

Research Article

Exploring the Integration of Key Inquiry Questions in Lesson Planning and Delivery Among Student Teachers: A Case of the University of Nairobi, Kenya

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Abstract

Kenya's Competency-Based Education system represents a significant transformation in learning philosophy, aimed at producing empowered, competent and ethical individuals. Inquiry-based learning (IBL) is central to this paradigm and involves the use of Key Inquiry Questions (KIQs). KIQs focus and direct research, boost student curiosity, promote deeper understanding, active learning and critical thinking. Empirical research shows that despite the paradigm shift, teachers still use close and teacher-directed questions that emphasise recall rather than exploration. This limits acquisition of higher-order thinking skills among learners, reduces learners' engagement, results in minimal learner autonomy and results in shallow learning. The purpose of this study was to investigate how effectively student teachers from the University of Nairobi integrated KIQs in both the planning and actual delivery of their lessons during teaching practice. Specifically, the study sought to determine the extent to which these trainee teachers used KIQs which would promote inquiry-based engagement in the classroom. The study intended to provide insights into student teachers' preparedness to apply questioning strategies that support meaningful learning during their practicum experience. It was guided by Vygotsky's Social Constructivist Theory, which emphasises learning through social interaction and meaningful questioning. A descriptive survey design was employed. Using purposive sampling, 18 student teachers from Junior Secondary and Pre-primary schools were involved. The student teachers were from four teaching practice zones: Eastern, Nairobi, Nakuru and Kakamega. Research instruments used were questionnaires, a lesson plan evaluation tool and observation schedules. Data collected was analysed using content analysis and descriptive statistics. Findings show that majority of the student teachers' KIQs 24 (67%) from their lesson plans were relevant, appropriate and aligned with learning outcomes, most of the KIQs 36 (80%) were not incorporated into the parts of a lesson plan, an average number of students teachers 9 (50%) did not use the KIQs in the lesson delivery, though they were indicated in the lesson plan, an average number of student teachers 4 (44.5%) used the KIQs during the lesson delivery, while only 1 (11%) used them during the lesson's conclusion. The study recommends strengthening training on KIQs in teacher education programmes and enhancing practical training on KIQ development and use.

Keywords

Key Inquiry Questions, Student Teachers, Competence-Based Education, Inquiry-based Learning, Teaching Practice

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1. Introduction

Key Inquiry Questions (KIQs) are questions that focus on critical thinking, curiosity and promote deeper learning and understanding. Integrating KIQs in the learning process transforms learning from content delivery to inquiry-driven exploration. Kenya's Competency-Based Education (CBE) system, introduced in 2017–2018, has organised learning around competencies rather than content, with an emphasis on what the learner can do with what they know. It aims to be more learner-centred, practical and focuses on real-world and 21st-century skills such as communication and collaboration, critical thinking and problem-solving, creativity and imagination, digital literacy, citizenship and learning to learn. The CBE system represents a significant transformation in learning philosophy, aiming at producing empowered, competent, and ethical individuals. Central to this paradigm is inquiry-based learning (IBL), which promotes the use of Key Inquiry Questions (KIQs) [9]. Inquiry-based learning (IBL) is a form of active learning that starts by posing questions, problems or scenarios. It contrasts with traditional education, which relies on the teacher presenting facts and their knowledge. Inquiry-based instruction is closely related to developing and practising thinking and problem-solving skills [5].

According to Qablan et al. [25], inquiry-based learning is an approach that encourages learners to engage in problem-solving through exploration and high-level questioning. It incorporates learners' active participation by involving them in posing questions and sharing real-life experiences (Muchira et al., [16]). This approach's basis is to channel the learners' thought process through queries and help them learn "how to think" instead of "what to think."

The Competency-Based Curriculum (CBC) emphasises learner-centred teaching approaches that foster critical thinking, creativity and real-world problem-solving. A core strategy for achieving these goals is the use of Key Inquiry Questions (KIQs), which are fundamental to inquiry-based learning. These are open-ended questions designed to spark curiosity, provoke critical thinking and connect learning to real-life contexts. The questions challenge learners to reflect, analyse and engage meaningfully with content (Florah, [7]; Muge & Waiganjo, [17]).

Research indicates a positive impact of inquiry-based learning on learners' achievement. A six-month inquiry-based learning (IBL) science project in Bangladesh, conducted with middle and high school learners, reported a statistically significant effect on the development of 4C skills (communication, collaboration, critical thinking, and creativity) (Nahar & Machado, [20]). A study examining the effect of inquiry-oriented approaches on students' performance in History and Government at the Kenya Certificate of Secondary Education (KCSE) level in Kericho County revealed that inquiry-based learning enhances critical thinking and problem-solving, improving academic outcomes (Langat, Situma

& Kapkiai, [13]). Muge and Waiganjo [17] examined inquiry-based learning and the effective development of the twenty-first-century skills in secondary agriculture classrooms in Kenya. They found that IBL enhanced learning, motivation, curiosity and imagination. Additionally, Ahmad et al. [1] concluded that inquiry-based learning develops critical thinking skills and the ability to undertake investigations. In a review by Escalante [6], it was also found that learners who used inquiry-based learning achieved higher levels in their language learning because they had an active role in the learning process.

While KIQs are embedded in CBC Curriculum Designs and despite the numerous gains in the paradigm shift, research suggests that teachers struggle to translate theory into practice, particularly when incorporating inquiry strategies in real classroom settings (Mwangi, [19]). According to Kiptoo [11], some teachers lack a foundational understanding of CBC's principles and the teaching approaches it demands, often leading them to resort to traditional methods. Despite the positive findings reported in Langat, Situma, and Kapkiai's [13] study, it was also noted that teachers reported difficulties in implementing IBL due to limited resources and inconsistent use of the learning approach. Muge and Waiganjo [17] and Kunga [12] noted that teachers faced difficulties in applying IBL effectively due to limited resources and inadequate teacher training in designing, implementing and managing inquiry-based lessons. They recommended the need to retool teachers to develop a good understanding of the IBL principles and practices.

In addition, Hiltunen, Karkkainen and Keinonen [8] posit that research indicates that both teacher-led and recitation questions dominate in classrooms; teachers ask more closed-ended questions than open-ended questions. Their study on the use of questioning techniques by student teachers during inquiry-based biology lessons revealed that primary school student teachers primarily asked questions to gather factual knowledge, concepts and basic knowledge. Secondary school student teachers also asked questions mainly about concepts and basic knowledge. The study recommended that student teachers' questioning should be developed more towards higher-order thinking.

The success of IBL and KIQs implementation depends on effective teacher preparation, stakeholder collaboration, and continuous monitoring and support. Effective teacher training preparation will lead to effective lesson planning and delivery. Effective lesson planning will integrate the use of KIQs which is crucial in aligning the demands of the CBC in Kenyan primary and secondary schools. The learner's engagement in class will increase due to the opportunities to be active participants, critical and creative thinkers and problem-solvers. This will lead to more profound and meaningful comprehension of concepts that promote deeper learning.

2. Objective

To examine the extent to which student teachers from the University of Nairobi incorporate Key Inquiry Questions (KIQs) in Competency-Based Curriculum into their lesson planning and delivery during their teaching practice.

The significance of this study lies in providing insight into the readiness of pre-service teachers to implement inquiry-based strategies, informing teacher educators and curriculum designers about areas requiring more focus in professional development and supporting policymakers in aligning teacher preparation with CBE needs.

3. Methodology

The study employed the descriptive survey design, which was deemed appropriate for obtaining interpretable information regarding student teachers' practices during teaching practice. This design enabled the collection of data about the integration of KIQs in lesson planning and delivery without manipulating the study environment. It also facilitated both qualitative and quantitative descriptions of the instructional practices demonstrated by the student teachers.

The target population consisted of third year Bachelor of Education students at the University of Nairobi who were undertaking their teaching practice unit. The participants were drawn from four officially designated teaching practice zones: Eastern, Nairobi, Nakuru and Kakamega regions. These zones presented geographical diversity in the teaching contexts and represented different educational settings in Kenya. From the population of 76 student teachers supervised, purposive sampling was used to select 18 student teachers teaching in

Junior Secondary and Pre-Primary levels. Purposive sampling was chosen because the study required participants who were handling CBC classes.

The research instruments used were questionnaires, a lesson plan evaluation tool and observation schedules. Data collection occurred during the teaching practice period. After obtaining appropriate permissions, the teaching practice schools in the four zones were visited. Questionnaires were administered to student teachers, followed by lesson plan reviews. Observations were conducted during scheduled lessons, ensuring minimal disruption to normal teaching activities. All data were collected in adherence to ethical standards, including voluntary participation, confidentiality and informed consent.

The study utilized both qualitative and quantitative analysis techniques. Descriptive statistics such as frequencies and percentages were used to summarize quantitative data obtained from the questionnaires and evaluation tools. Content analysis was applied to qualitative responses and observation notes to identify emerging themes, patterns and interpretations related to teaching practices. The combined analytical approaches provided a comprehensive understanding of student teacher instructional experiences.

4. Results and Discussion

KIQs in Student Teachers' Lesson Plans

The lesson plan evaluation tool was used to assess the student teachers' lesson plans in both subjects. Table 1 presents findings on whether student teachers incorporated KIQs into their lesson plans and whether the KIQs were relevant, appropriate and aligned with the learning outcomes.

Table 1. Use of KIQs in the Lesson Plan.

Responses	Yes		Some		No	
	F	%	F	%	F	%
Lesson plan contains relevant and appropriate KIQs	24	67%	9	25%	3	8%
KIQs align with learning outcomes.	33	92%	--	-	3	8%

The majority of the student teachers' lesson plans (67%) had KIQs. The KIQs were relevant and appropriate for the level intended. Some of the student teachers' lesson plans (25%) had KIQs, while (8%) did not have KIQs. The majority of the KIQs (92%) in the lesson plan were aligned with learning outcomes. However, (8%) KIQs were not relevant, appropriate or aligned with the learning outcomes. The findings show that the majority of the KIQs in the student teachers' lesson plans were relevant and appropriate. This implies that student teachers are aware of the importance and neces-

sity of including appropriate and relevant KIQs in their lesson plans. KIQs help anchor learning outcomes during lesson planning and this leads to purposeful and aligned lessons. They also drive inquiry and guide learners' engagement during lesson delivery, leading to active and focused instruction. This aligns with the sentiments expressed by Wiggins and McTighe [26], who argue that essential questions in the lesson enable learners to explore significant ideas and form meaningful connections. The questions are essential as they foster a deep understanding rather than rote memorisation.

The Nature of the Student Teachers' KIQs

The study examined the quality of the student teachers' KIQs to determine the nature of the questions used. Table 2

presents the quality of KIQs in the student teachers' lesson plans.

Table 2. *The Student Teachers' KIQs Quality.*

Responses	F	%
Factual: Descriptive KIQs (What, who, where, when)	15	33%
Conceptual: Analytical KIQs (How, why)	30	67%
Debatable (Critical) KIQs	-	-
	45	100%

Table 2 shows that the quality of the questions was appropriate as the student teachers were able to incorporate 15 (33%) factual and 30 (67%) analytical questions. This implies that the KIQs used by the student teachers are questions that are designed to guide learners' thinking and encourage transfer of understanding. This shows that if the student teachers effectively integrate the KIQs during the learning process, deep and active participatory learning will be realised. The need for appropriate questions is supported by Oduor [22] and Wiggins and McTighe [26], who agree that well-formulated inquiry questions promote learner understanding and should be embedded across the lesson. Similarly, Chigeza and Jackson [3] describe relevant KIQs as essential tools for promoting

learner-centred engagement and critical thinking, particularly when aligned with curriculum goals and real-life contexts. Indeed, a good lesson starts with a factual question to ground learning, moves to a conceptual question to deepen understanding and ends in a debatable question to foster critical thinking and application.

Incorporation of KIQs in the Parts of a Lesson Plan

Concerning the incorporation of KIQs in the parts of a lesson plan, the study examined whether student teachers indicated KIQs in the different parts of a lesson. Table 3 presents the findings on how the KIQs were incorporated into the different parts of the lesson.

Table 3. *KIQs Incorporation in the Parts of a Lesson Plan.*

Responses	Incorporated		Not incorporated	
	F	%	F	%
KIQs are indicated in the parts of the lesson.	9	20%	36	80%

Table 3 shows that most of the student teachers' KIQs (80%) were not incorporated into the different parts of the lesson plan, indicating when they would be used. This implies that the student teachers did not specify during which part of the lesson the KIQ would be used. KIQs should be incorporated at all stages of a lesson, which include the introduction, development and conclusion, as each stage serves a distinct and purposeful role in guiding the teaching and learning process. At the introduction stage of a lesson, the KIQ introduces the central problem or theme of the lesson and helps learners

connect new learning with existing knowledge. During the development stage, the KIQs function as a thinking lens as learners refer back to the questions as they investigate, discuss or apply concepts. At the conclusion stage, the KIQ supports formative assessment, encouraging learners to articulate their understanding and think about next steps.

Use of KIQs in Lesson Delivery

The study further sought to establish when student teachers used KIQs during lesson delivery. Table 4 presents findings on the use of KIQs during lesson delivery.

Table 4. Use of KIQs During Lesson Delivery.

Responses	Incorporation		Non-incorporation	
	F	%	F	%
KIQs incorporation in lesson delivery	9	50%	9	50%

Responses	Introduction		Lesson development		Conclusion	
	F	%	F	%	F	%
Usage of KIQs in different stages of the lesson	4	44.5%	4	44.5%	1	11%

During the lesson delivery, 9 (50%) student teachers integrated KIQs in their lesson delivery while 9 (50%) did not. This implies that some student teachers indicated KIQs in the lesson plan but did not incorporate them during the lesson delivery. This shows that some student teachers include KIQs in the lesson plan as a formality, as they do not integrate them during lesson delivery. This reduces the instructional value of the KIQs. Besides indicating KIQs at the beginning of the lesson plan, effective use of KIQs requires student teachers to integrate them into the different parts of the lesson, not just in one part. When introduced at the beginning, revisited during learning and reflected upon at the end, KIQs become powerful tools for enhancing learner understanding, promoting inquiry and reflection, supporting competency development and aligning teaching with CBC principles.

The majority of the student teachers, 4 (44.5%) and 4 (44.5%), used the KIQs during the lesson development and introduction parts of the lesson, respectively. In comparison, 1 (11%) of them used the KIQs during the conclusion part of the lesson. This implies that most of the student teachers integrate

KIQs in the introduction and development parts of the lesson, but do not use the KIQs to recap the lesson. According to Oduor [22], KIQs anchor learners' attention and direct the learning process from the introduction. Wiggins and McTighe [26], on the other hand, argue that KIQs should be used at the beginning of a lesson to frame the learning goals and set up content for exploration. Further, Chigeza and Jackson [3] suggest that during the lesson development, KIQs act as scaffolds that help learners stay focused on what really matters as they work through activities. Additionally, Wiggins and McTighe [26] stress that lessons should reflect on the KIQs at the end, helping learners to consolidate what they have learned and how it applies beyond the classroom. According to Oduor [22], when student teachers fail to revisit the KIQs at the conclusion stage, they miss the chance to consolidate inquiry-based learning.

Student Teachers' Views on KIQs

The study sought to examine student teachers' views on the KIQs. Table 5 presents findings on their views on the importance of KIQs.

Table 5. Student Teachers' Views on the Importance of KIQs.

Responses	F	%
Encourages asking questions and seeking answers through exploration.	7	13%
Guides the delivery of content or a lesson.	12	23%
Sparks learners' interest, curiosity and creativity in learning.	10	19%
Guides the design of activities and learning resources.	8	15%
Promotes critical thinking and problem-solving.	15	29%

Table 5 shows that the majority of responses from the student teachers on the views on the importance of KIQs, 15 (29%), indicated that KIQs promoted critical thinking and

problem-solving. In comparison, 12 (23%) indicated that KIQs guided the delivery of content or a lesson, 10 (19%) indicated that KIQs sparked learners' interest, curiosity and

creativity in learning, 8 (15%), they guided the design of activities and learning resources and 7 (13%), they encouraged asking questions and seeking of answers through exploration. This implies that the student teachers are aware that KIQRs are powerful tools in lesson delivery, particularly within inquiry-based and competency-based education models, as they help shape the structure, focus and purpose of a lesson. They promote deeper thinking and reflection, support backward planning as outcomes guide the choice of learning experiences, ensure learning tasks are purposeful and not just activity-based, encourage learners to ask further questions and shift lessons from teacher-centred to learner-centred. The

findings align with Wiggins and McTighe [26], who state that KIQRs promote deep understanding and help learners explore big ideas. KIQRs also shape lesson delivery by focusing instruction on inquiry, problem-solving, and application of knowledge (KICD, [10]; Oduor, [22]). In addition, KIQRs contribute to learner autonomy, deeper engagement, and critical thinking (OECD, [23]).

Student Teachers' Views on What Informs KIQRs

The study sought to examine student teachers' views on what informs their construction of KIQRs. Table 6 presents findings on their views on what informs their construction of KIQRs.

Table 6. Student Teachers' Views on What Informs KIQRs.

Response	F	%
Guided by learning outcomes	18	45%
Guided by learning experiences	4	10%
Guided by developmental level and learners' interests and experiences	2	5%
Guided by lesson content	6	15%
Guided by the strand and sub-strand	4	10%
Questions that encourage thinking, discussion and exploration.	2	5%
Age-appropriate and relevant questions	4	10%

Table 6 shows that the majority of responses from the student teachers on the views on what informs their construction of KIQRs, 18 (45%), indicated that they were guided by learning outcomes. In comparison, 6 (15%) indicated that they were guided by lesson content, 4 (10%) indicated that they were guided by learning experiences, by the strand and sub-strand or age-appropriate and relevant questions and 2 (5%) were guided by developmental level, learners' interests and experiences or questions that encouraged thinking, discussion and exploration. This implies that student teachers derive their KIQRs from Competency-Based Curriculum learning outcomes and align them with the expected compe-

tencies and values. The age also guides them, background knowledge and experiences of learners and the need to guide exploration and critical thinking. The findings on guidelines when formulating KIQRs concur with Chigeza and Jackson [3], who posit that teachers should use curriculum goals, learners' context and real-world issues to design meaningful KIQRs.

Challenges Faced When Using KIQRs

The study sought to assess challenges student teachers faced when using KIQRs during their lesson planning and delivery. Table 7 presents findings on challenges faced when using KIQRs.

Table 7. Challenges Student Teachers Faced When Using KIQRs.

Responses	F	%
Limited time to fully explore each KIQR during a lesson/Time-consuming	6	33%
Finding the appropriate level of complexity.	3	17%
Writing relevant, clear, concise and thought-provoking questions.	5	28%
Encouraging learners to think critically.	4	22%

Table 7 shows that the majority of the student teachers 6, (33%) faced the challenge of limited time to explore each KIQ during a lesson fully as they indicated that using KIQs was time-consuming. In comparison, 5 (28%) indicated that they faced the challenge of writing relevant, clear, concise and thought-provoking questions, 4 (22%) faced the challenge of encouraging learners to think critically and 3 (17%) faced the challenge of finding an appropriate level of question complexity. The findings imply that student teachers faced a major challenge of limited time to explore each KIQ fully during their lesson delivery and in writing relevant and thought-provoking questions. This may be due to poor planning, lack of KIQs structure, lack of adequate instruction and practice on the use of KIQs. Majority of the student teachers 13 (72%) indicated that they were taught about KIQs while 5 (28%) stated that they were not taught. One student teacher indicated:

“No, I was not taught, I just learned it myself from various online sources”.

This reveals a gap in teacher training, where student teachers should receive adequate preparation on the use of KIQs. This gap needs to be addressed to ensure the tenets of Kenya’s Competency-Based Education (CBE) system are achieved. The aim to ensure education is more learner-centred, practical and focused on real-world and 21st-century skills can be achieved if teachers use inquiry-based learning.

These findings concur with Maharma and Abusa’allek [14], who noted similar challenges in the integration of KIQs in the lesson delivery. The challenges include: lack of knowledge in developing relevant and deep-thinking questions (Brew & Kapitzke, [2]), organisation of the inquiry and the capacity of the learners to explain their discoveries or think critically. Mutai and Ngeno [18] and Pike et al. [24] identified the challenges of time constraints and the tension between structured and open inquiry.

One respondent indicated that:

“I always feel pressured to cover much with little contact time”.

Further, a Kenya Institute of Curriculum Development (KICD) [10] report noted that a key gap in teacher education was the ability to craft and use KIQs effectively. It recommended targeted professional development and mentorship during teaching practice. Nderitu [21], on the other hand, noted that student teachers felt unsure about how to use KIQs to stimulate critical thinking.

The use of inquiry-based questions is more effective when teachers are well-trained and supported (Chin, [4]). Oduor [22] further argues that well-developed inquiry questions are essential for learner-centred instruction and that most teachers require structured support to generate and apply them meaningfully. In addition, Momanyi and Rop [15] further point out that teachers are the implementers of any curriculum. To focus entirely on curriculum implementation, they should be prepared thoroughly through in-service training since lack of

teacher preparedness is one of the impediments to successful curriculum implementation. Wiggins and McTighe [26] advocate for direct training of educators on how to write clear, thought-provoking inquiry questions, as KIQs play an essential role in guiding curriculum and instruction.

5. Conclusion

The study reveals that majority of the student teachers can write relevant, appropriate KIQs that align with learning outcomes, though it was noted that not all student teachers have been trained to prepare and use KIQs. Most of the student teachers’ KIQs 36 (80%) are not incorporated into the parts of a lesson plan, while an average number of student teachers do not use the KIQs in the lesson delivery, though they are indicated in the lesson plan. The majority of the student teachers use the KIQs during the lesson introduction and delivery, while only 3 (17%) use them during the lesson’s conclusion.

6. Recommendations

Based on the study findings, it is recommended that there should be an enhancement of practical training on KIQ development, integration and use during micro-teaching sessions. KIQ integration should be made a standard requirement in lesson planning formats by including a clearly labelled KIQ section in the lesson plan templates and by encouraging student teachers’ supervisors to check for KIQs when reviewing and approving lesson plans. Further, there should be an enhancement of support during teaching practice to avoid a lack of consistency in the use of KIQs in the parts of the lessons. Student teachers’ mentor teachers and supervisors should observe and give feedback on the use of KIQs throughout the lesson. There should also be reinforcement of the importance of using KIQs in the introduction to frame the purpose of the lesson, during the development of the lesson to guide exploration and at the conclusion of the lesson to support reflection and synthesis.

In addition, there should be strengthening of training on KIQs in Teacher Education Programmes. This can be done by having course units on inquiry-based learning and development of KIQs in the curriculum methods courses. Explicit instruction and modelling of KIQs use in all parts of a lesson should be provided. This should include micro-teaching sessions that demonstrate how to write and use KIQs effectively. It should also include monitoring and evaluation of KIQ implementation in the pre-service programme.

Moreover, there should be development of contextualised KIQ banks and planning resources such as online resource banks or handbooks, that provide subject-specific sample KIQs aligned to curriculum stands and learning outcomes for different levels.

Abbreviations

CBC	Competency-Based Curriculum
CBE	Competency-Based Education
IBL	Inquiry-Based Education
KCSE	Kenya Certificate of Secondary Education
KIQs	Key Inquiry Questions

Author Contributions

Ruth Mugo Kahiga is the sole author. The author read and approved the final manuscript.

Conflicts of Interest

The author declares no conflict of interest.

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