



Teachers' Pedagogical Preparedness to Use Project-Based Learning in the Implementation of Competency-Based Education in Junior Schools, Nyeri County, Kenya

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Article History

Received: 2026.06.02

Revised: 2026.08.30

Accepted: 2026.09.01

Published: 2026.09.04

Keywords

Implementation

Pedagogy

Project-based learning

Teachers

How to cite:

Kanyugo, E. W., Gachahi, M. & Wanderi, A. (2026). Teachers' Pedagogical Preparedness to Use Project-Based Learning in the Implementation of Competency-Based Education in Junior Schools, Nyeri County, Kenya. *Journal of Research and Academic Writing*, 3(2), 162-171.

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Abstract

Despite the implementation of Competency-Based Education (CBE) in Junior secondary schools, teachers, being the main implementers, are likely to face challenges in relation to their understanding of the curriculum and in the application of instructional approaches. This study focused on the assessment of teachers' pedagogical preparedness to use project-based learning in the implementation of CBE in public junior secondary schools in Nyeri County. The study was guided by Gross' curriculum implementation theory and adopted the descriptive survey research design. The target population was 1980 teachers and 391 head teachers in junior schools in Nyeri County. The sample comprised 39 head teachers and 198 teachers in junior schools in the study area. Questionnaires and interview schedules were used to collect data from the teachers and headteachers respectively. The quantitative data were analysed using descriptive statistics such as percentages, mean, and standard deviations, while qualitative data were analysed thematically. The findings of the study revealed that 55.1% of teachers used project-based learning, 64.7% incorporated real-world problems or community-based problems, 42.4% received support to enhance their ability to implement project-based learning, and 52.5% assessed students' learning outcomes using project-based learning. The study recommended that there should be provision of resources needed for the use of project-based learning, enhanced support to teachers to enhance their ability to use project-based learning, increased time for projects, and streamlined the evaluation process. The study will provide insights on how to improve the use of project-based learning by teachers.

Introduction

UNESCO (2019) emphasised the need for all learners to be nurtured by qualified, professionally trained, motivated, committed, and well-supported teachers who use relevant pedagogical approaches. Consequently, delving into the area of teacher preparedness in the implementation of Competency-Based Education (CBE) is crucial in order to address any gaps that may be noted. This means that there is a need to have both in-service and refresher courses to equip the teachers to be able to implement the CBE.



Kenya implemented CBE in January 2017 following the report released in 2012 by the task force on the realignment of the education sector to the Constitution of Kenya 2010. The mandate of the taskforce was to realign the schooling sector with the 2010 Constitution, Vision 2030 and Sessional Paper No. 10 of 2015 on *"Reforming Education and Training in Kenya"*. This transition was informed by the realisation that the 8-4-4 education system, which was anchored on the education for self-reliance philosophy, did not meet societal expectations (GOK, 2007; KICD, 2019).

The primary resource in the teaching and learning process is the teacher. By the use of the knowledge and abilities they gain through education and experience, teachers support learning. Teachers are able to comprehend, interpret and implement the curriculum in accordance with the recommendations made in the curricular framework given by the particular nation. Learning institutions place a strong emphasis on the role performed by teachers, claiming that the nature of a nation's educational system depends on its educators (Mwita, 2023). Teachers' knowledge, skills and attitudes are some of the most essential considerations in the successful implementation of a curriculum. Teachers interpret and implement the intended curriculum. Therefore, teachers should be well prepared through in-service training, seminars and workshops to equip them to be able to implement the curriculum and handle any emerging challenges during the implementation process (Wambiya & Ogula, 2023). Successful implementation of CBE requires teachers to have skills and knowledge in various teaching and learning approaches in order to facilitate productive learner engagement in the learning process.

According to Kitasse and Ssembatya (2024), teachers are responsible for designing learning tasks, such as discussions, that will facilitate learners to acquire the necessary competencies. However, most teachers may not have the required competencies to facilitate CBE due to a lack of proper retooling. Rwigema and Andala (2022) indicate that teachers may encounter challenges in relation to content and subject demarcations, underlying assumptions, goals, teaching approaches and assessment methods when implementing a new curriculum.

Although the Teachers Service Commission (TSC) and the Ministry of Education have made an effort to train teachers in CBE, there have been many doubts over the effectiveness and sufficiency of this training. Cheruiyot (2024) claims that a large number of educators have admitted to being unprepared and missing the professional development required to deliver the CBE outcomes successfully. Additionally, according to reports from Gichurur (2024), junior school teachers in Nyeri County, like those in many other parts of the nation, confront difficulties such as a lack of training time, insufficient instructional tools, and differing degrees of comprehension of CBE principles. Likewise, according to Kinyua's (2025) research on the difficulties teachers encountered when implementing CBE in Nyeri County, the lack of proficiency in particular subject areas as a result of insufficient preparation necessitates extensive teacher development programmes. Project-based learning is one of the subject areas used in teaching in the implementation of Competency-based education (KICD, 2019). Therefore, there is a need to assess teachers' pedagogical preparedness in the use of project-based learning for the implementation of CBE in junior secondary schools within Nyeri County. Understanding the teachers' pedagogical preparedness in the use of project-based learning and identifying gaps will provide valuable insights for policy makers, education stakeholders and training institutions to enhance teacher capacity and ensure effective curriculum delivery.

Literature Review

Project -based learning improves students' critical thinking skills by pushing them to challenge presumptions, work with peers and solve challenging real-world issues. However, teachers' facilitation skills will ensure that project-based learning is adopted successfully in classrooms; hence,



the success of project-based learning in the classroom will depend on how well teachers support it. A study by Williamson (2023) indicated a gap in understanding the complex relationship between teacher facilitation and the development of critical thinking within a PBL framework. This implies that it is necessary to thoroughly investigate particular instructor behaviours, tactics, and interventions that have the biggest impact on students' development of critical thinking abilities. Additionally, there is also a gap in the lack of comprehensive longitudinal studies in tracking the persistence and application of critical thinking skills in real-world scenarios over an extended period, since most studies provide insights into short-term effects.

A study done in an Italian secondary school showed that some teachers applied project-based learning while teaching computer classes. However, some gaps were noted, which included scarcely formalised projects which were not fully project-based learning compliant, as a result of poor planning and poor definition of learning goals. Hence, there was a need for training teachers to help them develop project-based learning compliant projects. Additionally, certain student projects, both in terms of design and evaluation, do not concentrate on the particular skills of the subject area field (Giaffredo et al. 2022). Likewise, in Japan, according to Yamada (2021), a study on the application of project-based learning in teaching English noted that English teachers actively use project-based learning in their classes. However, there was a gap in using project-based learning between disciplines, which can be filled by teachers having an attitude of learning from each other and learning events.

A meta-analysis study conducted in China by Zhang and Ma (2023) noted that project-based learning greatly enhanced students' learning outcomes and positively contributed to academic achievement, affective attitudes, and thinking skills when compared to traditional teaching models. The study's findings demonstrated that many moderating factors, such as the region, subject area, course type, academic period, group size, class size and experimental period affected the efficiency of project-based learning and teaching. From a pedagogical standpoint, project-based learning works best in small groups of four to five people; with the project taking place over between nine and eighteen weeks, it is more suitable and has clearer benefits for use at the high school level. However, there was a need to integrate technology into project-based learning.

Inadequate facilities in various institutions were another gap noted in the use of project-based learning. According to Boateng et al. (2023), teachers teaching agriculture in Ghana find it difficult to engage their students in the basic hands-on experience required for the programme due to inadequate facilities. As a result, teachers usually modify their methodology when working in disadvantaged schools but where they are not able the theory-based approach was used. These facilities included school farms and a laboratory for research.

Ndahimana and Nkundabakura's (2023) study on lower secondary Mathematics and Science teachers' perceptions towards project-based learning in Rwanda indicated that teachers had extremely positive perceptions of the project-based learning approach. Additionally, project-based learning was relevant in improving students' skills, hence more effective in implementing the CBE. However, there was a need to increase training and follow-up of the trainees in order to assess the implementation of what was learnt and the challenges faced. Likewise, in another study by Ntawuzibymanikora (2025), the following gaps were noted in the use of project-based learning: limited resources, insufficient teacher training, and difficulties in aligning assessment for the projects given.



According to a study by Kidega et al. (2024) in Uganda, project-based learning enables students to learn by doing, which fosters teamwork, investigation, and a sense of discovery. Hence, project-based learning develops the core competencies that are impacted by the curriculum. However, a gap was noted with regard to the frequency, efficiency and relevance of the projects given. Additionally, according to Namaalwa et al. (2024), project work was used to assess learners, which allows teachers to identify learners who were more creative than others. However, there was a challenge of not having a laid down procedure by the ministry for assessment, hence, teachers sit in departments to come up with ways of assessment.

Project work techniques and encouraging student discussions enhance the development of creativity and imagination competency. This is according to the study by Lola et al. (2023) in Kitui West Sub-County, Kenya. However, there is a need to create an environment where teachers and learners collaborate to foster imaginative and creative skills. Likewise, inadequate pedagogy and evaluation training for teachers leads to implementation uncertainty as noted by Wanyama (2025).

Teachers are using project-based learning in their lessons, however there is a need to ensure that the teachers are sufficiently trained, necessary resources are provided, assessments of projects are well aligned, using project-based learning between disciplines, integrate of technology in the project-based learning and comprehensive longitudinal studies in tracking the persistence and application of critical thinking skills in real-world scenarios over an extended period since most studies provides insights on short-term effects. Notably, when these gaps are addressed, teachers will be able to effectively use project-based learning in the implementation of competency-based education.

Theoretical Framework

The study employed Gross' (1971) curriculum implementation theory. The theory emphasises curriculum implementation based on four key elements, which are related, namely: teacher competence, teacher capacity, adequate provision of teaching and learning materials and management of teacher support. The first element states that teacher competence is key since the implementation of the curriculum needs well-equipped teachers with relevant content for its effective implementation. Hence, teacher training is essential. The second element is the capacity of the teacher as a curriculum implementer, which requires clarity and awareness of the curriculum for successful implementation. The acquisition of desired skills, attitudes, behaviours, and knowledge for implementing the curriculum can be aided by the teacher's continuous attendance at in-service training through workshops and seminars.

Adequate provision of essential teaching and learning materials is key for either new or existing curriculum implementation, which is the third element. The achievement of desired competencies requires relevant learning and teaching resources for the specific task. The fourth element entails management of teacher support in classroom organisation. Since they collaborate well to ensure that the curriculum is implemented smoothly, student participation in the learning process, where the institution's head support is crucial in facilitating teacher classroom management. (Gross,1971)

Therefore, Gross Curriculum implementation theory was deemed appropriate, for there existed a close link between it and this study since it entailed the essentials of curriculum implementation. The theory was appropriate for this study since it focuses on the assessment of teachers' pedagogical preparedness in the use of project-based learning, which will require the school and the stakeholders to provide resources. Teachers' ability to assess learners using project-based learning will depend on their training and capacity.



Methodology

This section included the research design, target population, sample size, sampling procedures, research instruments and data analysis.

This study adopted a descriptive survey research design (Creswell & Creswell, 2017). This design was adopted because it allows quantitative data from a relatively large and geographically dispersed population to be systematically collected, organised and analysed in order to describe the current state of a phenomenon and investigate relationships among variables without the need for experimental manipulation (Sasfiani & Adelia, 2024). The study was conducted in Nyeri County, Kenya.

The target population was 391 head teachers and 1980 teachers in public junior secondary schools in Nyeri County, Kenya. According to the Ministry of Education, these schools are divided into eight sub-counties, and each sub-county has the following number of schools, namely: Kieni West-58, Kieni East -57, Mathira East-50, Mathira West-35, Tetu-44, Mukurweni-48, Nyeri South-55, and Nyeri Central-44. According to Mugenda and Mugenda (2019), a sample size of ten percent to thirty percent of the target population is considered adequate for descriptive survey research. Using simple random sampling for both headteachers and teachers, 10% of each group was selected, resulting in a sample size of 39 headteachers and 198 teachers.

A closed -ended questionnaire was used to collect data from the teachers, while an interview schedule was used to get data from the headteachers. The questionnaire was structured to help respondents maintain focus on examining the use of project-based learning. Likewise, an interview schedule was developed to collect precise data on how teachers use project-based learning in their lessons.

The data collected was quantitative data from the questionnaires and qualitative data from the interview guide, and was examined both qualitatively and quantitatively. Data obtained from questionnaires completed by teachers were coded and analysed using the Statistical Package for the Social Sciences (SPSS). They were summarised using descriptive statistics, including percentages, means and standard deviations. In addition, qualitative interview data were transcribed, grouped into themes and analysed thematically to provide in-depth explanations on teacher pedagogical preparedness in the use of project- based learning in the implementation of CBE to complement the quantitative findings.

Validity and Reliability

The study ensured content validity by expert evaluation, where the researcher consulted the academic supervisors who assessed whether the instruments addressed the research objectives. This study ensured reliability by piloting in Laikipia County with 4 headteachers and 20 teachers. The reliability of the instrument was assessed using Cronbach's alpha, which yielded coefficients of 0.855 for teachers. This value exceeds the conventional threshold of 0.70, confirming strong internal consistency.

Results and Discussions

The study sought to assess teachers' pedagogical preparedness in the use of project -based learning in the CBE implementation. For the researcher to be able to achieve this objective, the teachers indicated their level of agreement on the use of project -based learning using a five -point Likert scale as: A-Always (5), F-Frequently (4), S-Sometimes (3), R-Rarely (2), and N-Never (1). The responses were presented in the table below:

*Table 1: Teachers' pedagogical preparedness in the use of project -based learning in the CBE implementation*

Statement	A %	F %	S %	R %	N %	Mean	Std.D
How often do you incorporate project -based learning in your lessons?	18.2	36.9	31.8	10.6	2.5	3.58	0.988
When using project- based learning, do you integrate real- world or community-based problems in your project?	17.2	47.5	29.8	3.5	2.0	3.74	0.855
How often do you receive support to enhance your ability to implement project-based learning	14.1	28.3	41.4	13.2	3.0	3.77	0.983
How often do you assess student learning outcomes from project -based activities?	19.7	32.8	30.3	14.6	2.6	3.53	1.046
Average	17.3	36.3	33.3	10.5	2.5	3.66	0.968

The table shows a summary of teachers' responses to the use of project-based learning in the implementation of CBE. On their responses on how often they incorporated project- based learning in their classrooms, 18.2% of the teachers incorporated it always, 36.9% frequently, 31.8% sometimes, 10.6% used it rarely, while 2.5% never incorporated project-based learning in classrooms. An average score of 3.58 and a standard deviation of 0.988 showed that project-based learning was being incorporated during lessons. This indicates that 55.1% of teachers used project -based learning in their lessons. This agrees with Ndahimana and Nkundabakura (2023), who indicated that teachers had extremely positive perceptions of the project -based learning approach, hence applying it in their lessons.

Regarding the integration of real- world problems or community- based problems in the projects given, about 17.2% ensured that they always integrated, 47.5% frequently, 29.8% sometimes, 3.5% rarely, while 4.0% never integrated. An average score of 3.74 with a standard deviation of 0.855 indicates that most teachers incorporated real-world problems or community- based problems in the projects given to learners. About 64.7% of the teachers integrated the real -world problems or community -based problems in the projects given frequently. These findings agree with Boateng et al. (2023), who noted that the use of community-based challenges and project-based learning is important since it is meant to assist students in gaining practical experience. However, a lack of the necessary resources and facilities needed may hinder the integration of real-world problems or community -based problems.

Additionally, on receiving support to enhance teachers' ability to use project-based learning, 14.1% reported that they received support always, 28.3% frequently, 41.4% sometimes, 13.2% rarely, while 3.0% rarely received the support. The mean of 3.77 with a standard deviation of 0.983 suggests that a majority of teachers do not receive support to enhance their ability in project-based learning. This indicates 42.4% of the teachers received support frequently or sometimes; however, 60.6% of the teachers received the support either sometimes, rarely, or never received any support. This indicates that there is a need for teachers to be given more support. This agrees with Ndahimana and Nkundabakura (2023) on the need to increase training and follow-up of the teachers in order to assess the implementation of what was learnt and the challenges faced in the use of project- based learning.



Likewise, on teachers' assessment of learners' outcome using project-based learning, about 19.7% of the teachers reported that they assessed learners always, 32.8% did it frequently, 30.3% sometimes, 14.6% rarely, while 2.6% never assessed the learners. A mean of 3.53 and a standard deviation of 1.046 suggest that a majority of teachers assessed their learners. About 52.5% of the teachers assessed their learners frequently and always, indicating that a good number of the teachers assessed their learners. This supports Ntawuzibymanikora's (2025) assertion that there are challenges in coordinating assessment with project-based learning strategies, which may account for the fact that some teachers do not always evaluate their students.

The headteacher interviews on incorporating project-based learning revealed that teachers incorporated project-based learning in their lessons. This was done by dividing learners into defined groups where they work together on the projects given for the term or even for the lessons. Additionally, learners were given projects connected to real life and the community and are expected to present their findings after a given period of time.

Headteacher 5 said that: *"Teachers assign practical projects such as class vegetable garden linked to science and nutrition with learners keeping simple project diaries which are reviewed weekly and present their findings at the end of each month"*

Also, headteacher 23 said that:

"Teachers assign small group projects tied to real life situations, such as designing a kitchen garden for science or preparing a simple household budget for mathematics, and then the learners present their work in the lessons"

Further, the headteachers noted that to ensure that project-based learning is effective, there is a need to ensure that there is provision of necessary materials required by both the government and parents. Headteacher 33 said: *"Some parents do not give the resources needed to make some of the projects needed, and as a result, at times teachers are forced to provide these materials so that the learner will be assessed. In addition, headteacher 17 stated that: "There should be provision of materials needed for the project by both the government and the teachers"*

Regarding on the ways to ensure effective use of the project-based learning, teachers should make up time in the evenings since lesson times are insufficient. Thus, more time should be allocated for projects. Similarly, the project assessment instrument should be made simpler and teachers should receive basic training on both the projects and their evaluation. Based on the headteachers, teachers use project-based learning in their lessons, but they faced some challenges, such as a lack of enough resources and not enough time allocated for the projects. Therefore, these findings agree with Ntawuzibymanikora (2025), who noted that challenges such as limited resources, insufficient teacher training, and difficulties in aligning assessment with project-based learning affect the effective use of project-based learning.

Therefore, the findings revealed that a majority of teachers have embraced project-based learning by incorporating project-based learning classrooms, with 55.1% of teachers using it always and frequently. Additionally, 64.7% always and frequently integrate real-world or community-based problems in their projects. Also, 42.4% of teacher receive support to enhance their ability to implement project-based learning. Hence, this showed that teachers have been trained on project-based learning and are able to use project-based learning in their lessons. However, more training and support should be given to the teachers to ensure effective use of the project-based learning, since only 42.4% received the support. Additionally, based on the headteachers, there should be provision of the necessary



resources for project-based learning by both the government and parents and have a simplified assessment instrument.

Therefore, these findings align with the Gross' (1971) curriculum implementation theory, which is based on four key elements namely: teacher competence, teacher capacity, adequate provision of teaching and learning materials and management of teacher support. For instance, teacher competence and capacity are achieved by teachers' training through attending workshops and seminars, as revealed by interviewing the participants. As a result, 55.1% of teachers were able to use project-based learning. However, there was a need for more training for teachers to ensure more use of project-based learning in the classroom. In addition, concerning adequate provision of teaching and learning materials, there is a need to provide resources to ensure effective use of project-based learning, as it was proposed by the participants. Finally, about the management of teacher support, the school's head of support is crucial in facilitating teacher classroom management. Based on the findings, 42.4% of teachers received support to enhance their ability to use project-based learning. Hence, more support is required to be given to the teachers.

Conclusion

In conclusion, the purpose of the study was to assess the use of project-based learning by teachers in the implementation of CBE in Nyeri County, Kenya. The findings indicated that 55.1% of the teachers were using project-based learning in classrooms, which was also confirmed by the headteachers, 64.7% were integrating real-world problems or community-based problems when giving the projects. Additionally, 42.4% of the teachers often received support to enhance their ability to implement project-based learning, while 52.5% of teachers assess learners' outcomes using project-based learning. However, there is a need to enhance the support given to the teachers to enhance their ability to implement project-based learning, since only 42.4% of the teachers received the support. This will guarantee that teachers have the self-assurance, develop their abilities, and successfully employ project-based learning.

Additionally, there is also a need to provide the necessary resources needed, increase time allocated to project-based learning and have a simplified assessment procedure for the projects given. Therefore, the findings from the study conclude that teachers are using project-based learning in their lessons, ensuring that they integrate real-world or community-based problems in the projects given and assessing their learners. Nevertheless, there is a need to ensure that the teachers receive support to enhance their ability to use project-based learning and the provision of the necessary resources needed by both the schools and parents.

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