

Influence of Teachers' Professional Knowledge and Practice on Efficiency in Public Senior Schools in Nyeri County, Kenya

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Abstract

This study examined the influence of Teachers' Professional Knowledge and Practice on efficiency in Public Senior Schools in Nyeri County, Kenya. The study adopted a descriptive cross-sectional research design. The target population comprised 220 public senior schools, with 3,650 teachers. The study further selected 79 teachers using simple random sampling after proportionately stratifying schools by boys', girls', and mixed schools across the eight sub-counties. Teachers collected data using self-administered questionnaires. The study also obtained secondary data on KCSE performance for 2016–2025 to assess efficiency in terms of students' academic performance. A pilot study was conducted in three Public Senior Schools in Kirinyaga County. Content and criterion validity were assessed, while reliability was established using Cronbach's alpha. Quantitative data were analyzed using SPSS Version 27 through frequencies, percentages, and means, while Pearson's correlation was used to examine the relationship between Teachers' Professional Knowledge and Practice and Efficiency. Results were presented using tables. Teachers' Professional knowledge and Practice were found to positively influence the efficiency of Public Senior Schools in Nyeri County. Teachers indicated that enhancing professional knowledge through ongoing professional development, better academic qualifications, and peer review helped them improve their efficiency in delivering lessons. Although respondents did not seem comfortable using pedagogical tests to evaluate teacher knowledge, they agreed that professional competency played an important role in improving school efficiency. Correlation analysis indicated a positive and significant association between Teachers' Professional Knowledge and Practice and Efficiency. The study concluded that Teachers' Professional Knowledge and Practice had a significant positive influence on Efficiency in Public Senior Schools in Nyeri County. Continuous improvement in teaching subject proficiency, academic qualifications, professional programs, and peer learning enhanced quality education, lesson planning, classroom management, and learners' academic achievement. The study recommended that TSC provide regular subject-related training, workshops, and mentorship; principals encourage further qualifications and peer learning; and the Ministry of Education provide adequate funding for teacher professional development.

Keywords: *Teacher, Professional Knowledge, Practice, Efficiency, Public Senior Secondary Schools, Nyeri County, Kenya.*

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1. Introduction

Quality education is central to SDG 4, which seeks to equip learners with basic skills such as literacy, communication, and numeracy (UNESCO, 2024a). Teachers are the key actors in this learning process because they impart knowledge, support learners' critical thinking, deliver the curriculum, plan lessons, apply teaching methods, manage classrooms, conduct assessments, and provide feedback (Ajani, 2024). Teacher efficiency refers to the ability to use available learning and teaching resources to help learners attain educational objectives and can be reflected through student test scores, classroom attendance, feedback integration, and innovation (Puspita et al., 2024; UNESCO, 2024b).

Globally, challenges in Teachers' Professional Knowledge and Practice have affected Efficiency. In the United States, inadequate appraisal and monitoring of teachers' conduct and professionalism have been associated with poor instructional practices and an inability to address learners' intellectual needs (Munna & Kalam, 2021). In the United Kingdom, heavy workloads and ineffective classroom management have limited professional development opportunities, negatively affecting teacher efficiency (Ventista & Brown, 2023). In China, particularly in rural areas, insufficient institutional support and limited access to professional development and feedback have contributed to stagnation in teachers' professional knowledge and practice, reducing effectiveness and student learning outcomes (Shi, 2024).

Regionally, South African teachers have experienced a disconnect with learners due to poor engagement structures and unsuitable performance appraisal criteria (Marga et al., 2023). In Nigeria, limited access to technology has constrained teachers' ability to demonstrate current professional knowledge and practices required for efficiency (Ogwu et al., 2023).

Locally, lack of feedback from performance appraisers has negatively affected teachers' efficiency in executing their responsibilities (Macharia, 2024), while failure to align the curriculum with learners' needs has resulted in poor classroom management and increased dropout rates (Suter et al., 2022). In Kenya, TSC has implemented TPAD since 2016 to assess and monitor teacher performance and address professional knowledge and practice, among other areas (TSC, 2020, 2024). Performance appraisal has been found to positively influence teachers' efficiency by enabling supervisors to identify teachers' strengths and weaknesses (Njuguna & Kisilu, 2023). However, inadequate teaching resources, limited technology support, and high workloads remain challenges in Nyeri County, constraining teachers' ability to deliver quality teaching and apply innovative teaching methods (Mburu et al., 2021; Mwangi, 2022). Therefore, the study examined the influence of Teachers' Professional Knowledge and Practice on efficiency in Public Senior Schools in Nyeri County, Kenya.

1.1 Problem Statement

Teachers' contribution through effective teaching practices is critical to improving the quality of education in Kenya (Ventista & Brown, 2023). However, limited teacher proficiency and professionalism have affected innovativeness in using institutional resources and teachers' efficiency in Public Senior Schools in Nyeri County (Kariuki et al., 2024; Wanyonyi & Mwaniki, 2023). Inadequate supervision, limited principal-teacher interactions, poor evaluation methods, and insufficient class visits may further constrain Teachers' Professional Knowledge and Practice. Although teachers are expected to undergo regular appraisal and professional development to strengthen their knowledge and skills (Anane & Kuranchie, 2022; Teachers Service Commission, 2020), declining student outcomes in local and national

examinations continue to raise concerns about teachers' efficiency (KNEC, 2024; Wanjiku et al., 2024).

Globally, Paktar (2023) and Sangeeta (2024) examined teachers' conduct and professional development in India but did not adequately address leadership, government support, and teachers' communication skills. Regionally, Nkepah and Njang (2024) focused on teachers' qualifications and Mathematics training in Cameroon, while Thelma and Phiri (2024) examined school management and student discipline in Lusaka, leaving gaps regarding classroom practice and administrative support to teachers. Locally, John and Kirwok (2023) focused on teachers' time management, while Kaluku (2024) examined head teachers' administrative practices and student discipline. Therefore, few studies have specifically examined the influence of Teachers' Professional Knowledge and Practice on Efficiency, creating a gap the current study addresses.

1.2 Purpose of the Study

To examine the influence of Teachers' Professional Knowledge and Practice on Efficiency in Public Senior Schools in Nyeri County, Kenya.

1.3 Research Hypothesis

H₀1: Teachers' Professional Knowledge and Practice had no statistically significant influence on the Efficiency in Public Senior Schools in Nyeri County, Kenya.

2. Literature Review

2.1 Theoretical Review

Pedagogical Content Knowledge Theory (PCK), developed by Shulman (1986), informs professional knowledge and practice in teaching and teachers' professional development. The theory states that teachers need a deep understanding of a subject and the ability to combine this knowledge with the curriculum to teach effectively (Sangeeta, 2024). It emphasizes subject-matter mastery, appropriate teaching strategies, fluent communication, listening skills, and consistent interaction with students (Ajani, 2024; OECD, 2021; Anyanga & Kwaba, 2024). The theory also supports innovative teaching methods, practical learning, digital interactions, and personalized learning to enhance students' understanding and critical thinking (Bouranta & Psoma, 2023; Nzayisenga et al., 2023; Waiti et al., 2023). However, Shing et al. (2015) criticized PCK for not addressing implicit knowledge and experience, particularly aspects related to teachers' conduct and professionalism.

2.2 Empirical Review

Sangeeta (2024) examined how teachers' professional development influenced secondary-level student learning in India. Teachers' professional development entails a regular process of reflecting, learning, and acquiring the knowledge and skills that lead to improved practices that positively impact students' learning. Notably, the study revealed that when professional development of teachers was done effectively, the teachers were equipped not only to have an academic impact on the students, but also to support social development. Additionally, professional development programs equipped teachers not only with innovative teaching ideas but also with current knowledge and stronger classroom management skills. Nevertheless, Sangeeta (2024) did not show the impact of communication skills among qualified teachers, how they affected their ability to convey concepts effectively, or possible solutions to the problem. This study addressed how teacher professionalism enhanced concept delivery, bridging the gap on communication skills' impact.

Amie-Ogan and Etuk (2024) explored how secondary school students in Akwa Ibom State’s local governments performed academically in relation to their teachers' competency. The study adopted a descriptive survey design. The study used a self-developed questionnaire to collect data from nineteen secondary schools. Further, the study sampled one hundred and fifty-four male students and one hundred and sixty-nine female students from the three hundred and twenty-three population. The study found that teachers' content knowledge, teaching methods, and skills significantly affected students’ performance. However, Amie-Ogan and Etuk (2024) did not show how other factors, such as the availability of teaching resources, influenced teachers' ability to engage with students. This study explored how a comprehensive learning environment, including resource availability, influences teacher-student engagement and efficiency.

Anyanga and Kwaba (2024) examined how teachers' professional training and development influenced the performance of public secondary schools in Ndhiwa Sub-county, Kenya. The target population comprised fifteen schools, with one hundred and thirteen teachers and five hundred and twenty-two students as respondents. The study used semi-structured questionnaires to collect quantitative data. The study found that teachers’ professional training significantly affected students' academic performance in Ndhiwa sub-county secondary schools. Moreover, the review revealed that teachers who had undergone professional development demonstrated better classroom management strategies and better assessment methods. However, Anyanga and Kwaba (2024) did not show how a focus on theoretical knowledge during training limited efficiency. This study examined how integrating professional practice with training enhances teacher efficiency beyond theoretical knowledge.

3. Methodology

The study adopted a descriptive cross-sectional research design. The target population comprised 220 public senior schools, with 3,650 teachers. Further, 79 teachers were selected using simple random sampling after proportionately stratifying schools by boys’, girls’, and mixed schools across the eight sub-counties. Data were collected from teachers using self-administered questionnaires; secondary data on KCSE performance for 2016–2025 were also obtained to assess efficiency in terms of students’ academic performance. A pilot study was conducted in three public senior schools in Kirinyaga County. Content and criterion validity were assessed, while reliability was established using Cronbach’s Alpha. Quantitative data were analyzed using SPSS Version 27 through frequencies, percentages, and means, while Pearson’s correlation was used to examine the relationship between teachers’ professional knowledge and practice and efficiency. Results were presented using tables.

4. Results and Discussion

4.1 Response Rate

The study sampled 79 teachers and administered questionnaires. Table 1 presents the response rate results.

Table 1: Response Rate

Respondents	Sampled	Response	Percentage
Teachers	79	66	84%

As shown in Table 1, 66 of 79 teachers returned the completed questionnaires, for a response rate of 84%. According to Mugenda and Mugenda (2003), a 70% response rate was desired in social science studies, since it signifies the absence of non-response bias. High response rates imply that the opinions gathered were sufficient.

4.2 Reliability Results

A pilot study was conducted in Kirinyaga County, where 3 Public Senior Schools were sampled using simple random sampling. Table 2 presents the results.

Table 2: Reliability Results

Instrument	Cronbach's Alpha
Teachers' Professional Knowledge and Practice	0.851
Efficiency	0.837
Average	0.844

Table 2 shows a Cronbach's Alpha of 0.851 for Teachers' Professional Knowledge and Practice and 0.837 for Efficiency. The average Cronbach's Alpha coefficient was 0.844. Because both coefficients and the average exceeded the commonly accepted threshold of 0.70, the instruments had satisfactory internal consistency and were therefore reliable for the study.

4.3 Descriptive Results of Efficiency of Teachers

The study's dependent variable was efficiency, measured by students' test scores, classroom attendance, feedback integration, innovation, and resource utilization. The tables used an ordinal Likert Scale where SD=Strongly Disagree, D=Disagree, N=Neutral, A=Agree, and SA=Strongly Agree. Table 3 presents the descriptive results.

Table 3: Descriptive Statistics of Teachers' Efficiency

Statements N=66	SD	D	N	A	SA	Mean	Std Dev
Academic excellence is tracked through national exam results	1(1.5%)	3(4.5%)	6(9.1%)	33(50.0%)	23(34.8%)	4.12	0.869
Professional knowledge improves school efficiency	0(0%)	6(9.1%)	4(6.1%)	24(36.4%)	32(48.5%)	4.24	0.929
Teacher professionalism improves school efficiency	3(4.5%)	10(15.2%)	22(33.3%)	18(27.3%)	13(19.7%)	3.42	1.110
Teacher development enhances school efficiency	12(18.2%)	11(16.7%)	14(21.2%)	17(25.8%)	12(18.2%)	3.09	1.378

A supportive learning environment improves school efficiency	2(3.0%)	3(4.5%)	0(0%)	28(42.4%)	33(50.0%)	4.32	0.931
Quality teaching has increased student attendance	2(3.0%)	2(3.0%)	50(75.8%)	8(12.1%)	4(6.1%)	3.15	0.707
Teachers use student feedback to improve teaching	28(42.4%)	20(30.3%)	9(13.6%)	6(9.1%)	3(4.5%)	2.03	1.163
Teachers apply innovative teaching methods	0(0%)	7(10.6%)	8(12.1%)	18(27.3%)	33(50.0%)	4.17	1.017

From the above results as presented in Table 3, it was realized that 33(50.0%) and 28(42.4%) of respondents agreed, with a mean of 4.32 and a standard deviation (Std Dev) of 0.931, that a supportive learning environment improved school efficiency. In addition, the results showed that 32 (48.5%) and 24 (36.4%) strongly agreed and agreed, respectively, that professional knowledge improved school efficiency, with a mean of 4.24 and a standard deviation (Std Dev) of 0.929. Furthermore, it is indicated that 33(50.0%) and 18(27.3%) agreed and strongly agreed, respectively, with a mean of 4.17 and a standard deviation of 1.017 that the teachers applied innovative teaching methods

It can also be seen that 22 (33.3%) respondents were neutral, 18 (27.3%) agreed, and 13 (19.7%) strongly agreed that teacher professionalism improved school efficiency, with a mean of 3.42 and a standard deviation of 1.110. In addition, 50 (75.8%) were neutral, 8 (12.1%) agreed, and 4 (6.1%) strongly agreed that quality teaching increased student attendance, with a mean of 3.15 and a standard deviation of 0.707. Also, 17(25.8%) agreed, and 12(18.2%) strongly agreed, with a mean of 3.09 and a standard deviation of 1.378, that teacher development enhanced school efficiency. Nevertheless, most respondents, 28 (42.4%), strongly disagreed, while 20 (30.3%) disagreed, with a mean of 2.03 and a standard deviation of 1.163, that teachers use student feedback to improve teaching.

Considering the results presented in the previous two paragraphs, school efficiency was mostly determined by a good learning environment, professional knowledge of the teachers, and innovative teaching techniques, as indicated by the highest mean scores. The results indicated that respondents viewed effective teaching strategies and favorable learning environments as factors contributing to school efficiency. These results aligned with those of Dacholfany et al. (2024), who found that developing teachers' competence improves the quality of education. In contrast, teacher development, higher student attendance, and the use of student feedback were rated low, suggesting these measures were not fully embraced in Public Senior Schools in Nyeri County, Kenya. The results also align with Razak et al. (2023), which found that innovation in teaching approaches increases instructional effectiveness.

Table 4 presents the overall K.C.S.E mean scores, completion rate, and dropout rates for 2016 to 2025.

Table 4: Secondary Data Results

Efficiency Metrics	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
K.C.S.E mean scores	3.68	3.51	3.93	3.766	3.61	3.329	3.29	3.381	4.479	4.507
Completion rate	91.2	91.8	92.5	93.1	92.7	93.8	94.6	95.3	96.1	97.5
Dropout rates	8.8	8.2	7.5	6.9	7.3	6.2	5.4	4.7	3.9	3.3

The mean KCSE score varied over the period, starting at 3.68 in 2016, dropping to 3.51 in 2017, then rising to 3.93 in 2018. Afterward, it remained relatively stable, with values ranging from 3.29 to 3.77 in 2019 and 2023. However, it rose sharply in 2024 to 4.479 and in 2025 to 4.507. During the same period, the completion rate rose steadily from 91.2% in 2016 to 97.5% in 2025, showing that more students completed their studies. At the same time, the dropout rate declined from 8.8% in 2016 to 3.3% in 2025. These trends indicated a gradual improvement in the efficiency of Public Senior Schools, with higher completion rates, lower dropout rates, and improved academic performance in the KCSE examination.

Past studies like Ndayi et al. (2024) indicated that school facilities, learner motivation, counseling, and the relationship between teachers and students improve learner completion in public schools. This evidence supports the increase in the completion rate from 91.2 percent in 2016 to 97.5 percent in 2025 and the decrease in dropout rates from 8.8 percent to 3.3 percent, suggesting better conditions for students staying in school. Moreover, Imbovah et al. (2018) concluded that teaching and learning resources contributed to improved completion rates. According to Nyagah and Irungu (2013), school facilities and teaching resources affected KCSE results, whereas Nyakundi, Sankale and Omuchesi (2025) indicated that good school leadership led to improved KCSE results.

4.4 Descriptive Statistics of Teachers’ Professional Knowledge and Practice

The study examined the influence of Teachers’ Professional Knowledge and Practice on Efficiency in Public Senior Schools in Nyeri County, Kenya. The indicators measured were: mastery of subject content, classroom observation, peer review, and pedagogical knowledge tests. Table 5 provides the results.

Table 5: Descriptive Statistics of Teachers’ Professional Knowledge and Practice

Statements N=66	SD	D	N	A	SA	Mean	Std Dev
The school supports teachers in attending programs to improve subject mastery	7(10.6%)	2(3.0%)	14(21.2%)	21(31.8%)	22(33.3%)	3.74	1.256
Teachers are encouraged to observe and identify areas students struggle with	2(3.0%)	3(4.5%)	51(77.3%)	8(12.1%)	2(3.0%)	3.08	0.640
Teachers welcome peer reviews and constructive feedback	10(15.2%)	7(10.6%)	13(19.7%)	26(39.4%)	10(15.2%)	3.29	1.286
Pedagogical tests assess teachers’ understanding	25(37.9%)	18(27.3%)	6(9.1%)	7(10.6%)	10(15.2%)	2.38	1.465
Teacher’s value was advanced by their academic qualifications	0(0%)	7(10.6%)	8(12.1%)	18(27.3%)	33(50.0%)	4.17	1.017
Professional knowledge and practice improve efficiency	2(3.0%)	1(1.5%)	0(0%)	26(39.4%)	37(56.1%)	4.44	0.844

Based on Table 5, 37 (56.1%) respondents strongly agreed and 26 (39.4%) agreed that teachers' professional knowledge and practice improved efficiency, with a mean of 4.44 and a standard deviation (Std Dev) of 0.844. Also, 33(50.0%) strongly agreed, and 18(27.3%) agreed, with a mean of 4.17 and a Std Dev of 1.017, that teachers’ value was advanced due to their academic qualifications. Additionally, 22(33.3%) strongly agreed, and 21(31.8%) agreed, with a mean of 3.74 and a Std Dev of 1.256, that the school supported teachers in attending programs to improve subject mastery.

The findings also showed that 26 (39.4%) participants agreed and 10 (15.2%) strongly agreed (M = 3.29, SD = 1.286) that teachers welcomed peer reviews and constructive feedback. Moreover, 51 (77.3%) were neutral, 8 (12.1%) agreed, and 2 (3.0%) strongly agreed (M = 3.08, SD = 0.640) that teachers were encouraged to observe and identify areas where students struggle. However, most of the respondents, 25(37.9%), strongly disagreed, and 18(27.3%) disagreed, with a mean of 2.38 and a standard deviation of 1.465, that the pedagogical tests assessed teachers’ understanding.

According to the results, teachers enhanced professional knowledge and skills, career growth, and opportunities to develop their competence as the major factors contributing to the effectiveness of schooling. The results matched Ajani's (2024) claims that teachers' professional knowledge is an integral part of teaching. Mohamed et al. (2024) found that

professional development increased instructional effectiveness. Peer review and feedback were considered partially acceptable, as teachers cooperated in learning from one another but could have developed this further. In contrast, teachers rated pedagogical tests as the least effective method, indicating they did not see them as a useful tool for evaluating teachers' knowledge. Similarly, Mafa-Theledi (2024) found that strong pedagogical and subject content knowledge were very important for effective teaching and a better learning experience in public senior secondary schools.

4.5 Correlation Results of Teachers’ Professional Knowledge and Practice

The study used Pearson’s correlation analysis to test the null hypothesis that Teachers’ Professional Knowledge and Practice had no influence on efficiency in public senior secondary schools in Nyeri County, Kenya. Table 6 provides the results:

Table 6: Correlation Results of Teachers’ Professional Knowledge and Practice

		Professional Knowledge and Practice	Efficiency
Pearson	Professional Knowledge and Practice	1	.464**
	Pearson Correlation		
	Sig. (2-tailed)		.001
	N	66	66
	Efficiency	.464**	1
	Pearson Correlation		
	Sig. (2-tailed)	.001	
	N	66	66

**Correlation is significant at the 0.01 level (2-tailed)

Table 6 indicates that Teachers’ Professional Knowledge and Practice had a moderate positive and statistically significant influence on the Efficiency of public senior schools ($r = 0.464$, $p = 0.001$). Therefore, the schools whose teachers had higher professional knowledge were more efficient. The results were statistically significant because the p-value was less than 0.05; thus, the hypothesis H01, that Teachers’ Professional Knowledge and Practice did not have any statistically significant influence on the Efficiency of Public Senior Schools in Nyeri County, Kenya, was rejected. The results aligned with Amie-Ogan and Etuk (2024), who noted that teachers’ competence contributed to enhanced learner performance. Moreover, Dacholfany et al. (2024) noted that teaching quality improved learning.

4.6 Summary

Teachers’ Professional Knowledge and Practice was found to positively influence the efficiency of Public Senior Schools in Nyeri County. Teachers indicated that enhancing professional knowledge through continuous professional development, better academic qualifications, and peer review helped them improve their efficiency in delivering lessons. Although respondents did not seem comfortable using pedagogical tests to evaluate teachers' knowledge, they agreed that professional competency played an important role in improving school efficiency. Correlation analysis indicated a positive and significant association between professional knowledge and practice and efficiency.

5. Conclusion

The study revealed a significant positive influence of Teachers' Professional Knowledge and Practice on Efficiency in Public Senior Schools in Nyeri County. This was because teachers continued to develop their proficiency in the subjects they taught, increased their academic qualifications, enrolled in professional programs, and adopted peer learning; as a result, they could offer quality education and improve school performance. It was also evident that increasing the professional competencies of teachers led to efficient lesson planning, classroom management, and academic achievement of the learners.

6. Recommendations

Continuous professional development for teachers in public senior schools in Nyeri County could be enhanced through frequent subject-related training and workshops, as well as mentorship programs, by the Teachers Service Commission (TSC). Principals should also motivate teachers to pursue further qualifications and engage in peer learning to improve instructional competence. Moreover, the Ministry of Education needs to provide enough funding for professional development within schools.

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