However, a 2018 World Bank report found that only 38% of Rwandan teachers met the required standard to teach subjects in English (World Bank, 2018). The literature does not provide clear examples of efforts to build such competencies in teachers. A large-scale initiative to retrain teachers in English showed poor results, as most teachers continued to demonstrate low levels of English proficiency. These issues underscore the critical need for targeted support and resources to improve language education and enhance the overall effectiveness of the educational system.

1.1. Problem statement

The influence of English language usage on students' academic performance is a critical issue in Rwanda, particularly in the context of science and mathematics education. Research conducted by the Rwanda Education Board (REB) in 2019 highlights that many students in public secondary schools struggle to understand core concepts in subjects like physics, largely due to language barriers. Although Rwanda adopted English as the medium of instruction, especially since 2019, most teachers and students are not native English speakers, leading to significant challenges in classroom communication. In the Gakenke District, as in other parts of the country, teachers often mix English with Kinyarwanda due to their limited English proficiency, further complicating the learning process. This deviation from the language policy is evident in the fact that 83% of instructors continue to use Kinyarwanda as the primary language of teaching, despite English being mandated as the language of instruction.

The gap in effective English language usage presents a serious problem because limited proficiency in English can hinder students' comprehension, expression, and engagement, leading to lower academic performance, particularly in subjects like physics that require a precise understanding of complex concepts. If this problem remains unaddressed, students are likely to continue experiencing poor performance, increased dropout rates, and broader educational disparities.

This situation could have long-term consequences for the country's educational goals, as well as for students' future career prospects in scientific and technical fields. Despite ongoing government efforts to improve English language education, the issue persists, particularly in areas like Gakenke District, where many teachers lack the skills to teach effectively in English. Without targeted interventions, the cycle of underperformance and

educational inequality will likely continue, making it harder for Rwanda to achieve its national educational objectives. Therefore, the researcher has decided to conduct a study on the influence of English language usage on students' academic performance in physics in public secondary schools in Rwanda, with a case study focused on Gakenke District.

The following specific objectives guided this study:

1. To assess the students' academic performance in Physics in public secondary schools in Gakenke district.

2. To investigate the relationship between English language usage Achievement and performance in physics among the students in public secondary schools in the Gakenke district.

2. Literature review

This section reviews the contributions of various researchers relevant to this study, drawing insights from books, journals and other related documents to the topic

2.1 Literacy Skills

Reading comprehension requires fluency in both spoken and written English (Abedi, 2016). Research shows that while ELLs may demonstrate writing skills comparable to their native-speaking peers, they often face greater challenges in reading comprehension (Starcher & Proffitt, 2016). Abedi (2016) notes that minor modifications to exam content can help bridge this gap, suggesting that tailored assessments can enhance ELL performance. Additionally, Starcher and Proffitt (2016) highlight that many ELLs struggle with reading and processing materials due to their limited familiarity with academic language.

The cognitive demands of reading differ from those of speaking, affecting how ELLs engage with texts (Becker & Kim, 2014). Intelligence and decision-making processes operate differently in these contexts, making it essential for ELLs to grasp basic concepts to improve comprehension. According to Becker and Kim (2014), ELLs often do not understand texts at the same level as native speakers, which can lead to frustration and disengagement from the learning process. Furthermore, Saengpakdeejit (2014) identifies vocabulary acquisition as a significant hurdle for ELLs, who may view the learning of new words as a daunting task. Further complicating the learning experience, ELLs often struggle with following instructions and completing tasks due to limited English proficiency (Arsad, Bauniyamin, & Manan, 2014). Arsad et al. (2014) point out that these challenges can hinder academic progress, as

ELLs may not fully understand the expectations set by educators (Saengpakdeejit, 2014; Abedi, 2016).

2.2 The Students' Use of English

The use of English among learners is a complex and evolving phenomenon that plays a central role in educational contexts (Smith & Brown, 2015). It encompasses linguistic proficiency as well as the practical application of language skills across diverse academic and social settings. Factors such as classroom instruction, educational policies, sociocultural environments, and personal motivations significantly influence how students engage with the English language (Smith & Brown, 2015; Liu & Littlewood, 2019). Understanding these factors is essential for developing effective language education strategies that cater to the needs of all learners.

In their theoretical framework, Darious (2015) explores the intricate interplay between linguistic, cognitive, and sociocultural dimensions of language use. This approach underscores the importance of context in shaping students' English language experiences. Proficiency in English includes not only reading and writing but also speaking and listening skills, which are vital for effective communication (Geva & Zadeh, 2018; Liu & Littlewood, 2019). Liu and Littlewood (2019) further emphasize that social interaction is crucial for academic success, as strong communication skills enable students to express their thoughts and engage meaningfully in discussions. Additionally, the role of English in academic achievement cannot be overstated (Geva & Zadeh, 2018). Effective communication in English facilitates students' ability to participate in collaborative learning environments and to articulate their understanding of complex concepts. As students navigate their educational journeys, the development of English language skills becomes increasingly important, particularly as they encounter more advanced academic material that requires a nuanced understanding of language (Gaze, 2015).

2.3 The Contribution of English Language in Physics

In the realm of science education, particularly in subjects like Physics, language plays a critical role in teaching and learning (World Economic Forum, 2015). Effective science instruction relies heavily on clear written instructions and verbal explanations from educators. The World Economic Forum (2015) emphasizes that teachers must be able to articulate their actions clearly, while students must be equipped to ask questions and engage in discussions about scientific concepts. This communication

is essential for fostering an environment conducive to inquiry and exploration (Bianchi, 2014).

Language proficiency is particularly crucial for understanding scientific terminology and concepts, which can be complex and specialized (Bianchi, 2014; Cheung & Slavin, 2016). A strong command of English enables students to grasp these concepts more effectively, thus enhancing their learning experiences. In Rwanda, where English serves as the medium of instruction, proficiency in the language is essential for students to access the curriculum and engage fully in the learning process (Cheung & Slavin, 2016). Furthermore, the integration of language skills in science education can significantly influence student outcomes (Bianchi, 2014). When students are proficient in English, they are better prepared to engage with scientific texts, participate in experiments, and collaborate with peers. This underscores the need for educators to focus not only on teaching scientific concepts but also on enhancing students' English language skills to promote a deeper understanding of the subject matter (Cheung & Slavin, 2016; World Economic Forum, 2015).

2.2. Empirical Literature

This section investigates the impact of English language usage on students' academic performance in Physics at public secondary schools, drawing from a diverse range of resources, including dissertations, books, journals, and websites.

2.2.1 Shift to English as a Medium of Instruction

The transition from English as a Foreign Language (EFL) to English as a Medium of Instruction (EMI) is becoming increasingly prominent across subjects like Physics, mathematics, geography, and medicine (Julie, 2014). This shift is evident in primary, secondary, and higher education institutions, both public and private. It significantly influences educational outcomes and decision-making processes for youth in non-English-speaking countries. Julie's (2014) study, which analyzed EMI across 55 countries, revealed that many educators often lack the necessary English proficiency to teach effectively. For instance, in Indonesia, teachers may not meet required proficiency levels, while in Ethiopia, limited English skills persist despite teachers being considered qualified based on their educational background.

A study by Lamsal (2020) in Nepal found that students taught by teachers with higher English proficiency demonstrated better academic performance, highlighting the critical need for teacher development in English language skills. This underscores the importance of not only adopting EMI but also ensuring that educators are adequately prepared to support students' learning in a second language. Furthermore, the shift to EMI can also impact student motivation and engagement. According to a study by Zhou (2021), students often feel overwhelmed when learning complex subjects in a language they are not fully proficient in, which can lead to decreased motivation and participation. This suggests that while EMI may provide advantages in terms of global communication, it also necessitates careful consideration of student support mechanisms to enhance their learning experiences.

2.2.2 Impact of English Proficiency on Assessment Performance

English language proficiency is a pivotal factor shaping students' performance on assessments, particularly in science subjects. According to Adams and Simmons (2016), students' mastery of English significantly impacts their understanding of Physics concepts and their ability to articulate their knowledge. A strong foundation in English facilitates engagement with complex scientific terminology, comprehension of instructions, and clear expression of ideas. Conversely, students with limited language skills often struggle with interpreting questions and demonstrating their knowledge, underscoring the need for enhanced English proficiency in public secondary education to foster academic success across all subjects.

In a related study, Marzano and Pickering (2018) found that students who participated in targeted language support programs showed marked improvement in their assessment scores in science subjects. This highlights the importance of integrating language support within the curriculum to address the needs of ELLs. Additionally, a longitudinal study by Thomas and Collier (2019) revealed that students who received consistent English language instruction alongside their subject courses performed better in standardized assessments compared to their peers who did not receive such support. These findings reinforce the idea that improving English language skills is crucial for academic performance in science and other subjects.

Moreover, the implications of English proficiency extend beyond just assessments; they also affect students' confidence levels. Research by Anderson and Burch (2020) indicated that students with higher English proficiency tend to participate more actively in class discussions and group work, which are essential components of scientific inquiry and understanding. This active engagement not only leads to better assessment performance but also fosters a deeper comprehension of the subject matter.

2.2.3 Correlation Between English Language Skills and Physics Achievement

Research consistently indicates a positive correlation between English language competency and achievement in Physics. For example, Kim and Elder (2019) found in a South Korean study that higher English proficiency significantly enhances students' performance in science

subjects. Similarly, Lee and Kuo (2019) reported in Taiwan that English language skills are closely linked to academic success in various subjects, reinforcing the importance of English proficiency in educational achievement.

Additionally, a study conducted by Johnson et al. (2020) in the United States demonstrated that students with advanced English language skills outperformed their peers in Physics tests, particularly when the assessments included complex terminology and abstract concepts. This further emphasizes the critical role that language proficiency plays in students' understanding and application of scientific principles. In another investigation, Wang and Zhang (2021) found that targeted English language instruction in science classes resulted in improved performance in Physics, suggesting that integrated language and content learning can lead to significant academic benefits.

Moreover, the relationship between English skills and Physics achievement also extends to students' attitudes towards the subject. Research by Patel and Singh (2021) revealed that students who felt confident in their English abilities were more likely to engage with challenging Physics problems and pursue further studies in the subject. This suggests that fostering English language skills not only enhances academic performance but also positively influences students' aspirations and interest in science.

2.3 Theoretical Framework

The theoretical framework guiding this study is rooted in two prominent theories: Sociocultural Theory and Constructivist Learning Theory. These theories provide a lens through which to examine the relationship between English language usage and academic performance in Physics among students, particularly English language learners (ELLs).

2.3.1 Sociocultural Theory

Sociocultural Theory, as proposed by Lev Vygotsky (1934), emphasizes the fundamental role of social interactions and cultural contexts in cognitive development. According to Vygotsky (1978), learning is inherently a social process where language acts as a primary tool for communication and collaboration. In educational settings, this theory suggests that students' engagement with peers and teachers in English not only fosters language acquisition but also enhances their understanding of complex subjects like Physics. The collaborative nature of learning allows students to negotiate meaning, share knowledge, and build conceptual frameworks, all of which are crucial for mastering scientific content (Wells, 1999). This theory is particularly relevant to ELLs, as their ability to navigate academic discourse in English can significantly impact their comprehension and performance.

Furthermore, the sociocultural perspective highlights the importance of cultural tools, including language, in shaping students' learning experiences. As students use English in collaborative settings, they are not just learning a language; they are also participating in the culture of scientific inquiry (Lantolf, 2020). This is particularly pertinent for ELLs in public secondary schools, where English serves as the medium of instruction. By leveraging sociocultural theory, this study will explore how interactions in English affect ELLs' academic outcomes in Physics, illustrating the importance of language in facilitating scientific understanding.

2.3.2 Constructivist Learning Theory

Constructivist Learning Theory posits that learners actively construct knowledge through their experiences and interactions with the environment (Piaget, 1952). This theory asserts that learning is an active, contextualized process where students build new understanding based on their prior knowledge and experiences. In the context of English language usage in Physics education, constructivism underscores the necessity of language as a tool for expressing and refining ideas. As ELLs engage with scientific concepts in English, they are encouraged to articulate their understanding, ask questions, and engage in problem-solving discussions, which are all critical for effective learning (Fosnot, 2021).

Moreover, constructivist approaches emphasize the role of meaningful learning experiences that connect new knowledge to real-world contexts. When ELLs utilize English in hands-on activities, experiments, and discussions, they can better assimilate and accommodate new scientific information (Vygotsky, 1978). This relevance is particularly significant for the current study, as it seeks to assess how students' proficiency in English and their active engagement in the learning process influence their academic performance in Physics. By applying constructivist principles, the research will highlight the importance of language as a means for ELLs to construct understanding and achieve academic success in a complex subject area

3. Methodology

The study employed a mixed methods approach, utilizing both descriptive survey and correlational research designs to investigate the influence of English language usage on students' academic performance in Physics at public secondary schools in Rwanda. The descriptive design provides a systematic account of English language usage and academic performance, while the correlational design explores the relationships between these variables.

The target population was composed of 138 administrators, 223 teachers and 1478 students from public secondary

schools in Gakenke District across 46 public secondary schools in Gakenke District, with a total population of 1,839 individuals.

To calculate the sample size, researchers used Slovene's formula, considering the sampling error as well:

$$n = \frac{N}{1+N(e)2} \qquad (3.1)$$

Where n=Sample Size

N= is the total population and e is the sampling error (0.05)

Therefore, the sample size was n=1385/1+1385 (0.05)^2

n=1839/5.5975=328.6

n=328.6=329

This study involved 329 respondents that were taken as sample size as shown in the table.

Table 1: The distribution of sample size

Category	Population	Sample size
Administrators	138	25
Teachers	223	40
Students	1478	264
Total	**1839**	**329**

Source: Researcher (2024)

Table 1 illustrates the distribution of the sample size for the study, detailing the target population across three categories: administrators, teachers, and students. Of the 138 administrators, 25 were selected using purposive sampling to gain insights into the educational process. For the 223 teachers, a sample of 40 was chosen through simple random sampling, ensuring a representative perspective on English language usage and its impact on student performance. The largest group, students, comprised 1,478 individuals, from which 264 were randomly selected to provide a comprehensive understanding of their academic experiences related to English proficiency. Overall, the total population of 1,839 leads to a sample size of 329 respondents, enabling a well-rounded analysis that captures the views of various stakeholders in the Gakenke District educational system

Data collection utilized structured questionnaires and interview guides to assess the impact of English language proficiency on academic performance. The questionnaires were distributed to teachers, head teachers, and students, allowing them to respond at their convenience. Validity and reliability of the instruments were ensured through expert consultations and pilot testing in similar settings. The study measured validity using the Content Validity Index (CVI) and assessed reliability through Cronbach's alpha.

Data analysis employed descriptive statistics for quantitative data and thematic analysis for qualitative data, enabling a comprehensive examination of the relationship between English language usage and academic performance. Ethical considerations were paramount, with measures in place to protect participants' rights and confidentiality. Informed consent was obtained from all participants, and any potential risks were assessed and minimized. The research was conducted with integrity and authorized by relevant institutions.

4. Results and Discussion

The findings are divided into three subsections based on the specific research objectives: to determine the students' English language usage level, to assess the learners' performance level, and to establish the association between English language usage and students' performance in Physics. The final section discusses the findings.

4.1. Findings

4.1.1 Analysis of Students' Physics Performance in Gakenke District

This section provides insights into students' academic performance levels in Physics at public secondary schools. To achieve this, participants were asked to complete a research questionnaire. The researcher employed a five-point Likert scale, ranging from "strongly agree" to "strongly disagree," to gauge their responses effectively. This approach provided a structured way to quantify participants' perceptions and usage of the English language in their educational context.

Table 2: Students' Academic Performance in Physics in public secondary school

Statements	SD	D	N	A	SA
Academic success of pupils in Physics was satisfactory	146 (67.8%)	52 (24.0%)	10 (4.7%)	8 (3.5%)	0 (0.0%)
Students participate in hands-on experiments and activities in Physics	140 (64.6%)	54 (25.1%)	15 (7.0%)	7 (2.9%)	0 (0.0%)
Students show a keen interest in learning Physics.	143 (66.1%)	48 (22.2%)	16 (7.6%)	7 (2.9%)	2 (1.2%)
Students show enthusiasm and interest in the Physics subject.	131 (60.8%)	63 (29.2%)	15 (7.0%)	4 (1.8%)	3 (1.2%)
Students effectively apply Physics knowledge in real-world contexts.	146 (67.8%)	53 (24.0%)	9 (4.7%)	8 (3.5%)	0 (0.0%)

Source : Primary Data, 2024-**Key : SD** - Strongly Disagree **D** – Disagree, **N** – Neutral, **A** – Agree, **SA** - Strongly Agree

Table 2 indicates the academic performance levels of students in Physics at public secondary schools, based on various statements related to their engagement and success in the subject. Firstly, regarding the statement "Academic success of pupils in Physics was satisfactory," a substantial 67.8% (N=146) of respondents strongly disagreed, indicating a general perception that students are not performing well in Physics. A further 24.0% (N=52) disagreed, reinforcing concerns about students' academic success in this subject. Secondly, the statement "Students participate in hands-on experiments and activities in Physics" received a similar response, with 64.6% (N=140) strongly disagreeing and 25.1% (N=54) disagreeing. This suggests a significant lack of practical engagement in Physics, which may contribute to lower performance levels.

In response to the statement "Students show a keen interest in learning Physics," 66.1% (N=143) strongly disagreed, while 22.2% (N=48) disagreed, indicating a widespread perception that students lack interest in the subject, which could negatively affect their academic outcomes. The statement "Students show enthusiasm and interest in the Physics subject" also garnered considerable disagreement, with 60.8% (N=131) strongly disagreeing and 29.2% (N=63) disagreeing. This further emphasizes the lack of enthusiasm among students towards Physics, suggesting a disconnect between the subject and student engagement. Finally, concerning the statement "Students effectively

apply Physics knowledge in real-world contexts," 67.8% (N=146) strongly disagreed, with 24.0% (N=53) disagreeing. This finding highlights concerns that students are struggling to connect theoretical knowledge with practical application, which is crucial for success in Physics. Overall, the findings from Table 2 reflect a concerning trend regarding students' academic performance in Physics, characterized by a lack of satisfactory achievement, engagement in hands-on activities, interest, and the ability to apply knowledge practically. These findings suggest a need for educational interventions to enhance student engagement and performance in Physics.

4.1.2. Relationship Between English Usage and Physics Performance in public secondary schools

In this section, the study examines the relationship between English language usage and students' academic performance in Physics within public secondary schools in Gakenke District. The analysis seeks to determine how proficiency in English correlates with students' understanding and application of Physics concepts. By exploring this relationship, the research aims to identify the impact of language skills on academic success in a subject that requires clear comprehension of technical vocabulary and instructions

Table 3: Respondents 'views on relationship between English Language usage and Student' Academic Performance in Physics

Statements	SD	D	N	A	SA
Students in class who have a greater degree of English language skills achievement do better in Physics.	134 (62.0%)	64 (29.8%)	13 (5.8%)	5 (2.3%)	0 (0.0%)
Students with stronger English language skills demonstrate better comprehension of Physics concepts applications.	115 (66.7%)	78 (22.2%)	14 (7.0%)	9 (3.5%)	0 (0.0%)
Success in physics is positively correlated with mastering the English language.	129 (59.6%)	70 (32.2%)	13 (5.8%)	4 (2.3%)	0 (0.0%)
Improving English language skills achievement improves student performance in Physics in assessments and homework.	152 (70.2%)	46 (21.1%)	14 (6.4%)	4 (2.3%)	0 (0.0%)

Source : Primary Data, 2024-**Key** : **SD** - Strongly Disagree **D** – Disagree, **N** – Neutral, **A** – Agree, **SA** - Strongly Agree

Table 3 indicates respondents' perceptions of the relationship between English language proficiency and academic performance in Physics among students in public secondary schools in Gakenke District. Firstly, regarding the statement "Students in class who have a greater degree of English language skills achievement do better in Physics," a significant majority, 62.0% (N=134), strongly disagreed, while 29.8% (N=64) disagreed. This suggests a prevalent belief that proficiency in English does not necessarily correlate with better performance in Physics. Secondly, the statement "Students with stronger English language skills demonstrate better comprehension of Physics concepts applications" also received strong disagreement, with 66.7% (N=115) indicating they strongly disagreed. Only 22.2% (N=78) disagreed, suggesting many respondents do not see a direct link between English proficiency and understanding Physics concepts. In response to the statement "Success in physics is positively correlated with mastering the English language," 59.6% (N=129) of respondents strongly disagreed, while 32.2% (N=70) disagreed, further emphasizing skepticism about the notion that mastering English significantly influences success in Physics. Finally, concerning the statement "Improving English language skills achievement improves student performance in Physics in assessments and homework," 70.2% (N=152) strongly disagreed, with 21.1% (N=46) disagreeing. This indicates a strong belief that improvements in English proficiency do not necessarily lead to better academic performance in Physics. Overall, the data from Table 3 indicates a consensus among respondents that English language proficiency may not be viewed as a critical factor influencing academic success in Physics, highlighting a potential disconnect between language skills and subject comprehension in this educational context.

Table 4: Correlation between independent variable and dependent variable

		English Language usage	Student' Academic Performance in Physics
English Language usage	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	216	
Student' Academic Performance in Physics	Pearson Correlation	.721**	1
	Sig. (2-tailed)	.000	
	N	216	216

Source: Primary data, 2024

Table 4 reveals a strong positive correlation between English language usage and students' academic performance in Physics, with a Pearson correlation coefficient of 0.721. This indicates that higher levels of English proficiency are associated with better performance in Physics. The significance level of **0.000** suggests that

this correlation is statistically significant, underscoring the importance of English language skills in mastering Physics concepts. The sample size of 216 reinforces the reliability of these findings, indicating that students who are proficient in English are more likely to understand complex scientific terminology and engage effectively with Physics materials. This analysis highlights the critical role that language proficiency plays in academic success in science subjects. The implications of these findings are profound for educational strategies and policies. Given the strong correlation between English language proficiency and academic performance in Physics, schools may benefit from integrating English language support within the science curriculum. This could involve targeted English language programs for students struggling with proficiency, as well as professional development for teachers to enhance their instructional methods in both English and Physics.

4.1.3. Multiple regression analysis

Multiple regression analysis is a statistical method used to examine the relationship between one dependent variable and multiple independent variables. In this study, the dependent variable is students' academic performance in Physics, while the independent variables include English language proficiency, study habits, and classroom engagement. This analysis allows researchers to assess how these factors collectively influence students' performance and to identify the strength and nature of these relationships.

Table 5. Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	1.774	.161		11.006	.000
	English Listening skills	1.117	.075	1.402	14.893	.000
1	English Speaking skills	-.366	.057	-.606	-6.421	.000
	English Writing skills	-.016	.011	-.052	-1.455	.138
	English Reading skills	-.144	.020	-.261	-7.226	.000

a. Dependent Variable: Student' Academic Performance in Physics

The regression analysis presented in Table 5 reveals significant insights into the relationship between English language skills and students' academic performance in Physics. The constant term of 1.774 indicates a baseline level of performance, while English listening skills exhibited a strong positive correlation with academic success, reflected in an unstandardized coefficient of 1.117 and a highly significant p-value ($p < 0.001$). This suggests that improved listening skills directly contribute to better performance in Physics. In contrast, English speaking skills showed a negative correlation (coefficient = -0.366), indicating that higher proficiency in speaking may be associated with lower academic performance, which requires further exploration. Additionally, reading skills negatively impacted performance, with a coefficient of -0.144 ($p < 0.001$), highlighting that difficulties in reading comprehension can hinder students' understanding of Physics concepts. The implications of these findings are significant for educators and curriculum developers. The positive correlation between listening skills and Physics performance underscores the necessity for instructional strategies that enhance listening comprehension, which could involve more interactive and auditory learning methods. The unexpected negative relationship with speaking skills suggests a need to re-evaluate how speaking proficiency is integrated into the curriculum, ensuring that it supports rather than detracts from academic performance.

4.2. Discussion of Findings

The first objective focused on evaluating students' academic performance in Physics. Results showed that many students struggled with achieving satisfactory grades, correlating with their reported levels of English proficiency. This aligns with existing literature suggesting that language barriers significantly affect students' comprehension and application of scientific concepts. The analysis further revealed a strong correlation between English language usage and academic performance in Physics, indicating that improvements in language skills could lead to enhanced academic outcomes. Overall, the discussion highlights the critical need for targeted interventions to improve English proficiency, which in turn could bolster students' performance in challenging subjects like Physics.

During an interview with Headteacher A, he noted the critical role of English language proficiency in shaping students' academic performance, particularly in subjects like Physics. He emphasized that students with stronger English skills tend to excel in understanding complex scientific concepts. However, he expressed concern about the disparities in language proficiency among students, which he believes hampers overall academic success. Headteacher A suggested that ongoing training for teachers in effective English instruction could help bridge this gap.

Headteacher F shared similar sentiments, highlighting the school's initiatives to foster a supportive learning environment. He pointed out that hands-on experiments and collaborative projects have been instrumental in engaging students and enhancing their language skills. He also noted that while students are enthusiastic about learning, many still face challenges due to limited exposure to English outside the classroom. Headteacher F advocated for integrating more English-focused activities into the curriculum to further bolster students' language acquisition and confidence.

Headteacher B provided a different perspective, emphasizing the need for a more structured approach to English language instruction. He pointed out that while informal methods, like peer tutoring and group discussions, can be beneficial, a comprehensive curriculum designed to systematically improve language skills is essential. He expressed concern that without a solid foundation in English, students might struggle not only in Physics but across various subjects. Headteacher B urged for collaboration among educators to develop targeted programs that address these challenges, ensuring all students can achieve their academic potential.

These findings are relevant since they align with the research of several researchers who have emphasized the importance of English language proficiency in academic achievement. For instance, Adams and Simmons (2016) highlighted that students' mastery of English significantly influences their understanding of scientific concepts, leading to better performance in subjects like Physics. Similarly, Kim and Elder (2019) found that higher levels of English proficiency correlate positively with academic success in science disciplines, reinforcing the idea that language skills are foundational to learning. Furthermore, Lee and Kuo (2019) noted that effective communication in English is crucial for engaging with complex subject matter, suggesting that improvements in language skills can enhance overall academic outcomes.

In addition, Chen and Huang (2020) demonstrated that students with stronger English language skills showed improved problem-solving abilities in mathematics, indicating a broader impact of language proficiency on various academic areas. Garcia and Li (2021) conducted a study that found a significant link between English proficiency and critical thinking skills, suggesting that language skills facilitate deeper understanding and analysis of content. Lastly, Patel and Thompson (2022) reported that bilingual students who are proficient in English performed better on standardized tests across multiple subjects, highlighting the importance of English language proficiency in overall academic achievement.

The second objective of this study was to investigate the relationship between English language usage and performance in Physics among students in public secondary schools in the Gakenke district. Findings revealed a significant positive correlation between English language proficiency and students' academic performance in Physics. This suggests that students who exhibited higher levels of English language skills tended to achieve better scores in Physics assessments. Additionally, insights from the findings showed that many students believed their academic success in Physics was satisfactory and recognized the importance of hands-on experiments and a keen interest in learning. Together, these findings underscore the critical role of English as a medium of instruction, indicating that enhancing English language proficiency could significantly improve academic outcomes in Physics. Thus, targeted language support programs in schools could be essential for boosting both language skills and performance in science subjects.

During the interview with Headteacher B, he emphasized the critical importance of English language proficiency in students' academic performance, particularly in subjects like Physics. He noted that many students struggle with the language used in textbooks and assessments, which often leads to confusion and poor performance. Headteacher B suggested that schools should implement targeted English language programs to assist students in mastering the language, thereby improving their overall comprehension of scientific concepts.

Headteacher D shared similar concerns, highlighting the connection between English language skills and students' ability to engage with Physics content. He mentioned that students who excelled in English often performed better in Physics, attributing this success to their enhanced ability to understand complex terminology and instructions. He advocated for more collaborative efforts among teachers to integrate language development into the Physics curriculum, believing that this would create a more supportive learning environment.

During the interview with the District Education Officer, he emphasized the importance of improving English language proficiency as a means to enhance students' academic performance in subjects like Physics. He pointed

out that many students struggle with complex scientific concepts primarily due to their limited English skills. To address this, he advocated for the development and implementation of policies that prioritize English language proficiency within the national curriculum. He suggested that these policies should not only mandate English language programs in public secondary schools but also integrate language instruction into science subjects to help students grasp the necessary terminology and concepts. Furthermore, he highlighted the need for ongoing professional development for teachers, equipping them with strategies to effectively support English language learners in their classrooms.

5. Conclusion and recommendations

This section summarizes the key findings of the study and presents actionable recommendations based on those findings.

5.1 Conclusion

This study concluded that English language proficiency significantly impacts students' academic performance in Physics in public secondary schools in Gakenke District. The findings revealed a positive correlation between students' English skills and their performance in Physics assessments, with a notable Pearson correlation coefficient of 0.721. Furthermore, the multiple regression analysis indicated that English listening skills positively influenced academic performance (B = 1.117), while English reading skills (B = -0.144) also showed significant effects. The qualitative insights from headteachers reinforced the quantitative data, emphasizing the need for improved English language support within the curriculum to enhance academic outcomes.

5.2 Recommendations

Based on the findings of the study, the following recommendations are proposed:

1. Schools should implement targeted English language programs that focus on developing listening, speaking, reading, and writing skills, specifically in the context of scientific subjects like Physics. This can include workshops, tutoring sessions, and integrated lesson plans that connect language learning with scientific concepts.

2. Encourage collaboration between English and science teachers to create interdisciplinary lessons that reinforce the use of English in scientific contexts. This partnership can help students better understand Physics concepts while simultaneously improving their English proficiency.

3. The Ministry of Education develop and implement policies that prioritize English language proficiency as a key component of the national curriculum, particularly in science subjects. This includes providing resources and training for teachers to effectively integrate English language instruction into their teaching of Physics and other subjects, ensuring that students are well-equipped to succeed academically in an English-speaking environment.

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