



PRINCIPALS' INSTRUCTIONAL LEADERSHIP ROLE AND LESSON STUDY PROGRAM IMPLEMENTATION IN PUBLIC SECONDARY SCHOOLS IN KAJIADO COUNTY, KENYA

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Abstract:

The study investigated principals' instructional leadership role and lesson study program implementation in public secondary schools in Kajiado County. The objectives were to find out the role the principals played in supervising the implementation of the lesson study program and to find out the role the principals played in promoting collaborative practices when implementing the lesson study program. The study was anchored on Carrier's instructional leadership model and Vygotsky's social-cultural theory. A mixed-methods research approach was used with a convergent parallel mixed-methods design. The study's target population consisted of 95 public secondary schools, 95 principals, and 651 mathematics and science teachers from Kajiado County, with a sample size of 29 principals and 248 mathematics and science teachers. This was achieved using probability and non-probability sampling techniques, which included purposeful, proportionate, and simple random sampling. The collection of data was done using an interview guide for principals and a questionnaire for teachers. A pilot study was conducted in two schools that had characteristics similar to those of the schools that were involved in the study. The research instruments were validated by experts with knowledge of instructional leadership from Tangaza University College and the Catholic University of Eastern Africa. The analysis of quantitative data was done using descriptive statistics, which included frequency distributions and percentages, and were generated

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using Statistical Package for Social Sciences (SPSS) version 25. The data was presented in the form of bar graphs, pie charts, and frequency tables. Qualitative data was analyzed using a thematic approach and presented using narratives and direct quotes. The findings revealed that secondary school principals carried out supervision throughout the process of lesson study by attending lesson study meetings, observing lessons, and giving feedback. They also discuss challenges encountered by teachers during lesson study implementation, such as limited time, lack of funds, heavy workload, and competing programs. School principals were also found to be supportive in terms of collaborations such as teamwork, peer lesson observation, and team teaching. However, the study found some challenges that face such collaborations which include a lack of clear understanding of lesson study by newly employed teachers as well as uncooperative teachers, especially those with many years of experience. The study concluded that despite the challenges facing lesson study implementation, public secondary school principals in Kajiado County make an effort to supervise lesson study implementation. The study also concluded that secondary school principals promote collaborative practices that support the implementation of lesson study programs. The study recommends that Center for Mathematics Science and Technology Education in Africa (CEMASTE) organizes training on lesson study for mathematics and science teachers with a teaching experience of less than five years as well as sensitization workshops on lesson study for secondary school principals who are newly employed. Also, the study recommends that the Ministry of Education (MOE) develops a clear policy for lesson study implementation. The study suggests that further research be conducted to investigate lesson study program and students' academic achievement.

Keywords: principal, instructional, leadership, lesson study, program, implementation

1. Introduction

The instructional leadership role of the school principal has been reported to be critical for the effective implementation of a school-based education reform, particularly the professional development of teachers (Lee & Li, 2015). Lesson study refers to a professional development practice that involves small groups of teachers meeting regularly to engage in a collaborative process of lesson planning, implementation, evaluation, and refinement (Kanellopoulo & Darra, 2018; Dudley, 2014). Ngang and Sam (2015) underscore the role of the school principal as an instructional leader in the implementation of lesson study in which the commitment of the principals is to supervise, promote collaborative practices, support staff development of teachers as well as allocate resources.

Lesson study translated from the Japanese word "*jugyou kenkyuu*", is traced from the same country as early as the 1870s when a normal school in Tokyo had an educational lab attached to teachers who could come together to observe and discuss findings (Sithamparam, 2015). The LS program has assumed formal status in the early 20th century

and has evolved from a method to create lesson plans with formal steps to one of true inquiry with a goal of continuing education through lifelong learning (Akita & Sakamoto, 2015). To date, lesson study remains a central education policy applied in over 90% of schools in Japan as a core process of professional learning to continually improve the quality of education that experienced teachers provide to students (Takahashi & McDougal, 2016).

Lesson study is now recognized as very strategic to the improvement of the capacity of teachers significant to positive teaching and learning outcomes. This has prompted its adoption in Asia, USA, and Europe as well as in Africa (Chen, 2019; Elliot 2019; Nakai, 2016). In Asia, lesson study was recommended by Southeast Asian Ministers of Education Organization (SEAMEO) out of the need to develop mathematics and science teachers' quality standards that would facilitate students (Tahir & Thien, 2013). In line with the recommendations, individual countries have attempted to entrench lesson study in their education practice to improve education outcomes.

In Indonesia, a study by Subadi (2016) on lesson study implementation reported that lesson study had been identified as the means to meet the academic qualification and teacher competency standard outlined in ACT of No 14/2005, to effectively serve in the career. In Singapore, schools are clustered into teaching communities depending on their geographical location to facilitate lesson study to enhance teacher effectiveness as professionals (Cheng & Yee, 2012).

In Philippines, University of the Philippines National Institute for Science and Mathematics Development (NISMED) introduced lesson study to elementary and secondary schools aimed at promoting teaching mathematics through problem-solving and teaching science through inquiry in 2006. The initiative report showed that teachers and students positively appreciated the effects of lesson study for the opportunities created for them to think independently and deeply as they did research lessons. However, Ronda (2013) cited that teachers often reverted to the old strategies of teaching casting doubt on the effectiveness of lesson study implementation, a concern that was addressed in the current study.

In England, a study by Sarah (2019) to investigate challenges experienced in lesson study implementation revealed that lesson study had gained momentum taking a learning focus, engaging teachers in and with research through structured collaboration and mobilization of knowledge among schools. However, Sarah (2019) pointed out looming challenges in lesson study implementation especially on the leadership front in the management of change.

In Turkey, a study by Yetkin-Özdemir (2016) on the implementation of lesson study reported that since the introduction of lesson study in 2011 professional development of teachers through active participation and monitoring of their teaching as well as strengthening their collaboration and communication skills was evident. However, the same author cites that a lack of leadership support has been reported to hinder the effective implementation of the lesson study, a concern that this study investigated in a Kenyan context.

In comparison to Asian countries, the implementation of lesson study has remained a challenge in America (Jeremy & Komatsu, 2017). However, a study by Leithwood and Jantzi (2008) in America found out that principals who practice effective instructional leadership in school were able to strengthen the learning culture by nurturing teamwork and collaborative practices and staff development characteristics of lesson study. Hence there was a need to examine principals' leadership in the implementation of lesson study in public secondary schools in Kajiado County in Kenya.

In Sub-Saharan Africa, 22 countries have embraced lesson study engendered in Strengthening of Mathematics and Science Education (SMASE) in Western, Eastern, Central, and Southern Africa (JICA, 2015). In Nigeria, a study by Zainab, (2019) identified lesson study as a meaningful professional development of teachers that impacted positively on their teaching ability revealing great improvement in pupils' achievement. Similarly, in Zambia, a study by Nakai (2016) reported that the introduction of lesson study in 2005 as a two-year pilot program for teachers under the auspices of the SMASE project yielded to increased capacity of teachers. The study attributed the notable success to instructional leadership notably at the school level where the school principals took charge of the coordination of lesson study activities as well as supervision and resource allocation.

In South Africa, teachers trained in the use of modern ways of teaching through the application of lesson study programs rated highly in equipping teachers with instructional competences, whose success was attributed to effective instructional leadership Coe (2010). However, Fitina (2019) in a study on understanding lesson study in Tanzania pointed out that lack of clear policy and leadership in lesson study led to poor implementation of the program, a concern the current study examined in Kenya.

In Kenya, lesson study was introduced by the Ministry of Education through Centre for Mathematics Science and Technology Education in Africa (CEMASTEА) as a form of school-based teacher professional development for mathematics and science teachers' way back in the year 2011. The aim was to help mathematics and science teachers collaboratively reflect on the unique problems and challenges they faced in their schools and use the In-service Education and Training (INSET) values acquired to improve their practice (CEMASTEА, 2018).

The adaptation of lesson study to improve the teaching of mathematics and sciences by equipping teachers with necessary pedagogical skills was informed by the reported poor performance of the subjects over the years. Indeed, a study by CEMASTEА (2009) revealed weak instructional practices at the classroom level attributed to a lack of appropriate pedagogical skills among science and mathematics teachers. Secondly, mathematics and sciences form the core subjects in the adaptation of technology to the socioeconomic agenda in the country (ROK, 2008). Lesson study was therefore found to be sustainable and effective where teachers under the leadership of the principal are expected to implement it in the schools.

To strengthen lesson study, a collaborative framework for lesson study implementation was developed (CEMASTEА, 2018). The model envisages the

involvement of key stakeholders at the national, county, sub-county, and school levels. The framework is very particular about the school level where teachers at the same school as well as similar subjects meet and collaborate in lesson study design, implementation, and evaluation for the purpose of improving their professional competency in teaching and learning (CEMASTEА, 2017).

The role of the school principal as the key pillar of driving education reforms such as lesson study to achieve education goals is further affirmed by Nkoroi (2017), Musungu and Nasongo (2008), and Wanzare (2013). Indeed, MOE's (2015) policy document enlists the following strategies under the auspices of the school principal to implement innovative curriculum initiatives in the professional development of teachers; to enhance pedagogical approaches, resource acquisition and allocation, and careful supervision. Specifically, in the year 2016, CEMASTEА developed action plans to implement lesson study activities with emphasis at the school level in which the role of the school principal as instructional leader was underscored (CEMASTEА, 2017).

CEMASTEА (2016) carried out a study to track the effectiveness of the lesson study using a sample of 15 counties including Kajiado. In Kajiado County, the study revealed concerning gaps in the implementation of lesson study. These gaps included a lack of management and leadership of the program at the school level indicated by poor and late attendance of teachers at county-level facilitation programs. Moreover, teachers were not adequately conversant with lesson study and the process guidelines provided in the lesson study manual.

Osman and Mukuna (2013) argue that sometimes school principals do not provide leadership to implement effectively curriculum innovation effectively, principals have been trained in their leadership role in the implementation of the lesson study (CEMASTEА, 2016). There is limited literature on principals' leadership roles and lesson study program implementation. This study therefore bridged this gap by investigating principals' instructional leadership role and the implementation of the lesson study program in public secondary schools in Kajiado County particularly supervision, promotion of collaborative practices, coordination of staff development, and allocation of resources.

2. Statement of the Problem

In Kenya, an action plan by CEMASTEА places the school principal as the instructional leader at the pivot of the implementation of lesson study (CEMASTEА, 2016). However, an assessment of the implementation of the lesson study by CEMASTEА (2017) revealed glaring gaps in the management and leadership of the program in Kajiado County. This was indicated by the late and poor attendance of teachers in county lesson study forums, the uncoordinated and unprofessional presentation of lesson study instructional activities, and the missing record of teachers' experiences during lesson study. This lack of support by school principals has resulted in the ineffective implementation of lesson study, with teachers not benefiting from it.

Therefore, the noted gaps, if unabated, could result in continued weak pedagogical skills and poor instructional classroom practices by teachers. Consequently, this could lead to continued poor performance by students in mathematics and science, to the detriment of advancement in science and technology critical to the industrial takeoff envisioned in 2030. To bridge this gap, there was a need to investigate how school principals as instructional leaders promoted sustained lesson study practices.

2.1 Research Objectives

- 1) To investigate the instructional supervision role and implementation of lesson study program in public secondary schools in Kajiado County.
- 2) To investigate how principals' promotion of collaborative practices influences the implementation of lesson study program in public secondary schools in Kajiado County.

3. Theoretical Framework

The study was anchored on Carrier's (2014) instructional leadership model and Vygotsky's social-cultural theory. Carrier's instructional leadership model demonstrates an empirical illustration that deliberates on how the leader and staff engagements lead to the effective implementation of instructional practice to promote the effectiveness of teachers in teaching and learning. The instructional leadership model of Carrier (2014) singles out the work of the school principal as an instructional leader and that of the teachers which focuses on the value of learning for all the learners through developing a school community around a common vision and by entertaining great expectations for teaching and learning practices. The principal should focus on accomplishing desired goals and should be enthusiastic in performing the designated duties to advance teachers' capacity to improve instructional practice. The principals' ability to carry out instructional leadership, especially in the implementation of instructional programs is modeled by the output of teachers expected to transform teaching and learning.

The model postulates that principals should have clear knowledge of best practices, including responsive instructional leadership and pedagogy, by communicating high expectations for teachers in order for them to realize their full potential, which can lead to positive learning outcomes. The principal should focus on learning, communicate high expectations to teachers in order to improve learners' achievement, use data to inform the work of the school and develop a community that is unified around one vision and mission for the school and, especially, the needs of teachers and learners to improve curriculum delivery.

Vygotsky is one of the proponents of constructivist theory which opines that learning is a process that involves the construction of knowledge rather than obtaining it. The learner builds a personal understanding of the world depending on experiences and interactions with people in their environment. According to Vygotsky, community plays an important role in the development of individual knowledge. The way people

develop their knowledge and the way they attach meaning to this knowledge is formed in the social contexts (Purwanti & Hatmanto, 2019). The theory emphasizes that the cognitive and affective development of learners is influenced by interactions with peers, teachers, and instructional materials.

This theory is important in understanding interactions among teachers during lesson study. Individual teachers possess knowledge and skills which they use during the teaching and learning process. However, the need to bridge some professional gaps requires the teacher to engage in collaborative practices which help them learn from each other as they plan, teach, and reflect together.

4. Literature Review

4.1 Principals' Instructional Supervision Role and Implementation of Lesson Study

Research related to principals' instructional leadership indicates that school principals play a key role in the effective implementation of lesson study. In Malaysia, Ngang and Sam (2015) conducted a qualitative study on principal support in lesson study. The aim of the study was to explore the extent to which principals of elementary schools supported the implementation of lesson study. The participants consisted of nine elementary school principals from schools categorized as national, national Chinese type, and national Tamil type, each with five years of experience as principals. Data were collected through in-depth interviews.

Results of the study indicated an improved school performance after teachers had gone through the lesson study cycles resulting in the use of alternative teaching strategies, teachers working collaboratively, supporting students, and teacher professional growth. This was associated with support provided by principals in terms of materials, and time to plan, implement, and revise the lesson. Additionally, results indicated that principals' support of lesson study implementation is associated with improved teacher professional growth and consequently classroom improvement.

The study by Ngang and Sam (2015) is similar to the current study in that it investigates support given by principals in lesson study implementation. However, the study is different in that it adopted a qualitative approach. In addition, the study focused on principals from elementary schools in Malaysia while the current study employed both quantitative and qualitative approaches so as to provide a more comprehensive grasp of principals' supervisory role and implementation of lesson study program in public secondary schools in Kajiado County.

In the Netherlands Neeske et al. (2022) conducted an in-depth qualitative study on leadership practices and sustained lesson study. The aim of the study was to investigate leadership practices in schools that had a sustained lesson study. Purposeful sampling was used to select the two schools that were involved in the study; one secondary pre-vocational level school and one secondary senior general and pre-university level school. The schools were selected on the criteria that they practiced lesson study and considered it important in school improvement. Data was collected through observation and the use

of semi-structured interviews, thus the two methods serving the purpose of triangulation. Collected data was organized, coded, and categorized into themes.

Results revealed that leadership was evident in the two schools that were involved in the study. It also indicated that for sustainability of lesson study in school, there is a need for school leadership to play their role effectively which includes being knowledgeable on lesson study, having a plan for lesson study, being available during lesson study, and selecting a lesson study coordinator. The findings of this study provide important insights on principals' role in the implementation of lesson study which coincides with the current study. However, the study adopted a qualitative approach and was conducted in two schools in the context of the Netherlands. This study adopted both qualitative and quantitative approaches and involved the collection of data from a larger sample in a Kenyan context.

Lee and Madden (2019) conducted a study in the USA to explore how lesson study can broaden content knowledge and affect instructional leadership. This was a collaborative study between one university and eight schools which involved teachers and school principals. Participants were 8 principals and 37 regular and special education high school teachers in English/language arts, social studies/history from five districts. The study used a mixed-method design for purposes of triangulation and corroboration. Data was collected using observation during the lesson study cycle, lesson plans, artifacts from students, discussions by committees, and focus group interviews. Qualitative data was organized, analyzed, and reported while quantitative data was analyzed using descriptive statistical methods.

Findings indicated that lesson study had an impact on the roles of principals as instructional leaders which included being a partner in lesson study, being a coach as opposed to an evaluator, and their new understanding of an effective evaluator. The study concluded that partnerships between principals and teachers can help solve challenges as they work towards a common goal and create an inviting climate for learners. This study is similar to the current study since both adopted qualitative and quantitative approaches. However, this study is different from the current study since it was an explored partnership between principals and teachers in the implementation of lesson study in USA. This study investigated principals' instructional leadership in lesson study implementation in public secondary schools in Kajiado County.

Banda, Mudenda, Tindi, and Nakai (2015) conducted a study on Lesson Study Practice of Science Teachers in Zambia: Its Effects, Enhancing and Hindering Factors. The study was an impact survey to evaluate the success and factors that enhance and hinder the implementation of lesson study in Central province of Zambia. Data was collected using national examination pass rates in science and biology subjects to assess the effect of lesson study while interviews and questionnaires were used to determine factors that enhance and hinder lesson study implementation. This was done in 29 secondary schools in the central province and other 6 provinces that did not take part in the lesson study. Participants were teachers, facilitators, school heads, and grade 12 students.

Results indicated that pass rates for learners in Central province where lesson study was practiced were slightly higher than those of non-implementing provinces which was associated with improved teaching skills of science teachers arising from lesson study. High teaching load and high pupil-teacher ratio were found to be hindering factors to effective implementation while trained facilitators and support from school managers were found to be enabling factors to lesson study implementation. Though the study acknowledges the support of the school manager as an enhancement to lesson study implementation, it failed to give the specific role the school manager played in the effective implementation of lesson study. This is a gap the current study addressed by exploring principals' instructional leadership role and implementation of lesson study in public secondary schools in Kajiado County.

Sibomana (2020) conducted a study in Rwanda on the perceptions of teachers on the instructional leadership behaviors of secondary school principals in Rwanda. The study aimed at identifying secondary school principals' instructional leadership behaviours and how these behaviors impact the professional practices of teachers in Nyamagabe district in Rwanda. The study used a quantitative research method with a descriptive survey design. The sampling techniques used were proportionate, stratified random sampling, and purposeful sampling. Participants were 269 teachers selected from a population of 816 teachers from 48 secondary schools. Data were collected using a closed-ended questionnaire and analyzed using descriptive statistical methods.

Results indicated that teachers perceived principals to engage in instructional leadership behaviors such as instruction supervision, provision, and discussion of feedback with teachers. Results further reviewed that principals communicated shared goals as well as supporting teacher professional development and learning resources. The study recommended the need to provide schools with resources and training courses so as to enhance principals' instructional leadership. The study by Sibomana, (2020) is similar to the proposed study since it explores principal instructional leadership and adopts quantitative and qualitative approaches with data analysis done using descriptive statistics and thematic analysis. However, the study focused on teachers' perceptions of principals' instructional leadership behaviors in Rwanda while this study investigated principals' instructional leadership and lesson study in Kenya.

In Nigeria, Egwu (2015) conducted a study on principals' performance in the supervision of classroom instruction in Ebonyi state secondary schools. The aim of the study was to explore the performance of the principal in classroom instruction supervision. The study used a descriptive survey design. Participants were 630 secondary school teachers selected from 45 secondary schools from 3 education zones in Ebonyi state. Data were collected using a self-developed questionnaire and validated by measurement, evaluation, and educational administration experts. The analysis was done using both descriptive and inferential statistics.

Results indicated that there was effective supervision of classroom instruction by principals in secondary schools in Ebonyi state in Nigeria. The study recommended the need for principals to carry out effective classroom supervision so as to improve

instruction. This study by Egwu (2015) adopted a quantitative approach and focused on principals' effectiveness in classroom instruction. This coincides with the current study since it investigated principals' instructional leadership but differs in that the current study used both quantitative and qualitative approaches and focused on lesson study which is a program that helps teachers improve classroom instruction. It was therefore important to investigate how principals support lesson study an initiative that helps improve instruction. Hence the current study on principals' instructional leadership and lesson study implementation in public secondary schools in Kajiado County.

In Kenya, a study was conducted by Mutiso, Kiriimi, and Itegi (2020) on the effects of principals' instructional supervisory practices on students' academic performance in public secondary schools in Machakos County. The aim was to examine the association between the principals' instructional supervisory practices and students' performance in public secondary schools in Machakos County. The study used a mixed method of both qualitative and quantitative research using a descriptive survey design. The sampling methods used were simple random sampling and stratified sampling. Participants included 47 principals, 395 teachers of public secondary schools, and 8 sub-county Quality Assurance and Standards Officers (QASO), in Machakos County. The data collection instruments used were questionnaires and interview guides. Quantitative data was analyzed using descriptive and inferential statistics while qualitative data was organized into themes.

Results revealed that principals checked teachers' professional documents. However, principals did not promote instructional supervisory practices such as mentoring, classroom observations, and peer teaching among teachers. Though this study is related to the current study since it adopts both quantitative and qualitative approaches and investigates principals' instructional leadership, it is different because it focuses on student academic performance while the current one focuses on lesson study. In addition, it recommended the need for principals to support mentoring, classroom observations, and peer teaching among teachers. These are tenets of lesson study that contribute to teacher professional growth and consequently improve students' performance. Moreover, the study recommends that the government provide in-service training programs to train teachers on these practices. Lesson study is a school-based teacher professional program that helps teachers enhance mentoring, peer teaching, and lesson observation of which the principals play a key supervisory role in its effective implementation. Hence the current study on principals' instructional leadership in the implementation of lesson study in public secondary schools in Kajiado County.

4.2 School Principal and Promotion of Collaborative Practices in Lesson Study

Research indicates that lesson study allows teachers to work collaboratively as they plan for the research lessons. Richit, Ponte, and Tomasi (2012) conducted a study on aspects of professional collaboration in lesson study in Rio Grande do Sul state in Brazil. This was a qualitative study that aimed at exploring features of professional collaboration that are important for teacher professional development in lesson study. The study involved

8 public school mathematics teachers. The collection of data was through field notes, questionnaires, and interviews.

Results indicated that lesson study promoted relationships and teamwork among teachers. Results also revealed that lesson study yielded to several features of collaboration that included cooperation in doing tasks, reflection on classroom practice, and shared encouragement and support. The authors recommend further research on aspects of collaboration in other contexts. This study is related to the current study since it investigated lesson study and the way it promotes collaboration among teachers. However, the study did not examine how school principals support such collaborations. The current study bridged the gap by investigating how school principals support such collaborations during lesson study implementation.

Balyer, Karatas, and Alci (2015) conducted a study on school principals' roles in establishing collaborative professional learning communities at schools. The study aimed at exploring the principals' role in the establishment of communities of practice in Turkey. The study used a qualitative method using ethnographic design so as to have an in-depth understanding of the study. A purposive sampling method was used to select participants who were 15 principals (13 male and 2 female) from 15 state schools in Istanbul province in Turkey. Data was obtained through interviews with semi-structured questions. Data collected was coded, organized, and then analyzed using the constant comparative approach.

Findings indicated that school principals have an important role in creating professional learning communities. The findings however indicated that principals did not play this role effectively. Recommendations of this research included the need for principals to support professional learning communities so as to function effectively. Though the study by Balyer, Karatas, and Alci (2015) examined principals' role in establishing communities of practice, it failed to identify the specific role of the principal in promoting communities of practice that bring collaboration. Lesson study promotes communities of practice. The current study aimed at addressing this gap by exploring principals' instructional leadership and implementation of lesson study in public secondary schools Kajiado County, Kenya.

In Malaysia, Tahir, Mohammed, Musah, and Muhammad (2022) conducted a study on promoting professional learning communities: discovering principals' support and leadership strategies in Malaysian religious-based secondary schools. The aim of the study was to explore the perceptions of teachers about the role of school principals in professional learning communities in religious based secondary schools in Malaysia. The study adopted a sequential mixed method that was done in two phases: the first phase involved the collection of quantitative data, while the second phase involved the collection of qualitative data. Participants were 610 teachers selected from 8 religious-based public secondary schools in the first phase while in the second phase, participants were 16 teachers from the same schools. The 8 schools were selected using the cluster sampling method, while the 16 teachers were selected using the purposive sampling method to get teachers who actively participated in professional learning communities.

Data collection methods included questionnaires for quantitative data and semi-structured interviews for qualitative data. The analysis of data was done using descriptive and inferential statistics, while qualitative data was analyzed using thematic analysis procedures.

Findings revealed that principals supported professional learning communities as an important platform for teachers to collaborate, share, and work as a team by providing the necessary resources. The study concluded that school principals influence the effective implementation of professional learning communities in the context of religious-based public secondary schools in Malaysia. This study is similar to the current study since it used both quantitative and qualitative approaches, they are different in that this study used a sequential mixed method which involved the collection of data in two phases in religious-based schools while the current study adopted a descriptive cross-sectional survey where data was collected at the same point in time in public secondary schools. This study explored principals' support in lesson study and how it contributes to teacher collaboration and professional learning communities.

To, Yin, Tam, and Keung (2021) conducted a study on principal leadership practices, professional learning communities, and teacher commitment in Hong Kong kindergartens. The aim of the study was to explore principal leadership practices, learning communities, and the commitment of teachers to kindergartens in Hong Kong. Participants included 2,106 teachers from 153 kindergartens. The data were collected using a questionnaire and analyzed using descriptive statistics. Results revealed that the development of teacher-professional learning communities at school was facilitated by principals' leadership practices, which resulted in teacher commitment. The study by To, Yin, Tam, and Keung (2021) was conducted in kindergartens and focused on professional learning communities in Hong Kong. The current study focused on lesson study as a program that promotes professional learning communities among teachers and thus investigated how principals' leadership promotes its implementation in secondary schools in a Kenyan context.

In Nigeria, Isah, Agbe, Odeh, and Adelabu (2019) conducted a research to investigate the influence of collaborative instructional leadership of principals and teachers on students' academic performance in secondary schools in north central Nigeria using a survey research design. Participants were 36 principals and 355 teachers selected from a population of 972 principals and 15699 teachers from 972 public secondary schools respectively. Sampling techniques included multistage sampling, simple random sampling, and proportionate stratified random sampling. Data was collected using questionnaires and validated using a trial test in a state outside the area of study and was analysed using descriptive statistics.

Findings indicated that when principals and teachers work collaboratively in supervising instruction, coming up with the school goal, and protecting instructional time improves student achievement. The study recommended the need for principals and teachers to work together in lesson preparation and lesson supervision so as to improve students' academic performance. This study differs from the proposed study since it

adopted a quantitative approach and focused on how the collaboration of principals and teachers influences the academic performance of the students while the proposed study employed both quantitative and qualitative approaches focusing on principals' promotion of collaborative practices of teachers during lesson study implementation. Lesson study promotes collaboration among teachers and leads to improved students' performance. Hence this study on principals' instructional leadership and lesson study implementation in public secondary schools in Kajiado County, Kenya.

Irungu, Kagema, and Gachahi (2019) explored the influence of principals' collaborative practices on students' performance in secondary schools in Murang'a and Kirinyaga Counties, Kenya. The study used both qualitative and quantitative methods with a descriptive survey research design. Sampling was done using stratified, purposive, and simple random sampling techniques. Participants were 205 principals and 367 teachers. 123 schools from Murang'a County and 80 schools from Kirinyaga County were selected proportionally. Data was collected using questionnaires and interview schedules. Face-to-face interviews were conducted with the principals and teachers were given questionnaires. Analyses of data were done using descriptive and inferential statistics.

Results revealed that principals' promotion of collaborative practices was in Kirinyaga County which posted higher examination results than in Murang'a County. The study therefore concluded that students' performance is enhanced by collaborative practices in school. This study recommended the need for principals to support collaborative practices in their schools by involving teachers in networking. Lesson study is a form of teacher professional development that allows collaboration among teachers. In this study by Irungu, Kagema, and Gachahi (2019) there is evidence that the promotion of collaborative practices enhances students' performance and the principal is key in the promotion of collaborative practices. The current study explored principals' instructional leadership and lesson study implementation in public secondary schools in Kajiado County, Kenya.

In Kenya, Kariuki and Itegi (2019) conducted a study on teacher participation in collaborative professional development and learners' achievement. The study used a convergent parallel mixed methods research design. Sampling techniques included stratified and purposive sampling to select public and private schools and participants who included 194 class eight teachers and twenty head teachers. Data were collected using questionnaires and focus group discussions for the teachers and a semi-structured interview guide for the head teacher. Analysis of data was done using descriptive and inferential statistics for the quantitative data and thematically for the qualitative data.

Findings indicated that teachers participated in collaborative activities such as lesson observation, peer coaching, and team teaching. Findings also indicated that head teachers were supportive in creating a favorable school environment that resulted in improved school mean score. However, the findings indicated challenges faced by teachers in trying to engage in collaborative activities such as lack of ICT skills, lack of time, and lack of follow-up. It recommended the need for support from various

stakeholders and by school administration in promoting teacher collaborative forums. This study is similar to the current study in terms of research methods and sampling methods. However, the current study is different since it used a cross-sectional survey design and investigated collaborative practices in lesson study while the study by Kariuki and Itegi (2019) investigated how collaborative practices help improve learners' achievement. Lesson study is a collaborative activity that contributes to teacher professional growth and improved learner achievement. The current study bridged the identified gap by exploring how principals support lesson study as a form of collaborative practice.

5. Research Methodology

The study adopted a mixed methods research approach with a convergent parallel mixed methods design. The study's target population consisted of 95 public secondary schools, 95 principals, and 651 mathematics and science teachers from Kajiado County, with a sample size of 29 principals and 248 mathematics and science teachers. This was achieved using probability and non-probability sampling techniques, which included purposeful, proportionate, and simple random sampling. The collection of data was done using an interview guide for principals and a questionnaire for teachers. A pilot study was conducted in two schools that had characteristics similar to those of the schools that were involved in the study. The research instruments were validated by experts with knowledge of instructional leadership from Tangaza University College and the Catholic University of Eastern Africa. The analysis of quantitative data was done using descriptive statistics, which included frequency distributions and percentages and was generated using Statistical Package for Social Sciences (SPSS) version 25. The data was presented in the form of bar graphs, pie charts, and frequency tables. Qualitative data was analyzed using a thematic approach and presented using narratives and direct quotes.

6. Research Findings

The researcher distributed 248 questionnaires to the teachers from the sampled public secondary schools in Kajiado County out of which 202 were dully filled and returned. This registered 84.1% response rate. The researcher further interviewed 20 principals out of the expected 29 which registered a 69% response rate. According to Mugenda and Mugenda (2013), a response rate of 50% is adequate for analysis and reporting of data, 60% is good, and above 70% is excellent. Therefore, the response rate in this study was considered sufficient to allow for data analysis.

6.1 Principal Supervisory Role and Lesson Study Implementation

Teachers were required to show their level of agreement or disagreement with the statements about principals' supervisory role and lesson study implementation in public secondary schools in Kajiado County. The scale used by teachers to respond to the

questions was; Strongly Disagree (SD), Disagree (D), Not Sure (NS), Agree (A), Strongly Agree (SA). The findings are shown in Table 1.

Table 1: Principal Supervision in Lesson Study Implementation

Statement	SD		D		NS		A		SA	
	f	%	f	%	f	%	f	%	f	%
My school principal carries out supervision during lesson study implementation.	-	-	20	9.9	20	9.9	125	61.9	37	18.3
My principal asked for the lesson study implementation plan.	1	0.5	9	4.5	16	7.9	124	61.4	52	25.7
My principal monitors the lesson study using the implementation plan.	1	0.5	13	6.4	27	13.4	126	62.4	34	16.8
My principal states the aim of supervision during lesson study implementation.	1	0.5	7	3.5	32	15.8	128	63.4	34	16.8
My principal checks lesson plans and lesson notes to be used during lesson study implementation	1	0.5	11	5.4	15	7.4	125	61.9	47	23.3
My principal meets with the lesson study group to discuss lesson study implementation.	1	0.5	17	8.4	40	19.8	120	59.4	24	11.9
My principal ensures that lesson study objectives are consistent with the school's goal.	1	0.5	6	3.0	29	14.4	128	63.4	38	18.8
My principal observes lessons during a lesson study implementation.	-	-	19	9.4	37	18.3	112	55.4	34	16.8
My principal provides honest, open and constructive feedback during lesson study implementation.	1	0.5	8	4.0	33	16.3	86	42.6	74	36.6
The principal offers suggestions to improve instruction during lesson study implementation.	-	-	9	4.5	29	14.4	93	46.0	71	35.1
My principal ensures that the lesson study of the group keeps to the allocated instructional time.	2	1.0	7	3.5	28	13.8	109	54.0	56	27.7
Principal discusses challenges encountered during lesson study implementation.	6	3.0	7	3.5	33	16.3	94	46.5	62	30.7

The results from Table 1 indicate that the majority of teachers 125 (61.9%) agreed that the school principal carries out supervision during lesson study implementation. Also, the findings reveal that most of the teachers 126 (62.4%) agreed that the principal monitors lesson studies using an implementation plan. This was affirmed by one of the respondents' face-to-face interviews: "I ask teachers to do action planning for implementation, then check it when I want to know the progress", said participant 6. Responding to the same interview question, respondent 13 had this to say: "I ask the HOD to spearhead and call for consultation meetings and give me feedback on the progress".

Additionally, it emerged that most 128 (63.4%) of the teachers agreed that the principal states the aim of supervision during lesson study implementation while 125 (61.9%) agreed that the principal checks lesson plans and lesson notes to be used during lesson study implementation. One principal through the face-to-face interview indicated that he checks the lesson plans to be used for the lesson study and gives his input before the team implements the lesson in class. This is supported by Lee and Madden (2019)

who posit that a school principal as an instructional leader becomes more knowledgeable by working together with teachers through the process of lesson study implementation. Another majority of teachers 120 (59.4%) agreed that the principal meets with the lesson study group to discuss lesson study implementation, 24 (11.9%) strongly agreed with this statement while 40 (19.8%) were not sure. During a face-to-face interview, interviewee 9 said, *"Sometimes I normally attend the lesson study, I ask teachers to take videos as evidence of the lesson and use during the reflection meeting, when I am not available, I follow the video and advice the team principal 9, 25/07/2023"*.

Further, Table 1 findings reveal that the majority of teachers 128 (63.4%) were in agreement that the principal ensures that lesson study objectives are consistent with the school goal. In addition, the majority of teachers 112 (55.4%) agreed that the principal observes lessons during lesson study implementation while 33 (16.8%) strongly agreed with this statement. This is in line with principals' face-to-face interview response which indicated that principals do lesson observation and give feedback to the teachers in order to improve. One interviewee responded, *"I assist the deputy in lesson observation and check on the departmental lesson study files"*. Further, it emerged that the majority of the teachers 86 (42.6) % agreed that the principal provides honest, open, and constructive feedback during lesson study implementation while 74 (36.6%) strongly agreed with this statement.

Also, most teachers 94 (46%) were in agreement that the principal discusses challenges encountered during lesson study implementation, while 62 (30.7%) strongly agreed with this statement. These findings are supported by those of Banda, Mutenda, Tindi, and Nakai (2015) who investigated the effects, enhancing and hindering factors in lesson study practice of science teachers in Zambia and found out that though lesson study helps improve the teaching skills of teachers and improves students pass rates, it is faced with challenges which include heavy workload for teachers and large classes.

Overall, the findings of Table 1 indicate that teachers are in agreement that the school principal plays the role of supervision during lesson study implementation. This implies that secondary school principals are making an effort to supervise lesson study implementation in different ways such as checking implementation plans, observing lessons and giving feedback, offering suggestions to improve instruction as well as discussing with the teachers the challenges they encounter while implementing lesson study. This is in line with the findings of Egwu (2015) whose study on principals' performance in the supervision of classroom instruction revealed that effective supervision of teachers by the principal improves classroom instruction. However, the findings contradict those of Mutiso, Karimi, and Itegi (2020) who in their study on the effects of principals' instructional supervisory practices on students' academic performance revealed that principals did not support supervision in terms of classroom observation, peer teaching, and mentoring in their schools.

6.2 Principal Promotion of Collaborative Practices and Lesson Study Implementation

The second objective of this study was to investigate principals' promotion of collaborative practices and lesson study implementation in public secondary schools in Kajiado County. Teachers rated the items using the scale: Strongly Disagree (SD), Disagree (D), Not Sure (NS), Agree (A), and Strongly Agree (SA). The teachers' responses are presented in Table 2.

Table 2: Promotion of Collaborative Practices in Lesson Study Implementation

Statement	SD		D		NS		A		SA	
	f	%	f	%	f	%	f	%	f	%
My principal encourages interaction and teamwork among teachers during lesson study implementation.	2	1.0	4	2.0	11	5.4	105	52.0	80	39.6
My principal gives me an opportunity to collaborate with my colleagues during lesson study implementation	2	1.0	4	2.0	12	5.9	116	57.4	68	33.7
My principal encourages me to work with my colleagues during lesson study implementation.	2	1.0	4	2.0	14	6.9	98	48.5	84	41.6
My principal supports me to work with teachers from other schools in lesson study implementation.	2	1.0	10	5.0	44	21.8	99	49.0	47	23.3
My principal encourages teachers to assist one another in areas of difficulties during.	2	1.0	4	2.0	15	7.4	102	50.5	79	39.1
My principal engages teachers in networking and linkages that promote collaboration.	2	1.0	8	4.0	18	8.9	121	59.9	53	26.2
My principal involves teachers in making decisions concerning lesson study implementation.	2	1.0	6	3.0	19	9.4	111	55.0	62	31%
My principal puts a mechanism in place to ensure a harmonious working relationship among teachers during lesson study implementation.	3	1.5	8	4.0	26	12.9	101	50.0	64	32%
My principal enhances collaborative practices among departments implementing lesson study.	2	1.0	6	3.0	22	10.9	101	50.0	71	-

Based on the findings of Table 2, the majority of the teachers 105 (52%) agree that the principal encourages interaction and teamwork among teachers during lesson study implementation while 80 (39.6%) strongly agreed with the statement. This is affirmed by the principals' responses from the face-to-face interview that they supported teachers in teamwork while planning for the lessons, team teaching, and peer lesson observation. Asked what forms of collaborative practices exist in the school, Participant 1 responded; "lots of team teaching, a lot of networking with other departments and even with other schools especially in Maths". Yet another principal had this to say; "normally we have WhatsApp group based on subjects in school and WhatsApp group-based subjects in sub-county." Another respondent mentioned think-pair-share and networking with other schools as forms of collaboration. Principals were asked how they support such collaborations.

Their responses included; providing time for lesson study after classes and supporting teachers to go back to their homes, creating time and rooms for the groups to meet, and giving moral support, by providing offices for departments to allow conversations and work collaboratively and meeting virtually.

Additionally, it emerged that most of the teachers 116 (57.4%) were in agreement that principals gave them the opportunity to collaborate with colleagues during lesson study implementation with 68 (33.7%) strongly in agreement with this statement. This is affirmed by the findings of Venketsamy, Hu, Helmbold, and Auckloo (2022) which revealed that teachers acknowledged that they gained new skills as a result of collaborative practices resulting from lesson study. Also, most teachers 102 (50.5%) agreed that the principal encourages them to assist one another in areas of difficulties during lesson study implementation while 79 (39.1%) strongly agreed with the statement. This is supported by one of the principals' responses that: *"I encourage my teachers to do team teaching. Though I am not basically a science teacher I demonstrate to them how working with each other can help improve their classroom practice. I plan a lesson and ask teachers in my department to come and observe, and then we sit down and discuss. Next, I tell one to plan a lesson and I and the others observe. This collaboration has helped improve the mean of my subject- French significantly. I use my deputy whose teaching subject is mathematics to spearhead lesson study and he gives me feedback and slowly my students are improving in mathematics"* (Interview, 15th July 2023).

The results also show that most teachers 98 (48.5%) agreed that principals encourage them to work with colleagues during lesson study implementation and 84 (41.6%) strongly agreed with this statement. This is in line with principals' responses who indicated that they support teachers to work as departmental teams when marking examinations, planning lessons, and implementing and reflecting on the lessons. This is supported by the findings of Okoth and Yambo (2022) who conducted a study on principals' building collaborative cultures on the academic performance of secondary schools in Kisumu County and found out that principals built a collaborative culture among teachers which significantly influenced the academic performance of students in secondary schools.

It is also clear from the results of Table 4 that 121 (59.9%) of teachers were in agreement that the principal engages them in networking and linkages that promote collaboration while 53 (26.2) strongly agreed with this statement. From the principals' responses, the use of WhatsApp forums and the provision of Wi-Fi was cited as a means that makes networking and linkages possible. It also emerged that 99 (49%) agreed that principals support them to work with teachers from other schools in lesson study implementation while 47 (23.3) were strongly in agreement with this statement. However, 44 (21.8%) of teachers were not sure about this statement. This is in line with a response from one of the respondents who argued that sometimes it is difficult to collaborate with teachers from other schools during lesson study due to time factors given the tight school schedule and other co-curriculum activities.

Further, the majority of teachers 111 (55%) were in agreement that principals involve them in making decisions concerning lesson study implementation while 62 (31%) strongly agreed. This is in agreement with principals' responses which indicated that they involve teachers in developing a plan for lesson study implementation, and in determining resources required and time to implement the lesson study.

The results in Table 2 are a clear indication that secondary school principals promote collaborative practices that are required for the effective implementation of lesson study programs. The forms of collaborative practices include team teaching, peer lesson observation, networking, and linkages among departments and with teachers from other schools and in making decisions concerning lesson study. This is in agreement with the findings of Richit, Ponte, and Tomasi (2021) who in their study on aspects of professional collaboration in lesson study in Portugal found out that lesson study enhanced different forms of collaboration which include encouraging and supporting each other, teamwork and reflection. The findings further reveal that principals provided support in terms of ICT, time for collaboration, and offices to enable teams to meet. This is supported by the findings of Steyn (2015) who conducted a study on creating a teacher-collaborative practice in South African primary schools and found out that it is important for principals to support teachers in collaboration to enable them to share their intellectual property.

7. Conclusions and Recommendations

Based on the findings of this study and guided by the research questions, it is reasonable to conclude that public secondary school principals in Kajiado County supervise lesson study implementation in different ways. These include checking implementation plans, observing lessons and giving feedback, offering suggestions to improve instruction as well as discussing with the teachers the challenges they encounter while implementing lesson study.

Secondary school principals also promote collaborative practices that are required for effective implementation of lesson study program which include team teaching, peer lesson observation, networking and linkages among departments and with teachers from other schools and decision making in matters concerning lesson study.

The study also concludes that there are challenges experienced during lesson study implementation such as time for teachers to meet, lack of funds to buy resources, high work load by teachers and competing programs, lack of understanding on lesson study by newly appointed teachers and uncooperative teachers.

The study recommends that CEMASTEAs organize training on lesson study for mathematics and science teachers with a teaching experience of below five years and for secondary school principals who are newly appointed. The study also recommends that the Ministry of Education (MOE) develops a clear policy for lesson study implementation at the school level to enforce lesson study implementation by schools and to support its supervision by the school principals and the QASOs.

The study suggests further research on lesson study and students' academic performance.

Conflict of Interest Statement

As authors of this journal article entitled, Principals' Instructional Leadership Role and Lesson Study Program Implementation in Public Secondary Schools in Kajiado County, Kenya, we have no conflicts of interest to declare. We have all seen and agreed with the contents of the manuscript, and there is no financial interest to report. We certify that the submission is original work and is not under review by any other publication.

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