

Pedagogical Content Knowledge and Students' Academic Achievement in Kiswahili: A case of Public Secondary Schools in Murang'a and Kiambu Counties

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Abstract

Purpose: Teachers have a vital effect on students' academic attainment because they are responsible for implementing the school curriculum. The steady decline in educational performance of secondary school students has caused a lot of attention among backers in the education sector in Kenya. This study sought to investigate the influence of Teachers' Pedagogical Content Knowledge (PCK) on students' academic achievement in Kiswahili at KCSE examinations in Kiambu and Muranga counties.

Methods: A descriptive research design of survey type was used. The target population was 29,134 comprising 512 principals, 1,172 teachers, and 27,450 students across 512 secondary schools in Murang'a and Kiambu counties. Descriptive statistics such as frequencies, percentages, and standard deviation was used to analyze the data.

Results: The study established that teachers Pedagogical Content Knowledge positively influenced student academic achievement in Kiswahili at KCSE, ($M = 4.0$, $SD = 1.1$).

Implication: The findings emphasize the complexity of teachers' factors affecting students' academic achievement. Conclusively every practicing teacher should enroll in a teacher performance development program initiated by TSC to enhance and update teacher pedagogical content knowledge in teaching for an impressive students' academic achievement.

Keywords: *Academic Achievement, Teacher Characteristics, Pedagogical Content Knowledge*

1. Introduction

The level of teachers' effectiveness in transmitting skills and knowledge to the learners as measured by students' test scores during teaching-learning processes may lead to high or low students' academic gains despite the students' differences in terms of academic achievement and ability (Díez, & Iraurgi, 2020). The implication then is that when all factors are held constant, teacher effectiveness is the greatest contributor to students' learning compared to other factors such as school environment and family background.

Teacher certification is another teacher characteristic used to predict students' academic achievement. Citing the study by Toropova & Myrberg (2021) in their research on how teacher characteristics affect students' performance in science observed that teachers who are trained and licensed produced better students' mathematics results than the ones taught by untrained and unlicensed teachers. Similarly, a positive correlation index of between 0.51 – 0.71 was observed by Lee and Lee (2020) when differentiating students' results from teachers who are fully accredited and have specialized in their subject area and students' results taught by uncertified teachers. These research findings indicate the importance of teacher qualification and accreditation and the need for researchers and educators to focus more on these aspects in teacher education.

Subject matter understanding and information about teaching are other teacher characteristics that have been researched. Demchenko & Maksymchuk (2021). They state that pedagogical knowledge includes methods of teaching as well as psychological application of information about learners.

The mastery of subject matter and pedagogical knowledge are key attributes used when analyzing why some teachers are more effective than others. Acquiring good subject mastery and teaching methods and combining them well while teaching produces good students' results (Miyoba & Gondwe, 2023). On analysing research studies that correlated teachers' scores on subject matter tests with students' academic scores, Ajayi – Adenaike (2024) revealed that subject matter mastery had a stronger correlation with students' academic achievement compared to pedagogy. According to a study done in the USA, it was revealed that students' scores improved when taught by teachers with advanced stages in their subject area in science, (Podolsky & Kini, 2019).

According to Shulman, PCK is developed by use of appropriate teaching methodologies and aids. Content knowledge, information about prior knowledge of students, and teaching methods have therefore been outlined as the three elements of PCK (Gess-Newsome & Stuhlsatz, 2019).

Away from content matter mastery and pedagogic knowledge, Gess–Newsome (2019) added a third component to PCK. This is contextual knowledge which refers to understanding who, where, what to teach, what level of syllabus, and its connection to local background and national standards. According to contextual teaching and learning, students should be able to relate between what they are learning and the use of the same knowledge in real life.

Pedagogical content knowledge is seen as a new kind of knowledge developed based on subject matter mastery, pedagogical knowledge, and contextual knowledge as it can be interpreted in the transformational state. According to (Gess-Newsome, 2019) the first step would be coursework preparation, while training situation practice models and observations in everyday teaching circumstances would be the second. Jacob & Gwany (2020) further elaborate that pedagogic content understanding is applied information used by teachers to inform activities in instruction rooms.

There is an array of teacher characteristics that are linked to students' academic achievement namely; teacher personalities, certificates, experience, subject matter knowledge, pedagogical knowledge, pedagogical content knowledge (PCK), and gender. PCK is critical to effective teaching as this is the knowledge that enables the teacher to express subject matter content clearly and effectively for students to learn.

1.1 Problem Statement

The concern about the declining academic performance among secondary school students has created considerable interest among backers in the education sector in Kenya. The quality of education and students' performance depends on teachers as mirrored in their day-to-day activities and duties they discharge. Students' academic achievement has been used to define the efficiency of teaching and teachers over time. Considering the huge government investment in public education (473,705 billion on education in general and 55.4 billion on free day secondary education in particular in 2019 Kenya's budget). This budget has been observed as unproportional to education output described as quality of students' learning outcomes. Despite the increase in qualification of teachers with regards to educational attainment of students in KCSE examination results in Kiswahili to have not been encouraging as shown in Table 1.

Table 1: Kiswahili KCSE Examination Results in Kiambu and Murang'a Counties from the Year 2017 to 2019

County	Year		
	2017	2018	2019
Kiambu	3.930	4.107	4.644
Murang'a	3.334	3.567	4.795

Source MoE (2019)

Data from the Ministry of Education showed that in the period covering 2017 to 2019, the national Kiswahili KCSE performance slightly improved by 17% with an average mean score of 4.1 and 45% with an average mean score of 3.9 in Kiambu and Murang'a respectively. These overall mean scores indicate performance of 34% and 33% in Kiambu and Murang'a respectively in national exams. The statistics indicate these two counties have been performing poorly in Kiswahili at KCSE in comparison to the national performance. Ministry of Education data reveal in 2018, Murang'a County posted 13,140 (52%) of her 2018 KCSE examination candidates with the lowest mean grades. In 2019 the county posted close to 4% (3,894) of 30,840 national candidates who had attained E mean grade nationally, MOE (2019). In the year 2020, Murang'a and Kiambu posted the least mean scores of 4.3 and 4.4 respectively in comparison to neighboring counties Nyeri and Kirinyaga with mean scores of 4.62 and 4.64 respectively, MOE (2021). The findings necessitated the current research study to establish the influence of gender, age, personality, professional qualification, and Pedagogical Content Knowledge (PCK) characteristics on students' academic performance in Kiswahili in public schools in these two counties.

1.2 Research Question

What is the influence of teachers' pedagogical content knowledge on students' academic achievement in Kiswahili?

2. Literature Review

Pedagogical content knowledge refers to a superior kind of knowledge that comprises knowledge about teaching methodology and knowledge about the subject content or what to teach. It is the successful marriage between content and methodology of teaching (Howard, 2021). Pedagogical content knowledge involves a range of outlined activities including

comprehension, transformation, instruction, evaluation, reflection, and new comprehension (Howard, 2021). The leading phase of pedagogical content knowledge is understanding which entails teacher's knowledge of helping students gain literacy, enjoy learning experiences, instilling a sense of responsibility and respect for others as well as community, assist them in the investigation as well as discovery of new knowledge and developing wide comprehension of new knowledge and lastly assisting them to gain skills and attitudes that enable them to serve in a modern rational society.

Transformation as the next and second activity entails a crosscut between subject and pedagogy. It is the point where the teacher can convert content knowledge into forms that are powerful and yet adaptive to different students' abilities and backgrounds (Howard, 2021). Glathorn (1990) expresses this activity as preparation and illustration of the thoughts in the form of a new relationship of resemblance or equivalence to the original idea and also through metaphors. To respond to different students' abilities, differences in gender, language, cultural differences, what motivates each one of them, and their skills to differently to varying presentations, the teacher must consider selection of instruction, matching of students' activities and materials to reflect different students' learning styles.

Instruction entails instructional acts or important parts of teaching methods, management presentation relationships, discussions, being amusing, self-control, asking of questions, interrogation, and use of discovery instruction (Howard, 2021). The fourth activity is evaluation. Howard (2021) explains that it is significant that teachers build up a consistent way of testing and evaluating alongside teaching other than evaluating at the end of the teaching process. Evaluation activity helps to assess understanding or misunderstanding of ideas by learners and assists in analysis of own performance and hence adapting accordingly.

Jacob et al. (2020) described what entails pedagogical content knowledge. He outlined them as subject matter knowledge about students' abilities, learning strategies, different ages and growth development levels, values, motivation, and prior knowledge of students on concepts to be taught, and finally teachers' understanding of social, political, cultural, and physical setting of students' learning. The authors note as the teacher continues to teach so does, PCK continue to develop.

The PCK is superior knowledge to a teacher, and it is more than having in-depth knowledge of a subject; it accrues over time, and it implies the ability of the teacher to transform subject matter knowledge into teachable elements. According to Shing et al (2018), Teachers PCK develops when a teacher takes time to conceptualize appropriate teaching styles, student's age, gender, capabilities what they already know, and any misconceptions that they have about certain concepts and tailors the content according to students learning styles for teaching effectively (Munna & Kalam, 2021).

A study carried out in Nigeria to investigate the influence of practical learning and problem-resolving approaches on academic performance of Biology students, established higher students score in one group used as experimental compared to the other used as control on which conventional teaching method was used. The study suggested that Biology teachers should advance their knowledge in teaching strategies to enhance students' performance in Biology (Ayeni, 2022).

Pedagogical content knowledge is used by teachers to change teaching content so that it becomes adaptable in accommodating effective interaction between the instructor and the learner hence leading to improved student learning (Sharafeeva, 2022). The knowledge that enables the teacher to pass hard concepts of the subject in a very simple and understandable way is the PCK (Meier 2021). Sharafeeva (2022) stated that teachers' PCK knowledge helps

the teacher to transform their teaching methodology to meet students' different learning styles requirements. In addition to student achievement, PCK helps the teachers change their teaching styles, materials, and interventions and focus on individual students' strengths and weaknesses.

Providing a chance for principals, teachers, and students to express their perception of teachers' traits that kindle or de-motivate their learning will be a big step in the efforts towards refining teacher quality. This is the gap this study attempts to close.

3. Methodology

A descriptive design was used. This design was appropriate for the study since it allowed the researcher to gather all the required information without manipulation of study variables. The study targeted 512 principals, 1,172 Kiswahili teachers, and 27,450 Form three students in the 512 public secondary schools in Murang'a and Kiambu counties. In total 797 respondents were involved. The study used questionnaires to collect data from principals, students, and teachers. Descriptive statistics such as frequencies, percentages, and standard deviation was used to analyze the data.

4. Result and Discussion

4.1 Instruments' Return Rate

Table 1: Response Return Rate

Questionnaire Category	Distributed	Returned	Return Rate (%)
Teachers	299	299	100
Students	395	374	95.0
Principals	103	103	100
Total	797	776	97.3%

Source Author 2020

Table 1 indicates 100% return rate for principals and teachers. However, some of the questionnaires from students were not returned despite the researcher's efforts. The overall return rate-from 797 questionnaires distributed was 97.3%.

4.2 Principals and Teachers' Academic Qualification

Majority (73.8%) of teachers were found to have degrees as their highest academic level; similarly, majority (67.9%) of principals had master's degrees as their highest level of education. This shows that principals had higher academic qualifications compared to teachers. This was an indication of their efforts towards advancing the academic positions attributed to the fact that the entry point for the teaching profession is the bachelor's degree. The principals however have strived to acquire higher certification in the quest of achieving the ideals of their administrative offices. This was an indication of enhanced professional improvement as a measure of assuring optimal school administration in the requisite manner. Figure 1 shows principals' and teachers' academic qualifications.

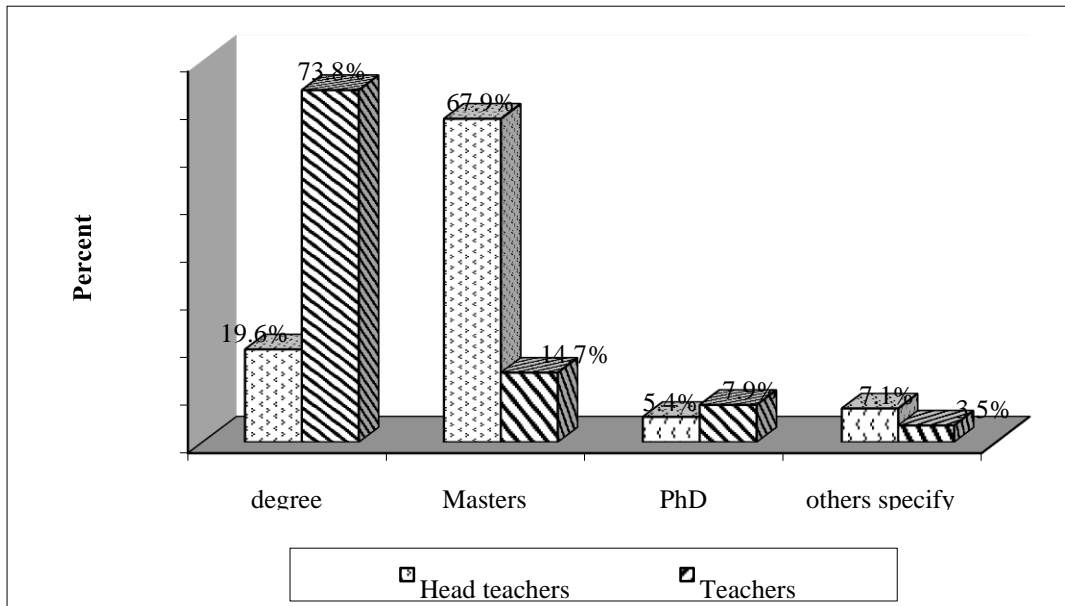


Figure 1: Principals and teachers’ highest academic qualification

Presence of PhD holders in the principals’ positions further reinforced the basis of advancement of professional qualifications by the individual principals. Others had postgraduate diploma qualifications in different areas. The fact that majority of teachers were degree holders was an indication that most of them had not strived to obtain higher academic qualifications beyond their entry-level in the teaching profession.

4.3 Teachers’ Pedagogical Content Knowledge Influence on Students’ Academic Achievement in Kiswahili

Students, teachers, and principals were asked to rate on a scale of 1 to 5 the extent to which they agreed that items on teachers’ Pedagogical Content Knowledge influence student academic performance in Kiswahili. Table 2 shows principals’ ratings on perceived influence of Pedagogical Content Knowledge on student academic achievement.

Table 2: Principals Ratings on Influence of Pedagogical Content Knowledge on Students Achievement in Kiswahili at KCSE.

Pedagogical Content Knowledge Items	Mean	S. Dev	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Use teaching aids enables the Kiswahili teachers in my school effectively impart knowledge	3.7	1.1	5(4.9%)	11(10.7%)	11(10.7%)	54(52.4%)	22(21.4%)
Teachers in school have strategic competence to the level of effectively solving all problem	4.2	0.8	2(1.9%)	4(3.9%)	2(1.9%)	56(54.4%)	39(37.9%)
Teachers in school are fluent in language thus unhindered instruction	4.4	0.6	1(1.0%)	0(0%)	2(1.9%)	55(53.4%)	45(43.7%)
Teachers in my school have a conceptual understanding of the Kiswahili	4.5	0.6	0(0%)	3(2.9%)	2(1.9%)	38(36.9%)	60(58.3%)
Teachers' ability to understand the students' knowledge is influenced by their entry behavior	4.3	0.6	0(0%)	2(1.9%)	3(2.9%)	51(49.5%)	47(45.6%)

Table 2 indicates that majority of the principals highly perceived teachers' conceptual understanding of Kiswahili as a key aspect of Pedagogical Content Knowledge which influences students' achievement in Kiswahili, ($M = 4.5$, $SD = 0.6$) while least perceived use of appropriate teaching aids enables Kiswahili teachers to effectively impart knowledge which influence students' Kiswahili academic achievement at KCSE, ($M = 3.7$, $SD = 1.1$). These findings agree with a study done by Hussein & Csikos (2023). Erbil-Iraq investigated the effects of teaching using conceptual understanding as opposed to procedural knowledge on students' achievement in, regard to anxiety about, and attitude toward mathematics. The study established improvement in mathematics achievement in the experiment group in comparison to a control group. The Attitude of students toward mathematics in treatment group improved progressively.

Table 3: Teachers Ratings on Influence of Teachers Pedagogical Content Knowledge on Students' Academic Achievement in Kiswahili at KCSE

Pedagogical Content Knowledge Items	Mean	S. Dev	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Use of appropriate teaching aids enables the Kiswahili teachers in our school	3.7	1.1	17(5.7%)	39(13.0%)	23(7.7%)	153(51.2%)	67(22.4%)
Teachers have strategic competence to the level of effectively solving all student problems	3.7	1.3	36(12.0%)	34(11.4%)	15(5.0%)	124(41.5%)	90(30.1%)
Teachers in school are fluent in language thus unhindered instruction	4.1	1.2	21(7.0%)	21(7.0%)	12(4.0%)	106(35.5%)	139(46.5%)
Teachers in my school have a conceptual understanding of the Kiswahili	4.1	1.2	21(7.0%)	19(6.4%)	16(5.4%)	105(35.1%)	138(46.2%)
Teachers' ability to understand the students' knowledge is influenced by their entry behavior	3.9	1.0	10(3.3%)	27(9.0%)	13(4.4%)	175(58.5%)	74(24.8%)

Table 3 indicated majority of teachers highly perceived teachers conceptual understanding of the Kiswahili and fluency in the language as key aspects that influence students' academic achievement in Kiswahili at KCSE ($M = 4.1$, $SD = 1.2$). Teachers least perceived teachers who had strategic competence to the level of effectively solving all student problems as Pedagogical Content Knowledge aspect which influenced students' academic achievement in Kiswahili at KCSE, ($M = 3.7$, $SD = 1.3$). These findings agree with those of Bella and Moluayonge (2020) who established: a significant relationship between teachers' ability to write English and students' academic achievement in HTTTC Kumba.

Table 4: Students' Ratings on Influence of Teachers' Pedagogical Content Knowledge Influence on their Achievement in Kiswahili at KCSE

Pedagogical Content Knowledge Items	Mean	S. Dev	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
Teachers have strategic competence to the level of effectively solving all student problems	4.0	1.1	12(3.5%)	43(11.5%)	21(5.6%)	141(37.7%)	156(42.7%)
Kiswahili teachers enable students to understand importance of Kiswahili as a subject	3.4	1.5	56(15.0%)	81(21.7%)	8(2.1%)	116(31.0%)	113(30.2%)
Kiswahili teachers in our school use appropriate teaching aids to effectively impart knowledge to the learners	2.8	1.5	102(27.3%)	113(30.2%)	6(1.6%)	82(21.9%)	71(19.0%)
Kiswahili teachers use technology like projectors for set books for content delivery	3.8	1.5	59(15.8%)	41(11%)	0(0%)	103(27.5%)	171(45.7%)

Table 4 indicates majority of students identified teachers' Pedagogical Content Knowledge having strategic competence to the level of effectively solving all student problems ($M = 4.0$, $SD = 1.1$) while least perceived was teachers' use of appropriate teaching aids to effectively impart knowledge to the learners as aspects which influence their academic achievement in Kiswahili at KCSE, ($M = 2.8$, $SD = 1.5$). This finding concurs with those of Ayeni, (2022) who studied the effects of experiential and problem-solving Strategies on academic performance. The researcher used two groups of students. One group was taught using practical learning and problem-solving strategies while the control group was taught using a traditional method. The findings showed higher performance in the treatment group than in the control group. The current study therefore recommends seminars and workshops for Kiswahili teachers where they can be in-serviced on experiential and problem-solving strategies and teaching methods as an element of pedagogical content knowledge and hence lead to improved student academics.

4.4 Overall Ratings of Pedagogical Content Knowledge Influence on Students' Academic Achievement in Kiswahili

The overall mean from all the items that measured Pedagogical Content Knowledge among principals, students, and teachers was computed on perceived influence of teachers' PCK on student achievement. Table 5 shows the means and standard deviations obtained by principals, teachers, and students across various items on Pedagogical Content Knowledge.

Table 5: Pedagogical Content Knowledge Influence on Students' Academic Achievement in Kiswahili KCSE Examination

Study Sample	No. of Respondents	Pedagogical Content Knowledge	
		Mean	S. Dev
Principals	103	4.3	0.7
Teachers	299	3.9	1.0
Students	374	4.0	1.2

As shown in Table 5, principals had the highest mean score ($M=4.3$, $SD=0.7$), followed by students ($M=4.0$, $SD=1.2$), and then finally the teachers ($M=3.9$, $SD=1.0$). Table 6 shows the ANOVA test on mean score comparison on the perceived Pedagogical Content Knowledge influence among principals, teachers, and students.

Table 6: ANOVA results for Pedagogical Content Knowledge influence on students Achievement in Kiswahili

Sum of Squares	Sum of Squares	df	Mean Square	F	Sig.
Between	10.7812	2	5.3906129	4.57	0.010
Within	912.2087	773	1.1800889		
Total	922.989	775			

Table 6 indicates that the perceived influence of Pedagogical Content Knowledge differed significantly among principals, teachers, and students as indicated by $F(2, 773) = 4.57$, $p = .010$ as an aspect that influences students' academic achievement in Kiswahili at KCSE. Bonferroni Scheffe post hoc analysis established that the perception between teachers and principals differed with only $p = 0.011$. These findings are incongruent with those of Mailizar & Fan (2020) who established that a teacher's pedagogical content knowledge serves as a sole influencer of performance.

Majority of the principals agreed that teachers in their schools had a conceptual understanding of the Kiswahili subject to enhance student performance in Kiswahili at KCSE. However, principals indicated use of appropriate teaching aids to enable the Kiswahili teachers to effectively impart knowledge to the learners as the least aspect which influences students' achievement. On the other hand, teachers indicated teachers' fluency in language and conceptual understanding of Kiswahili as a key element that influences students' academic performance in Kiswahili at KCSE. Majority of the students agreed that teacher's strategic competence to effectively solve all students' problems is the key Pedagogical Content Knowledge aspect which influences their performance in Kiswahili at KCSE. However, students' perception agreed with that principals that the use of appropriate teaching aids to enable the Kiswahili teachers to effectively impart knowledge to the learners is least aspects that influence their achievement in Kiswahili at KCSE. ANOVA test results showed that the perceived agreement on influence of Pedagogical Knowledge Content did differ significantly among teachers, students, and principals.

5. Conclusion

The study confirmed Teachers' Pedagogical Content Knowledge in particular the ability of the teacher to solve students' academic problems as a fundamental attribute that influences students' academic achievement positively.

6. Recommendations

The Quality assurance department under the Ministry of Education may organize subject-based seminars, workshops, and capacity-building programs to upgrade teachers' pedagogical content knowledge in particular- teaching strategies focusing on students' problem-solving skills.

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