Influence of Geography Teachers' Competencies on Students' Map Reading Achievement in Secondary Schools in Nakuru County, Kenya

[1]Omodu Paul Molley., [1]Gabriel Senanu Akakpo (PhD)., [2]Prof. Samson Rosana Ondigi (PhD)., [2]Adelheid Marie Bwire (PhD)

[1]Regional Maritime University, Accra, Ghana

[2]Kenyatta University, Nairobi, Kenya

DOI: https://doi.org/10.47772/IJRISS.2026.10200616

Received: 23 February 2026; Accepted: 28 February 2026; Published: 23 March 2026

ABSTRACT

The study examined the influence of geography teachers' competencies on students' map-reading achievement in Secondary Schools in Nakuru County, Kenya. The study used a descriptive survey and mixed-methods approach, employing simple random and purposive sampling to select 194 students, 14 geography teachers, and 7 heads of department from 7 public secondary schools. Data were collected through questionnaires, assessment tests, interview schedules, and observation plans. Content analysis was employed to extract qualitative data, central tendency measures were implemented to analyse quantitative data, and descriptive statistics were implemented to review the characteristics of the collected data. Infographics and bar graphs were used to illustrate the findings. The results indicated that geography educators exhibited pedagogical content knowledge, as well as technological content knowledge and high self-efficacy. According to 71.4% of the respondents, the competence of instructors in performing their duties was the determining factor in the success of students in map reading. Nevertheless, 28.6% of the instructors indicated that, although competency was a significant predictor of academic success, it was not the sole factor influencing performance. Classroom environment, instructional material availability, and the attitudes of students and teachers towards outdoor learning were other factors that influence academic achievement. These responses were tested, and the test's P-value (.001) was below the threshold (α=.05), indicating a statistically significant association between instructors' competency and student Map Reading achievement. Gender differences in performance were not statistically significant, as the p-value (0.329) is greater than the significance level ($\alpha = 0.05$). Therefore, gender did not influence students' learning achievement in map-reading. The study concluded that the recommended method for teaching map reading to partially theoretical principles, which involves exposing students to outdoor learning, would be advantageous. The research suggests that school administrators should guarantee that geography teachers receive regular seminars, workshops, and in-service map-reading training. Instructional tools should be accessible to facilitate effective learning.

Keywords: Geography, Teachers' Competence, Students' Academic Achievement, Map Reading.

INTRODUCTION

Background to the Study

Education is fundamental in equipping individuals with the knowledge and skills needed for national development. The effectiveness of education, however, depends largely on the competence of teachers who serve as facilitators of learning and implementers of the school curriculum. Student academic achievement is therefore closely linked to teacher preparedness and instructional competence. Sandaraj and Hashim (2022) found that student mastery of map reading significantly improves when the teacher demonstrates competence in both

[1] Omodu Paul Molley is an MSc. Student in Regional Maritime University, Accra, Ghana
[2]Samson Rosana Ondigi is a professor at Kenyatta University, Nairobi, Kenya

knowledge delivery and classroom adaptation. Their study in Malaysia revealed that teachers who model effective thinking, problem-solving behavior, and instructional flexibility foster higher achievement among learners. Similarly, Kaiser and König, (2020) argue that teachers' competence plays a pivotal role in motivating learners, enabling them to achieve better academic outcomes through structured and meaningful instructional practices. Teacher competence is central to the teaching and learning process because it supports the interpretation and implementation of curriculum content, thereby improving students' understanding (Nam et al., 2022). Competent teachers are trained to predict student difficulties, identify misconceptions, and apply appropriate strategies to clarify concepts. Content knowledge alone, however, is insufficient. Fernandes (2019) emphasizes that effective instruction requires integration of subject expertise with pedagogical skills that promote student engagement, interest, and participation. These pedagogical competencies are important in map reading as they involve spatial reasoning, symbol interpretation, and analytical skills. Globally, map-reading performance at the secondary school level has been a concern. Studies in Jordan show continuous low performance in map interpretation skills (Malkawi & Smadi, 2018). In the United States, Ken (2019) reported improved student understanding in classrooms where teachers demonstrated competence in technology integration, geographic knowledge, and learner-centered pedagogy. The study emphasized that map reading requires not only theoretical knowledge but also practical skills supported by relevant technological tools when handled by well-trained teachers. In Indonesia, achievement in national examinations has been closely tied to teacher competence, as teachers' instructional strategies significantly shape student achievement (Prasetio et al., 2017). An interrelated concern is the lack of Pedagogical Content Knowledge (PCK) among teachers. Kadhin (2020) revealed that many Geography teachers in Iraqi secondary schools could not translate subject content into meaningful learning activities, leading to poor student comprehension. The absence of Technological Pedagogical Content Knowledge (TPCK) further made map reading appear abstract and difficult, discouraging students from pursuing Geography at higher levels. Sulaiman & Noor Ismail (2020). Similarly, 21st-century map-reading instruction requires teachers to integrate ICT skills with conceptual teaching approaches to enable students to develop spatial reasoning and independence in map interpretation tasks.

However, some studies offer alternative perspectives. Blömeke & Olsen, (2019) argued that the impact of teacher competence on student achievement may be limited in contexts where physical and instructional resources are inadequate. Their study across England, South Korea, and Tunisia found only a weak positive relationship between teacher competence and student performance, suggesting that classroom conditions, such as size and resource availability, also influence outcomes. Brühwiler (2011) noted that smaller class sizes improve student achievement more consistently than teacher competence alone. Blömeke et al. (2022) confirmed that even teachers with strong content knowledge are limited when classrooms are overcrowded and poorly equipped.

Teacher experience also contributes significantly to teaching effectiveness. According to Gess-Newsome *et al.* (2019) Sustained classroom experience enhances PCK and deepens teachers' ability to respond to learners' needs. Ken (2019) asserted that experienced teachers are inclined to diagnose student difficulties and tailor explanations accordingly. Shulman (1987) provided a foundational understanding of teacher knowledge domains, arguing that productive teaching requires mastery of subject matter, pedagogy, curriculum, learner characteristics, and educational context. In Kenya, particularly in Naivasha Sub-County, academic achievement in map reading remains low despite government reforms aimed at promoting Competency-Based Curriculum (CBC) and technology integration. KNEC reports (2018–2022) show persistent underperformance in map reading. Mutebi (2019) observed that competent teachers organize learning environments effectively and employ varied instructional tools, contributing to improved performance. However, Wanjiru (2020) and Momanyi et al. (2020) cautioned that insufficient training in CBC methodologies may have hindered effective instructional delivery.

While some studies link map reading performance to teacher competence, others attribute performance challenges to inadequate teaching resources, poor teacher supervision, and limited student support (Musyoka & Mutindi, 2018; Munyari, 2022; Mensah & Frimpon, 2020). These mixed findings indicate that teacher competence interacts with contextual school factors to influence learning outcomes. Therefore, this study investigates teacher competence and instructional conditions affecting Form Three students' academic achievement in map reading in Naivasha Sub-Country.

Statement of the Problem

Teacher competence is crucial for enhancing students' academic achievement in map reading, as well as their reasoning and comprehension skills. Map-reading abilities cannot easily be learned by memorization alone but required hands-on, practical instruction. Research shows that many teachers struggle to effectively train students in map reading when relying on traditional teaching approaches. Therefore, the need for qualified teachers who can apply modern teaching strategies in supportive learning environments is essential for student progress. Map reading is a core component of Geography and is important for developing students' geographical skills for societal functioning. The Government of Kenya and school authorities have emphasized improving map reading, encouraging teachers to use appropriate teaching aids and instructional materials. Despite these efforts, students have consistently performed poorly in Map Reading in the Kenya Certificate of Secondary Education (KCSE) over the last five years. Wanjiru (2020) reports indicate that challenges persist. In Naivasha Sub-County, performance has continued to decline, with the region failing to reach a mean score of C+ or C for five consecutive years. Due to these concerns and stakeholder observations, this study seeks to investigate the influence of Geography teachers' competencies on academic achievement in map reading among Form Three students in Naivasha Sub-County, Nakuru County, Kenya.

Research Objectives

The following specific objectives guide the study:

i. To establish the types of competencies Geography teachers displayed in classrooms.

ii. To identify factors that influence students' achievement in the teaching and learning of map reading.

iii. To establish gender differences in the performance of students in Map Reading.

Research Questions

i. What competence do Geography teachers display during the teaching and learning of geography?

ii. What are the factors that influence students' academic achievement in map reading in Geography?

iii. Are there any gender differences in performance in Map Reading?

Research Hypothesis

i. There is no relationship between teacher competence and students' learning outcomes in Map Reading in Geography

ii. There is no significant difference in map-reading performance based on gender

Table 1: Acronyms/Abbreviations

ACRONYMS	**DESCRIPTIONS**
PCK	Pedagogical Content Knowledge
KCSE	Kenya Certificate of Secondary Education
CBC	Competency-Based Curriculum
TK	Teacher's Technical Knowledge
TTK	Teacher's Technological Knowledge

TPPK	Teachers' Professional Practice Knowledge
DL	Distance Learning
SPSS)	Statistical Package for Social Sciences
GenPCK)	General Pedagogical Content Knowledge

REVIEW OF RELATED LITERATURE

Pedagogical content knowledge is cardinal in the determination of student academic achievement. The PCK helps teachers to employ the appropriate teaching approaches, methods, and strategies to effectively communicate content in a specialized field to learners. The term postulates the ability to teach content proficiently within the educational process. The PCK gives a teacher the skills to best understand the challenges that students are confronted with in the learning environment because it focuses on the teacher explaining and transforming parts of subject-matter knowledge to help students learn (Kind, 2019). Kunter *et al.* (2013) argue that learning achievement could be difficult, if not impossible, to increase in the absence of teachers who are equipped with the right pedagogy, since it is the conglomeration of subject matter/ content and teaching methods (pedagogy). Additionally, Shulman (1987) argued that for effective and successful instruction, a teacher must possess seven foundational knowledge domains.

Possessing strong content knowledge and the appropriate skills, such as effective methods, strategies, techniques, and approaches, to break down complex concepts and make them easily understandable for learners is a fundamental requirement for all teachers. Iserbyt *et al.* (2017), describe PCK as an integral ingredient of the teaching profession because it helps a teacher make a choice on what and how to teach. In contrast, a study on the impact of Physics teachers' PCK and motivation on students' achievement and interest in Germany found that neither teachers' content knowledge nor their motivations predict students' achievement in Physics (Keller et al., 2017). From the literature reviewed, General Pedagogical Content Knowledge (GenPCK) is identified as a factor that influences students' performance in Science and Math education in Kenya and other parts of the globe. However, very limited studies have been conducted on the influence of teachers' competence on academic achievement in Naivasha Sub-County. The present study is necessary to investigate the influence teacher competence has on academic achievement in the research locale to gather data that will inform the education policy makers about the cause of the decline in learner performance in the study area.

Teacher's Communication Abilities and Students' Academic Achievement

Prasetio *et al.*. (2017) carried out a study on the relationship between lecturers' professional competency (which also encompasses the ability of teachers to communicate with their learners) and students' academic performance in higher education in Indonesia. The study employed a descriptive survey research design. The findings established that professional competency did not have a significant relationship with students' academic performance, though academic performance is determined by professional competency in some instances. In contrast, an investigation on teachers' communication skill and the role it plays in learners' academic advancement concluded that teachers' communication skills were associated with learners' academic achievement (Khan *et al.*. 2017). There is a high possibility for learners to perform poorly even if the teacher planned and selected necessary instructional resources for the lesson, once the teacher fails to communicate effectively and efficiently. Also, Akiri and Ugborugb (2018) investigated the influence of teachers' classroom effectiveness on academic performance in public secondary schools in Delta state Nigeria. Nine hundred seventy-nine (979) teachers drawn from seventy-two (72) out of three hundred sixty-one (361) public secondary schools in Delta state, and a descriptive Survey design was used. The results showed that a teacher who plans and communicates the planned lesson aptly produced better-performing students. Waswa (2017) examined the effect of Kenyan principals' communication abilities on their pupils' academic success. The research used a descriptive survey design and a mixed-methods methodology. According to the results, student academic performance rises when teachers and students can communicate more effectively in the classroom. Although the study revealed how communication skills are important in enhancing the achievement of students, it fails to

establish the extent to which communication skills enhance teaching and learning. Therefore, this study endeavours to establish the extent to which communication skills enhance the teaching and learning of Map Reading.

Factors Influencing Students' Academic Achievement in Map Reading

Teaching and learning are crucial to providing a state with a quality education. When teachers are competent, supported with appropriate teaching and learning materials, and provided with the ideal learning environment, student achievement may increase. When teachers are incompetent and lack the necessary instructional materials (textbooks, teaching aides) to facilitate instruction and, at the same time, make the classroom engaging for students, learning outcomes will decline.

Geography Teacher's Technological Knowledge

Teacher's Technical Knowledge (TK) refers to the proficiency of a teacher in the classroom application of technology. This implies that utilization of instructional technologies, tools, and resources in the T&L processes is the educator's method of thinking and acting. This requires knowledge of the technology and its potential workplace and ordinary life applications (Koehler et al., 2009). A skilled educator knows when technology can aid student learning and when it can serve as a distraction. In today's classroom, technology has become both an attraction and a necessity. Teacher's Technological Knowledge (TTK) concentrates on integrating technology in the classroom or working with technology, tools, and other instructional resources. It entails being knowledgeable of the technology and how it can be used for productivity at work and in everyday life (Koehler et al., 2009). The instructor should be able to determine particular technological tools that will help or hinder the achievement of an objective in the learning environment. In the classrooms of the twenty-first century, technology has become both an attraction and a necessity.

In South Africa, Nigeria, Turkey, and Singapore, technology integration in the teaching and learning process is increasing. It has been emphasized that for technology to be incorporated as a teaching-learning tool in the classroom to complement CK and PCK, teachers must be knowledgeable of the technology that is optimal for teaching content and how to teach using the technology (Marcelo & Yot-Domínguez, 2018). In South Africa, it is asserted that teachers have the full charge for incorporating technology into the classroom, as they are responsible for designing learning activities and supervising their implementation. If the selection process for these technologies lacks a thoughtful assessment of the topic curriculum, it may adversely affect learning outcomes.

A geography teacher's technological knowledge can either motivate or demotivate students' active engagement because it involves a teacher selecting and integrating meaningful technologies in lessons. Oss & Oss (2018) found that the analysis, verification, and proof of Teachers' Professional Practice Knowledge (TPPK) is likely to lead to the development of teachers' professional knowledge in their field in Brazil. They argued that since TCK is associated with professional practice, a teacher who has acquired TCK over time may be deemed to possess professional knowledge. Consequently, a teacher's technological knowledge develops through experience. According to an adage, "practice makes perfect," and "perfection makes a professional."

Gender Differences in the Performance of Students in Map Reading

Masa'Deh et al (2021) investigated the moderating influence of self-esteem on academic performance and socio-demographic characteristics of students in higher education institutions. A descriptive cross-sectional study was employed in Jordan. Students were recruited using a non-random consecutive sampling method to provide demographic data and complete the Arabic Version of the Rosenberg Self-Esteem Scale. The correlation between socio-demographic factors (gender, educational sector, and educational program) and academic performance was influenced by self-esteem. Self-esteem was identified as a significant predictor of academic performance; therefore, it should be considered by stakeholders in all educational programs. The performance of learners may fluctuate base on their self-esteem, which is regarded as their belief system in the educational process, irrespective of gender differences among students. Self-esteem is a significant factor influencing academic progression; it reflects the degree to which learners possess self-belief and perceive themselves as

respected and valued within the educational setting, irrespective of their gender. The investigation indicates a contextual disparity, as it was conducted in Jordan, whereas this study is being conducted in Kenya. Conversely, Christopher *et al* (2017) findings were accepted following an analysis of the impact of demographic variables on academic performance among primary teacher trainees: a case study of Machakos Teachers College, Kenya. The data indicate no correlation between the Kenya Certificate of Secondary Education admission grade and student performance; however, older students (30–39 years) exhibited marginally superior performance compared to middle-aged students (23–25 years) and younger pupils (19–21years). There was no statistically significant difference in the age groups.

Notably, female students outperformed male students, but there was no association between gender and student performance. The findings show that the students' performance was not significantly impacted by gender differences. It was advised that the study be expanded to include sister colleges and the subject matter be widened to confirm or deny the result. The study employed a correlational research methodology, which led to a methodological gap. Findings suggest there is no substantial disparity in the learning outcomes of male and female students after the Blended Problem-Based learning model in Indonesia and Ghana, respectively.

However, El Refae *et al*. (2021) examined the impact of demographic variables on academic performance in face-to-face versus Distance Learning (DL) modalities instituted to mitigate the transmission of COVID-19. The results indicated that students achieved superior academic performance in distance learning compared to conventional classroom environments. The number of underperforming students in in-person learning decreased by over 11% in distance learning. The demographic attributes of students significantly influenced their academic performance, accounting for at least 7.4% of the variance between in-person and online learning modalities. Likewise, examined the relationship between demographic factors and the academic achievement of young adults. The research employed a descriptive approach. The findings confirmed a considerable positive correlation between several variables, particularly the demographic variables.

Conceptual Framework

The conceptual frame explains the relationship between teacher competencies, contextual factors, and student achievement. Teacher competencies and student entry behaviour interact to influence student achievement. While teacher competencies determine the quality of instruction delivered in the classroom, student entry behaviour reflects the learners' prior knowledge, skills, and attitudes, which together shape their level of academic achievement.

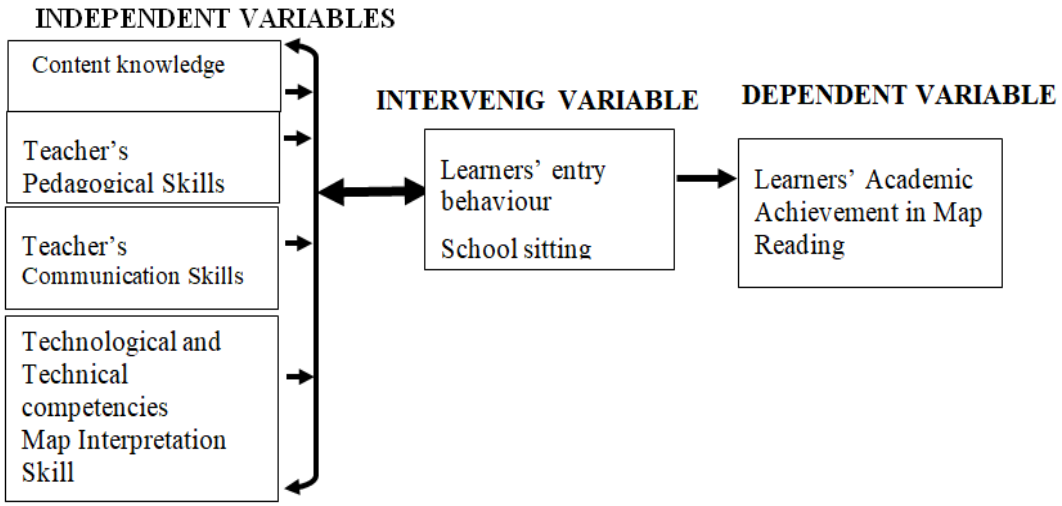

Figure 1.1: Conceptual Framework

METHODOLOGY

A descriptive survey design integrating both qualitative and quantitative methods was used. The study involved seven public secondary schools with a sample of 194 students, 14 Geography teachers, and 7 heads of subject.

Stratified sampling was used to select students, while teachers and subject heads were purposively selected. Data were collected through questionnaires, tests, interviews, and classroom observations. Data were coded, cleaned, and entered into the Statistical Package for Social Sciences (SPSS) Version 25**,** which facilitated analysis based on the study objectives. Quantitative data were analysed using descriptive statistics, while qualitative data were examined through content analysis to identify key themes. This combination allowed for a comprehensive understanding of factors influencing students' map-reading achievement. Descriptive statistics, including means, percentages, and standard deviations, were used to summarize quantitative data, with results presented in tables and charts. Qualitative data from interviews, observations, and open-ended responses were transcribed, coded, grouped into themes**,** and analysed through content analysis to explain patterns emerging from the quantitative findings.

Data Analysis

Types of Competencies Geography Teachers Display in Classrooms

Emerging trends in education reflect modern approaches that engage both teachers and students. The twenty-first-century classroom demands the integration of innovative and creative concepts into teaching and learning processes. This section presents teachers' perspectives regarding their preparedness to implement new educational trends. Table 1 summarizes teachers' responses concerning their Technological Pedagogical Content Knowledge (TPCK) competencies in implementing contemporary trends in Geography instruction.

Table 1: TPCK Skills to Implement New Trends in Education (n = 14)

Teachers' Responses	**Percentage**
Strongly Disagree	0.0%
Disagree	7.1%
Agree	42.9%
Strongly Agree	50.0%
Total	**100%**

The findings in Table 1 reveal that half (50.0%) of the teachers strongly agreed, while 42.9% agreed that they possessed the TPCK competencies necessary to implement new trends in education. Only 7.1% disagreed that they had the required technical skills. The majority, therefore, reported that they had been adequately trained and were capable of integrating emerging trends, particularly in map reading.

However, a minority of teachers indicated that they lacked sufficient TPCK training to effectively incorporate emerging trends into Geography instruction. Despite this concern, the overall findings suggest that most Geography teachers had the required TPCK skills to implement innovative teaching strategies aimed at enhancing learners' self-efficacy and interest. This may be attributed to the fact that many of them had recently completed university training where such competencies were emphasized.

These findings suggest that most teachers possessed the technical capacity to facilitate learning in line with modern educational trends. The results align with the 2018 report by the Kenya Institute of Curriculum Development (KICD), which indicated that a significant proportion of teachers were able to interpret and deliver curriculum content effectively without additional in-service training, having acquired these skills during their pre-service preparation. The findings further imply that declining performance in map reading may not be solely attributable to a lack of TPCK.

Nevertheless, interview responses from teachers and Heads of Department, as well as classroom observations, indicated that the practical integration of new technologies and teaching methods remained a challenge.

Although teachers were academically qualified under Ministry of Education (MOE) requirements, many struggled to translate TPCK knowledge into classroom practice. Observations revealed limited use of innovative strategies and insufficient efforts to make map-reading lessons interactive and learner-centred.

Table 2: Geography Teachers' Competencies (n = 14)

Competency Area	**Yes**	**No**
Methods to Retain Learners' Attention	28.6%	71.4%
Teacher Self-Efficacy/Confidence	85.7%	14.3%
Content Knowledge	85.7%	14.3%
Total	**100%**	**100%**

Table 2 shows that 85.7% of teachers demonstrated adequate subject content knowledge and reported strong self-efficacy. However, only 28.6% indicated that they effectively used pedagogical methods to retain learners' attention, while 71.4% acknowledged challenges in this area. These findings suggest that although teachers were confident and knowledgeable in their subject area, many lacked effective pedagogical strategies to sustain student engagement. This highlights the need for targeted professional development in instructional strategies. Effective teaching requires not only content mastery and confidence but also the ability to apply appropriate teaching methods that promote meaningful learning. When teachers possess strong pedagogical skills, learners are more likely to acquire practical knowledge and transferable skills beyond academic achievement.

Factors Influencing Learners' Achievement in Map Reading

The second objective of the study sought to establish factors influencing learners' achievement in map reading in physical geography in secondary schools in Naivasha Sub-County, Nakuru County, Kenya. Identifying these factors is essential for evaluating both student and teacher performance.

(i) Students' Responses on Factors Influencing Academic Achievement (n = 194)

The study explored students' perceptions of factors influencing their academic achievement in Map reading. Key areas examined included student interest in geography, availability of field trips, and the classroom learning environment.

The findings indicated that:

(i) 43.7% agreed that students show greater interest in Geography other subjects, while 30.0% disagreed.

(ii) 55.5% strongly disagreed, and 20.0% disagreed that teachers provided field trips.

(iii) 49.5% strongly agreed, and 36.8% agreed that teachers created a friendly learning environment.

The results demonstrate that although many students perceived their classrooms as friendly and supportive, the majority reported a lack of field trips. Field trips are critical instructional strategies that expose learners to real-world contexts and enable them to connect abstract concepts to practical experiences. When such experiential learning opportunities are absent, learners may struggle to internalize geographical concepts, potentially reducing motivation and interest.

While a conducive learning environment was generally reported, differing views regarding interest in Geography suggest variability in learner engagement. The 10.7% difference between students who express interest and those who do not highlights a need for deliberate strategies to strengthen students' enthusiasm and self-efficacy in the subject.

(ii) Factors Influencing Academic Achievement in Geography

Teaching methods, learning environment, and attitudes towards Geography (20.5%) emerged as the most influential factors, followed by field trips (18.4%) and teacher competence with availability of instructional materials (17.9%) (Table 3).

Table 3: Factors Influencing Learners' Academic Achievement in Geography (n = 194)

Factor	**Percentage**
Setting clear objectives and time management	11.6%
Field trips	18.4%
Teaching methods and learning environment	20.5%
Attitudes towards Geography	20.5%
Teacher competence and availability of instructional materials	17.9%
Others (motivation, communication skills, etc.)	11.1%
Total	**100%**

These findings underscore the central role of instructional practices and attitudes in shaping academic outcomes. Academic achievement improves when teachers adopt appropriate teaching strategies, create supportive learning environments, and demonstrate positive attitudes. Additionally, adequate instructional resources and experiential learning opportunities enhance learner engagement and understanding. Interview responses revealed challenges such as financial constraints, bureaucratic procedures for obtaining permission for field trips, time limitations, and classroom congestion. These barriers limit the practical implementation of experiential learning strategies. Other factors such as teacher motivation, leadership, communication skills, and exchange programs were also identified as predictors of performance. Exchange programs, in particular, were viewed as beneficial in exposing teachers and students to new teaching methods and global educational trends.

(iii) Teachers' Views on Factors Influencing Achievement in Map Reading

Teacher competence, preparedness, and ICT integration (35.7%) were identified as the most significant factors influencing performance, followed by attitudes toward mapwork (22.4%) and students' entry behaviours (20.4%) (see Table 4).

Table 4: Teachers' Views on Factors Influencing Achievement in Map Reading (n = 14)

Factor	**Percentage**
Time management	14.3%
Students' entry behaviours	20.4%
Teacher competence, preparedness, and ICT integration	35.7%
Teacher and learner attitudes towards mapwork	22.4%
Others (classroom congestion, interaction)	7.1%
Total	**100%**

Teachers highlighted that limited lesson time (40 minutes) constrained effective coverage of mapwork topics. However, beyond time allocation, effective time management and lesson planning were considered crucial. Declining mean scores in Physical Geography compared to human geography were attributed partly to negative attitudes towards mapwork and inadequate preparation. Making Geography an elective may also have reduced motivation among some learners and teachers. Classroom congestion was identified as a serious challenge, with some classes accommodating 60–70 students instead of the recommended 45. Overcrowding restricts teacher–student interaction and limits hands-on engagement essential for map reading.

Iv One-Sample T-Test Results of Learning Map Reading and Teachers' Competency

The calculated P-value (.001*)* was obtained for the One- Test Results of Learning Reading and Teachers' Competency, less the significance of threshold (α=.05) at a 95.5% confidence interval. (See Table 5)

One-Sample T- Test			
	Test Value = 0		
	T	Df	Sig. (2-tailed)
Students' Scores	29.586	193	.001
Teachers' Competency	47.695	13	.001

* **Statistically significant at p-value *(p*<0.05*)***

As shown in Table 4.15, the calculated p-value (.001) was lower than the predetermined level of significance (α = .05) at the 95% confidence level. Consequently, the null hypothesis was rejected. This outcome demonstrates the existence of a statistically significant relationship between teachers' competence and students' academic achievement in Map reading. The one-sample t-test was employed to examine within-group differences, utilizing responses obtained from the same participants. This indicates that the data comprised related sets of scores drawn from a single group, thereby enabling the assessment of the association between the measured variables.

Overall, the findings affirm that the proficiency of geography teachers is significantly related to learners' academic performance in Map reading. In essence, students' achievement in Map Reading is influenced by the level of competence exhibited by their geography teachers, underscoring the critical role of teacher expertise in enhancing academic outcomes.

Gender Differences in Performance in Map Reading (n = 14)

The study investigated whether gender influenced performance in Geography. Results indicated mixed perceptions among teachers. While some believed girls showed greater interest, others believed boys were more interested. However, overall findings suggested that gender differences did not significantly determine academic performance (see Figure 1).

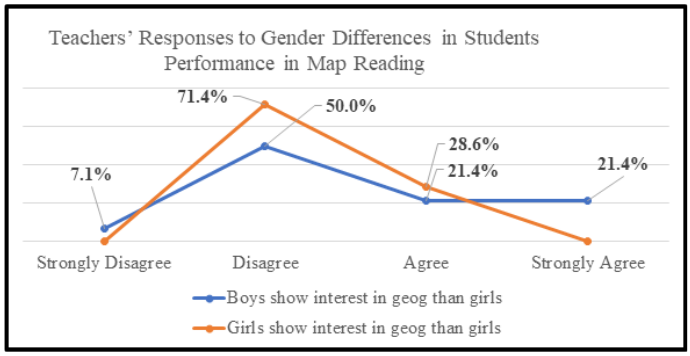

Figure 1: Gender Differences in Performance of Learners in Map Reading

Teachers' responses aligned with students' perceptions. The majority disagreed that either boys or girls demonstrated significantly greater interest in Geography. Thus, gender was not considered a determining factor in academic achievement. Instead, teachers emphasised that pedagogical preparedness, availability of instructional materials, classroom environment, and learner interest were more critical determinants of performance. Inadequate preparation and limited teaching resources may lead to unengaging lessons, thereby reducing learner motivation regardless of gender.

Table 6: Independent Samples t-Test of Map Reading Performance by Gender (N = 193)

Gender	N	Mean (M)	Std. Deviation (SD)	t-value	Df	p-value	Decision at α = .05
Boys	104	62.41	10.52				
Girls	89	63.87	9.94	-0.98	191	.329	Not Significant

Level of Significance: α = .05

Confidence Level: 95%

The results in Table 6. shows that the calculated p-value (.329) is greater than the predetermined level of significance (α = .05). Therefore, the null hypothesis is not rejected. This indicates that there is no statistically significant difference in map-reading performance between boys and girls

An independent-samples t-test was conducted to determine whether a significant difference existed in Map Reading performance between male and female students (N = 193; 104 boys and 89 girls) at α = .05 and a 95% confidence level. Although female students (M = 63.87, SD = 9.94) scored slightly higher than male students (M = 62.41, SD = 10.52), the mean difference of 1.46 points was not statistically significant, t (191) = -0.98, p = .329. Since the p-value exceeded the significance level, the null hypothesis was not rejected. The findings indicate no significant difference in map-reading performance based on gender, suggesting that pupils' map-reading ability is independent of their sex

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary of Findings

The study found the following findings.

(i) That, despite having subject matter and confidence in engaging students, teachers need more training opportunities to develop their pedagogical skills. Teachers should be well-equipped in terms of subject-matter expertise and self-efficacy (believing in one's ability to complete a task and using suitable teaching strategies) in order for instruction to be successful and for learning outcomes to improve. These abilities allow students to pick up practical information they may use daily after graduation, rather than only for academic success.

(ii) The study finds that a learning environment that is friendly and conducive to learning accepts students from diverse backgrounds. Factors such as time management, students' entry behaviours, teachers' competence, preparedness, and integration of ICT by teachers; teacher and learner attitudes towards mapwork, classroom congestion, and student-teacher interaction help learners greatly in map reading lessons.

(iii) The findings of the study show that there was a positive relationship between attitude, science, and knowledge, but it did not impact learning outcomes in terms of gender. The results indicated that teachers were of the same opinion as students that gender difference was not a factor in determining learners' performance in Geography.

Conclusions of the study

The study concludes that while most Geography teachers possessed adequate content knowledge and self-efficacy, significant gaps existed in pedagogical strategies and practical integration of innovative approaches. Learners' achievement in Map Reading was influenced more by teaching methods, attitudes, learning environment, teacher preparedness, ICT integration, and experiential learning opportunities than by gender differences. Addressing these pedagogical and structural challenges is essential for improving performance in Physical Geography.

Recommendations of the study

The study recommends continuous professional development for Map Reading teachers, including workshops, in-service training, and seminars to strengthen their content knowledge, pedagogical skills, and use of technology. Additionally, education stakeholders should support fieldwork and provide essential instructional resources such as maps, globes, and measurement tools to enhance practical learning and improve students' achievement. The study recommends exchange programmes, particularly for teachers, since they assist instructors become aware of global trends in education and gain some of the basic skills required of teachers. Classroom environment, instructional material availability, and the attitudes of students and teachers towards outdoor learning were other factors that influence academic achievement. Learning achievement was not affected by gender disparities among students. The study concluded that the recommended method for teaching map reading to partially theoretical principles, which involves exposing students to outdoor learning, would be advantageous. The research suggests that school administrators should guarantee that geography teachers receive regular seminars, workshops, and in-service map reading training. Instructional tools should be accessible to facilitate effective learning.

REFERENCE

1. Akiri, A. A., & Ugborugbo, N. M. (2018). Teachers' Effectiveness and Students' Academic Performance in Public Secondary Schools in Delta State, Nigeria. Department of Educational Administration and Policy Studies, Faculty of Education, Delta State University, Abraka, Nigeria. Semantic Scholar.
2. Balsemão Oss, D. I., & Balsemão Oss, D. I. (2018). The Relevance of Teachers' Practical Knowledge in the Development of Teacher Education Programs. Profile Issues in Teachers` Professional Development, 20(1), 167–178. https://doi.org/10.15446/PROFILE.V20N1.62327
3. Blömeke, S., Jentsch, A., Ross, N., Kaiser, G., & König, J. (2022). Opening up the black box: Teacher competence, instructional quality, and students' learning progress. Learning and Instruction, 79, 101600. https://doi.org/10.1016/J.LEARNINSTRUC.2022.101600
4. Blömeke, S., & Olsen, R. V. (2019). Consistency of results regarding teacher effects across subjects, school levels, outcomes and countries. Teaching and Teacher Education, 77, 170–182. https://doi.org/10.1016/j.tate.2018.09.018
5. Brühwiler, C. (2011). Effects of class size and adaptive teaching competency on classroom processes and academic outcome|. Academia.Edu. https://www.academia.edu/61038745/Effects of_class_size_and_adaptive_teaching_competency_on_classroom_processes_and_academic_outcome
6. Christopher, M. S., & Redempta, K. M. (2017). Influence of Demographic Factors on Academic Performance among Primary Teacher Trainees-a case Study of Machakos Teachers College. International Journal of Educational Studies, 3(1), 07–11.
7. El Refae, G. G. A., Kaba, A., & Eletter, S. (2021). The impact of demographic characteristics on academic performance: face-to-face learning versus distance learning implemented to prevent the spread of COVID-19. The International Review of Research in Open and Distributed Learning, 22(1), 91–110.
8. Fernandes, C. (2019). The Relationship Between Teacher Communication, and Teacher Credibility, Student Motivation, and Academic Achievement in India. Concordia University - Portland.
9. Gess-Newsome, J., Taylor, J. A., Carlson, J., Gardner, A. L., Wilson, C. D., & Stuhlsatz, M. A. M. (2019). Teacher pedagogical content knowledge, practice, and student achievement †. International Journal of Science Education, 41(7), 944–963. https://doi.org/10.1080/09500693.2016.1265158/SUPPL_FILE/TSED_A_1265158_SM9936.ZIP

10. Hanafi, Z., & Noor, F. (2017). Relationship between demographic factors and emerging adult's academic achievement. International journal of academic research in business and social sciences,. 6(6), 291–303.
11. Iserbyt, P., Ward, P., & Li, W. (2017). Effects of improved content knowledge on pedagogical content knowledge and student performance in physical education. Physical Education and Sport Pedagogy, 22(1), 71–88. https://doi.org/10.1080/17408989.2015.1095868
12. Kadhin, J. A. (2020). Effective Use of ICT for Learning and Teaching Geography. Aalborg Academy Journal of Human and Social Science.
13. Kaiser, G., & König, J. (2020). Analyses and validation of central assessment instruments of the research program TEDS-M. Student Learning in German Higher Education: Innovative Measurement Approaches and Research Results, 29–51. https://doi.org/10.1007/978-3-658-27886-1_3/COVER
14. Keller, M.M., Neumann, K., & Fischer, H. (2017). he Impact of Physics Teachers' Pedagogical Content Knowledge andMotivation on Students' Achivement and interest. Journal of Science Research in Science, 54(5), 586–614.
15. Ken, K. (2019). The importance of geography application.
16. Khan, A., Khan, S., Zia-Ul-Islam, S., & Khan, M. (2017). Communication Skills of a Teacher and Its Role in the Development of the Students' Academic Success. Journal of Education and Practice, 8(1), 18–21.
17. Kind, V. (2019). Development of evidence-based, student-learning-oriented rubrics for pre-service science teachers' pedagogical content knowledge. International Journal of Science Education, 41(7), 911–943. https://doi.org/10.1080/09500693.2017.1311049
18. Koehler, M., Koehler, M., & Mishra, P. (2009). What is Technological Pedagogical Content Knowledge (TPACK)? Contemporary Issues in Technology and Teacher Education, 9(1), 60–70.
19. Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013). Professional competence of teachers: Effects on instructional quality and student development. Journal of Educational Psychology, 105(3), 805–820. https://doi.org/10.1037/A0032583
20. Liu, M., Liu, S., Pan, Z., Zou, W., & Li, C. (2019). Examining Science Learning and Attitude by At-Risk Students After They Used a Multimedia-Enriched Problem-Based Learning Environment. Interdisciplinary Journal of Problem-Based Learning, 13(1), 6. https://doi.org/10.7771/1541-5015.1752
21. Malkawi, N. A. M., & Smadi, M. (2018). The Effectiveness of Using Brainstorming Strategy in the Development of Academic Achievement of Sixth Grade Students in English Grammar at Public Schools in Jordan. International Education Studies, 11(3), 92. https://doi.org/10.5539/IES.V11N3P92
22. Marcelo, C., & Yot-Domínguez, C. (2018). From chalk to keyboard in higher education classrooms: changes and coherence when integrating technological knowledge into pedagogical content knowledge. https://Doi.Org/10.1080/0309877X.2018.1429584, 43(7), 975–988. https://doi.org/10.1080/0309877X.2018.1429584
23. Masa'Deh, R., AlAzzam, M., Al-Dweik, G., Masadeh, O., Hamdan-Mansour, A. M., & Basheti, I. A. (2021). Performance and socio-demographic characteristics of students: Assessing moderation effect of self-esteem. International Journal of School & Educational Psychology, 9(4), 318–325.
24. Mensah, R. & Frimpong, A. (2020). Factors Affecting Students' Attitude towards the Learning of Social Studies in the Accra Metropolis of Ghana: A Mixed Method Analysis. Journal of Educational and Psychological Research, 3(2), 1–11.
25. Mishra, P., Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge. Teachers College Record, 108(6), 1017–1054.
26. Momanyi, J., Momanyi, J. M., & Rop, P. K. (2020). Teacher Preparedness for the Implementation of Competency-Based Curriculum in Kenya: A Survey of Early Grade Primary School Teachers in Bomet East Sub-County. The Cradle of Knowledge: African Journal of Educational and Social Science Research, 7(1), 10–15. https://serek.or.ke/conferencejournals/index.php/AJESSR/article/view/44
27. Musyoka, J. M. & Mutindi, M. J. (2018). School-based factors influencing students' performance in the Kenya Certificate of Secondary Examination in public Secondary schools in Kathiani Sub-county. http://repository.seku.ac.ke/handle/123456789/4086
28. Mutebi, A. (2019). Teachers' competencies and students' academic performance in Geography in selected private and public secondary schools in Wakiso District. http://makir.mak.ac.ug/handle/10570/7642
29. Nam, P. S., Tuong, H. A., Weinhandl, R., & Lavicza, Z. (2022). Mathematics Teachers' Professional

Competence Component Model and Practices in Teaching the Linear Functional Concept—An Experimental Study. Mathematics 2022, Vol. 10, Page 4007, 10(21), 4007. https://doi.org/10.3390/MATH10214007

30. Prasetio, A. P., Azis, E., Fadhilah, D. D., & Fauziah, A. F. (2017). Lecturers' Professional Competence and Students' Academic Performance in Indonesian Higher Education. International Journal of Human Research Studies, 7(1).
31. Sandaraj, M., & Hashim, H. (2022). Establishing the Relationship between Teacher Efficacy and Malaysian Primary Pupils' Achievement in Formative Reading Assessment. Creative Education, 13(2), 491–503. https://doi.org/10.4236/CE.2022.132029
32. Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reforms. Harvard Educational Review, 1-22. Harvard Educational Review, 57(1), 1–22. https://www.scribd.com/document/259629047/Shulman-L-S-1987-Knowledge-and-Teaching-Foundations-of-the-New-Reform-Harvard-Educational-Review-57-1-1-23
33. Sulaiman, J., & Noor Ismail, S. (2020). Teacher Competence and 21st Century Skills in Transformation Schools 2025 (TS25). Universal Journal of Educational Research, 8(8), 3536–3544. https://doi.org/10.13189/ujer.2020.080829
34. Wanjiru. (2020). School-based variables influencing students' performance in the Kenya Certificate of Secondary Education (KCSE) in public day secondary schools in Nyeri County, Kenya. Kenyatta University.
35. Waswa, N. N. (2017). Impact Of Principals' Communication Skills On Students' Academic Performance In Kenya. International Journey Od Innovative Research and Advanced Studies (IJIRAS), 4(2). www.ijiras.com