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THE EXTENT OF INCULCATING COMPETENCIES IN TEACHING COMPETENCE-BASED GRADE FOUR AGRICULTURE AMONG PUBLIC PRIMARY SCHOOLS IN NJORO SUB-COUNTY OF KENYA

(Research article)

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Abstract

This study aims to evaluate the integration of Competence-Based Grade Four Agriculture teaching competencies in public primary schools within Noro Sub-County, Kenya, examining prevalent teaching methodologies and their alignment with competence-based objectives. Data from 96 public primary schools in Njoro Sub-County were collected via a census method. A survey questionnaire, assessing teaching practices aligned with competence-based objectives, was employed. Data reliability was confirmed (Cronbach's Alpha = 0.743). Descriptive statistics using SPSS version 25 analyzed the data. Commonly used teaching approaches included question-and-answer sessions (Mostly used: 47.9%), discussions (Mostly used: 59.4%), and group work (Mostly used: 54.2%). However, the study revealed that project-based learning was utilized infrequently, with only 30.1% of teachers reporting it has mostly used application in Grade Four Agriculture classes. Similarly, problem-solving approaches were not extensively employed, with 45.2% of respondents indicating its mostly used implementation. Additionally, ICT tools were utilized to a limited extent, with 38.7% of teachers reporting it is mostly used application. Furthermore, agricultural field trips were notably underutilized, with only 9.4% of teachers indicating its mostly used implementation. While traditional methods dominated, lesser usage of project-based learning, problem-solving approaches, ICT tools, and agricultural field trips might hinder comprehensive competency development. Diversifying teaching methods aligned with Competence-Based Education principles is crucial for holistic competency development.

Keywords: Competence-based education, teaching competencies, public primary schools, Kenya

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1. Introduction

Agriculture plays a foundational role in the economic fabric of Kenya, standing as a pivotal pillar in the nation's economic structure. Its profound contributions extend far beyond the mere agricultural sector, significantly influencing Kenya's GDP and providing sustenance to a substantial segment of the population (Langat, 2021). The sector's multifaceted significance lies not only in ensuring the nation's food security but also in serving as a primary source of income for numerous households across the country. The livelihoods of many Kenyans are connected with agriculture, forming an essential part of their daily sustenance and economic stability (Eichsteller et al., 2022). Smallholder farmers, constituting a significant portion of the agricultural landscape, rely on their agricultural produce not only for personal consumption but also for generating income to sustain their families. This sector's resilience and dynamism have consistently supported rural communities, offering employment opportunities and fostering economic growth in these areas. Moreover, beyond catering to domestic needs, Kenya's agricultural sector plays a pivotal role in the global market. The export of agricultural products forms a critical component of the country's international trade, contributing substantially to generating foreign exchange (Nyoro, 2019). The export of goods such as tea, coffee, horticultural produce, and other agricultural commodities significantly bolsters the nation's economic stability and growth. This influx of foreign exchange earned through agricultural exports further strengthens Kenya's position in the global economy.

Schools play a pivotal role in shaping the future of agriculture by equipping students with competencies essential for success in the ever-evolving global work environment (Shayo, 2020). Beyond imparting theoretical knowledge, educational institutions serve as breeding grounds for cultivating a diverse skill set crucial to the agricultural sector. The contemporary workforce demands individuals who possess not just technical expertise but also problem-solving acumen, effective communication skills, networking capabilities, and the ability to collaborate effectively (Hernandez-de-Menendez et al., 2020). Due to ever-changing societal needs, schools serve as incubators, tasked not only with disseminating agricultural knowledge but also with instilling these essential competencies in students. As the agricultural sector becomes linked with technological advancements and global markets, the need for a skilled workforce proficient in multifaceted abilities becomes more pronounced (Manubag et al., 2023). Therefore, educational institutions bear the responsibility of not only educating students about the fundamental aspects of agriculture but also fostering a comprehensive competencies set essential for success in the competitive world of work. Moreover, schools serve as catalysts for igniting students' passion and interest in agriculture while simultaneously equipping them with the necessary tools to navigate its complexities. By integrating practical learning experiences, innovative teaching methodologies, and exposure to real-world agricultural challenges, schools can mold students into well-rounded individuals equipped to tackle the multifaceted demands of the agricultural sector (Kitcher, 2022). The role of schools extends beyond mere knowledge transfer; they act as crucibles where students acquire skills that are imperative for success in the agricultural workforce. Skills such as critical thinking, adaptability, problem-solving, and effective communication are not only desirable but have become indispensable in the modern agricultural landscape (Juhász & Horváth-Csikós, 2021). Schools, therefore, serve as essential hubs in nurturing these competencies, preparing students not just to be proficient

agricultural practitioners but also adaptable professionals capable of meeting the challenges posed by the rapidly evolving agricultural industry.

The landscape of education underwent a significant transformation in Kenya with the introduction of Competence-Based Education (CBE) in 2017 (Ministry of Education, 2018). This initiative, initiated by the Kenyan government, was a strategic response to address the evolving needs of both society and the workforce. Recognizing the limitations of traditional educational methodologies, CBE sought to overhaul the system, redirecting the educational focus from rote memorization toward a more pragmatic and competency-driven approach. At its core, CBE was conceived as a progressive educational framework aimed at fostering a paradigm shift within the country's education system. The fundamental objective of CBE is to revolutionize the way knowledge is imparted, emphasizing practical skills and competencies aligned with the demands of the contemporary world (Nyaboke et al., 2021). The introduction of CBE marked a departure from the emphasis on memorization of facts to a more dynamic learning approach centered on developing practical abilities and problem-solving skills. One of the primary motivations behind the adoption of CBE was to enhance the relevance and quality of education by bridging the gap between academic learning and real-world application (Mugambi, 2022). By integrating practical experiences, experiential learning, and competency-based assessments, CBE aims to provide students with a more holistic and comprehensive education. The focus shifted towards preparing learners not just to excel in examinations but also to thrive in practical scenarios, equipping them with skills essential for success in their future careers..

In examining Competence-Based Education (CBE) within agricultural contexts, exploring varied dimensions is essential. The following literature review sections investigate pivotal aspects of CBE's application in agricultural education. The literature explores various teaching approaches and the use of Information Communication and Technology (ICT) in promoting the acquisition of CBE competencies. In addition, the conceptual and theoretical frameworks are discussed.

2. Review of Literature

2.1. ***Experiential Learning in Agricultural Education***

Experiential Learning, a cornerstone of Competence-Based Agriculture Education, emphasizes immersive, practical learning methods. It prioritizes hands-on experiences, fieldwork, and application of theoretical knowledge within agricultural education (Shabani et al., 2023). This transformative pedagogical approach enables students to engage directly with farming practices, livestock management, and agribusiness scenarios. The immersive nature of experiential learning facilitates a deeper understanding of agricultural concepts and cultivates problem-solving abilities relevant to real-world agricultural challenges.

Experiential learning bridges the gap between theory and practice, enriching students' understanding of agricultural principles (Askren & James, 2021). By engaging in practical experiences, students transcend textbooks, directly interacting with the complexities of agricultural practices. This direct engagement allows them to gain a deeper appreciation for farming techniques,

livestock care, and operational intricacies in agribusiness. Moreover, this approach fosters problem-solving abilities necessary for real-world agricultural settings (Traini, 2019). Active participation in agricultural tasks compels students to think critically, analyze situations, and devise effective solutions. This hands-on engagement helps them develop problem-solving acumen, crucial for addressing agricultural challenges practically. Experiential learning's impact extends to augmenting theoretical knowledge and instilling confidence in students as they apply concepts in real agricultural scenarios (Bradberry & De Maio, 2019). This transformative educational approach empowers learners to connect theory with practice, fostering a holistic understanding of agricultural concepts and preparing them for the diverse challenges within the agricultural sector.

2.2. Project-Based Learning (PBL) in Agricultural Contexts

Project-based learning (PBL) within the sphere of CBE presents a structured and proactive approach that empowers students to delve into intricate agricultural challenges through project-based work (Hernández et al., 2021). This teaching approach is lauded for its effectiveness in cultivating critical thinking, fostering collaboration, and stimulating innovation within the agricultural domain (Irembere, 2019). Through steering students toward engaging in projects encompassing crop management, sustainable farming techniques, or entrepreneurial endeavors in agriculture, PBL serves as a conduit for the practical application of theoretical knowledge, facilitating the holistic development of skills essential for success in the agricultural sector. The effectiveness of PBL in agriculture lies in its structured framework that encourages students to enhance agricultural competencies (Oyewo et al., 2022)The process involves the identification of real-world problems within the agricultural landscape and devising solutions through project-based initiatives. This method not only facilitates a deeper understanding of agricultural concepts but also nurtures critical thinking skills as students navigate through multifaceted challenges inherent in agricultural practices.

Collaboration is a pivotal aspect of PBL, as highlighted by research (Mohammed Girei et al., 2020). Through collaborative project work, students engage in team dynamics, fostering cooperation and communication skills essential for successful teamwork within the agricultural sector. Collaborative efforts mirror real-world scenarios in agriculture, where collective problem-solving and teamwork are fundamental for addressing agricultural challenges effectively (Bird & Rice, 2021). Engaging in projects related to various facets of agriculture equips students with practical experiences that amalgamate theoretical knowledge with real-world scenarios (Vallera & Bodzin, 2020). Projects involving crop management, sustainable farming techniques, or agricultural entrepreneurship provide a platform for applying learned concepts in practical settings.

2.3 *Problem-Based Learning (PBL)*

Problem-based learning (PBL) strategies, an integral component of Competence-Based Agriculture Education, are designed to empower students to confront agricultural challenges through inquiry and problem-solving methodologies (Burris & Garton, 2020). studies by Ogweno et al. (2021) underscore the potency of PBL in stimulating students to analyze agricultural issues, propose

innovative solutions, and critically evaluate outcomes. Through immersing students in authentic agricultural dilemmas, this pedagogical approach catalyzes enhancing analytical skills, fostering teamwork, and honing decision-making abilities within diverse agricultural contexts. Problem-based learning encourages students to delve deeply into authentic agricultural problems, promoting active inquiry and analysis (Boncukçu & Gök, 2023). Moreover, PBL serves as a platform for students to propose innovative solutions to agricultural challenges (Mohammed Girei et al., 2020). By presenting authentic agricultural dilemmas, this approach encourages students to think creatively and devise effective strategies to address these challenges. Encouraging innovative problem-solving skills nurtures an entrepreneurial mindset, essential for adapting to and thriving in the dynamic agricultural landscape.

One of the salient strengths of PBL lies in its ability to enhance collaborative skills among students (Gabuardi, 2021). As students engage in dissecting and solving agricultural issues collectively, they learn to collaborate effectively, leveraging diverse perspectives and skill sets. Teamwork within the context of PBL mirrors the collaborative dynamics prevalent in real-world agricultural settings, preparing students for future professional endeavors. Additionally, PBL facilitates the development of robust decision-making abilities in diverse agricultural contexts (Nurtamara et al., 2020). Grappling with authentic agricultural dilemmas and evaluating potential solutions, students hone their decision-making skills. This hands-on experience empowers them to make informed decisions, crucial for navigating the complexities and uncertainties inherent in agricultural practices.

2.4 Field Trips in Agricultural Education

Field trips are instrumental in enriching students' comprehension of agricultural practices by offering direct exposure to authentic agricultural settings, and transcending theoretical knowledge to practical application (Foo & Foo, 2022). Excursions to farms, agribusiness establishments, or agricultural research centers allow students to observe agricultural methodologies firsthand, interact with industry professionals, and gain insights into the intricacies of agricultural operations. The significance of field trips lies in their ability to provide a tangible and immersive learning experience for students (Klippel et al., 2020). By witnessing agricultural processes firsthand, students move beyond theoretical understanding, engaging their senses and experiencing the practical aspects of agriculture. This direct exposure fosters a deeper understanding and appreciation of agricultural techniques, ranging from crop cultivation to livestock management and agribusiness practices.

Field trips serve as platforms for students to interact with industry professionals and experts (Pellas et al., 2019). Engaging with practitioners in the field allows students to glean firsthand knowledge, ask pertinent questions, and gain insights from experienced professionals. Such interactions provide valuable insights into industry practices, current trends, and the application of theoretical knowledge in real-world agricultural settings.

These excursions also allow students to comprehend the complexities of agricultural operations (Lee et al., 2020). Observing various stages of agricultural processes, from planting and harvesting to distribution and marketing, offers a holistic view of the agricultural industry. Understanding these

intricacies equips students with a comprehensive perspective, preparing them for the multifaceted challenges and diverse career opportunities within the agricultural sector. Moreover, field trips supplement classroom learning by offering a practical context for theoretical concepts taught in the curriculum (Zhao et al., 2020). Observing theoretical concepts in action reinforces classroom instruction, enhancing students' grasp of agricultural principles and techniques.

2.5 Class Presentations in Agricultural Contexts

Class presentations in agricultural education serve as dynamic platforms for students to showcase their comprehension of agricultural concepts while refining their communication and presentation proficiencies (McGovern et al., 2020). The study by Vallera and Bodzin (2020) emphasizes the pivotal role of class presentations in not only facilitating knowledge dissemination among peers but also fostering confidence in expressing agricultural ideas. presentations enable students to delve into various agricultural topics, share research findings, and propose innovative solutions to agricultural challenges, thereby refining their public speaking abilities and consolidating their understanding of agricultural concepts (Salem, 2019). The primary function of class presentations in agricultural education is to provide students with opportunities to communicate their understanding of agricultural principles Students, through these presentations, articulate their insights gained from theoretical learning, practical experiences, and research endeavors related to agriculture. This oral communication platform enables them to elucidate complex agricultural concepts, enhancing their ability to articulate ideas effectively.

class presentations create an environment conducive to knowledge sharing among peers (Boso et al., 2020). As students present their findings or solutions to agricultural challenges, they contribute to the collective learning experience of the class. This collaborative approach fosters an exchange of ideas, perspectives, and best practices within the agricultural domain, enriching the overall learning environment. Moreover, class presentations significantly contribute to the enhancement of students' public speaking skills (Tsang, 2020). Through regular practice and exposure to presenting on agricultural topics, students refine their ability to communicate ideas clearly and persuasively. This skill is crucial in professional settings within the agricultural sector, where effective communication is integral for disseminating information and fostering collaborations.

2.6. Transformative Role of Information and Communication Technology (ICT) Resources in Agricultural Education

The integration of Information and Communication Technology (ICT) in teaching agriculture has emerged as a transformative tool in modern educational practices, as emphasized by (Tiwari, 2022). The ICT offers a plethora of innovative resources and platforms that revolutionize the way agricultural concepts are taught and understood, enhancing both teaching methodologies and student engagement within agricultural education. Information and communication technology tools encompass a diverse range of resources such as educational software, simulations, online databases, mobile applications, and interactive multimedia, all tailored to facilitate the teaching and learning of

agricultural concepts (Shah et al., 2022). These tools provide dynamic and interactive experiences, allowing students to explore agricultural topics virtually, conduct simulations, and access a wealth of information beyond traditional textbooks.

One of the key advantages of ICT in teaching agriculture lies in its ability to make agricultural concepts more accessible and comprehensible to students (Njura et al., 2020). Through multimedia presentations, interactive simulations, and online resources, ICT offers visual and interactive representations of agricultural processes, enhancing students' understanding of complex topics such as crop management, soil science, and livestock production. In addition, ICT facilitates personalized and self-paced learning experiences in agriculture (Dewodo & Atiglah, 2020). Online platforms and educational software provide students with the flexibility to access agricultural materials at their convenience, catering to diverse learning styles and paces. Students can revisit lessons, engage in interactive quizzes, or access supplementary resources, fostering independent learning and reinforcing their understanding of agricultural concepts. ICT tools also foster innovation and practical application in agricultural education (Cheptirim et al., 2023). Platforms offering virtual labs, agricultural simulations, and modeling tools enable students to experiment with various agricultural scenarios, fostering creativity and critical thinking. This hands-on engagement with virtual environments allows students to explore real-world agricultural challenges, develop problem-solving skills, and propose innovative solutions within a controlled digital setting.

2.7 Conceptual Framework

Figure 1 presents the conceptual framework, which depicts the relationship between the study variables.

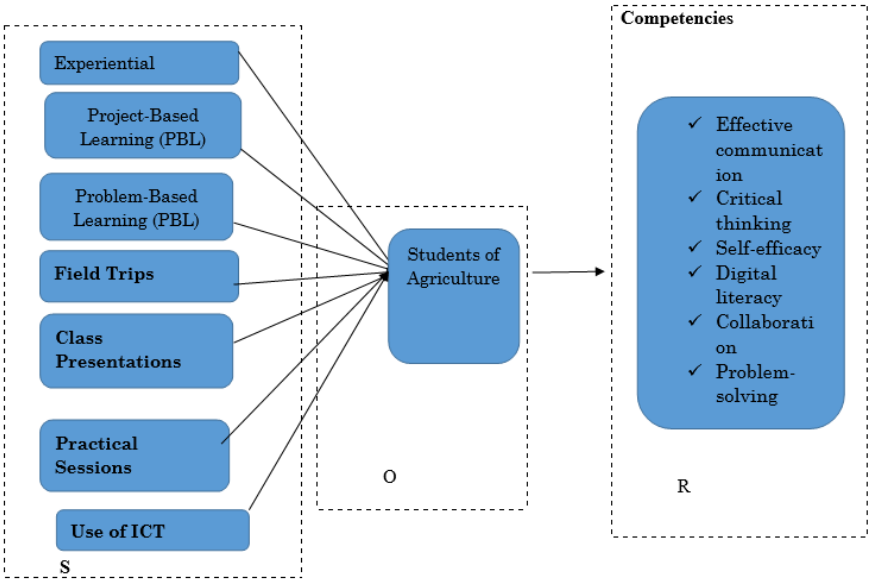

Figure 1: Conceptual Framework

The framework is rooted in understanding how external factors influence behaviors and cognitive processes. In the context of education, SOR offers a structured lens to explore how different teaching approaches (stimuli) impact learners' behaviors and cognitive functions (organisms), ultimately leading to observable outcomes or responses.

The **Stimulus (S)** in this context encompasses the diverse teaching methodologies employed in agricultural education. ICT usage involves the integration of digital tools, online resources, and technology platforms to enhance learning experiences. Experiential Learning emphasizes hands-on experiences, while PBL and PrBL focus on project-driven and problem-centric approaches, respectively. Field Trips offer direct exposure to real-world agricultural settings, Class Presentations facilitate knowledge sharing, and Practical Sessions involve application-based learning in agricultural tasks.

The **Organism (O)** represents the agriculture student as the focal point influenced by these teaching approaches. Students within the agricultural education context possess unique cognitive, emotional, and behavioral attributes. Their learning styles, prior knowledge, motivations, and abilities to engage with the teaching methods define the organism in the SOR framework.

The **Response (R)** having identified and cultivated competencies such as effective communication, critical thinking, self-efficacy, digital literacy, collaboration, and problem-solving within agriculture students, bears a substantial impact on the agricultural landscape. These competencies translate into a more skilled and adaptable workforce poised to address the evolving challenges in agriculture. Enhanced effective communication enables clearer dissemination of agricultural knowledge and practices among stakeholders, fostering better understanding and adoption of innovative techniques. Critical thinking and problem-solving skills empower individuals to assess complex agricultural issues and devise sustainable solutions, driving advancements in farming practices. Digital literacy equips them to leverage technology for precision farming, data-driven decision-making, and accessing global agricultural trends. Moreover, heightened self-efficacy instills confidence in implementing novel strategies, while improved collaboration fosters partnerships and collective problem-solving within the agricultural sector. Altogether, these competencies empower individuals to contribute significantly to agricultural innovation, productivity, and sustainability, thus positively influencing the sector's growth and resilience in the face of contemporary challenges.

2.8 Theoretical Underpinning

This study is grounded in David Kolb's Experiential Learning Theory (ELT) developed in the 1970s. Figure 2 presents ELT as a cyclical model of learning, encompassing four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation (Berg et al., 2023).

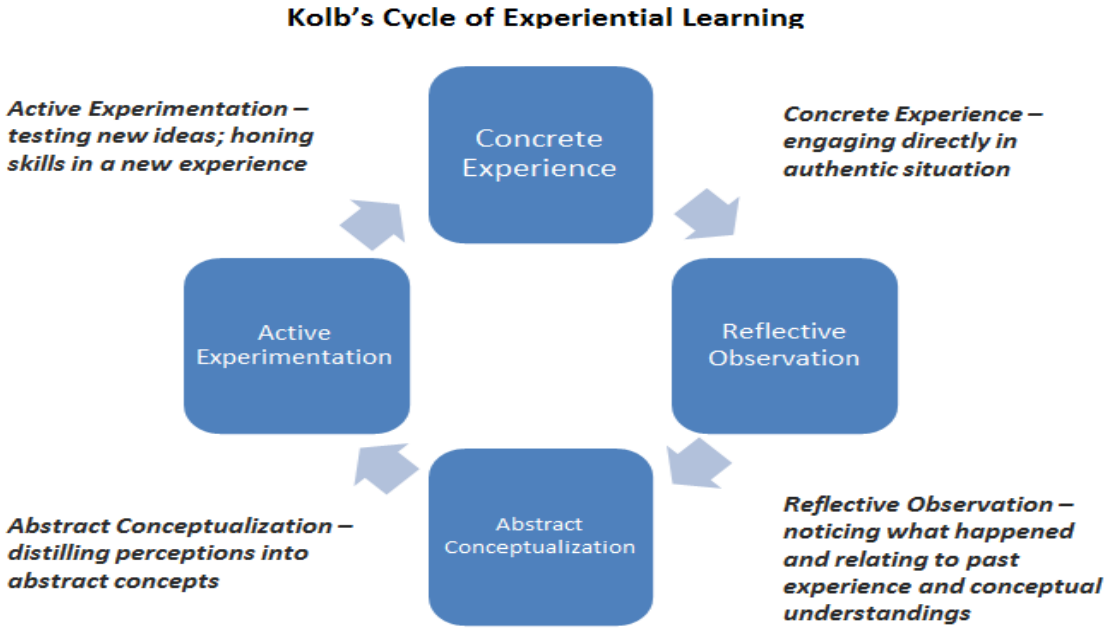

Figure 2: *David Kolb's Experiential Learning Theory*
Source: Boston University (2023)

At its core, ELT asserts that learning is an ongoing process rooted in direct experiences, reflection, conceptualization, and application. Specifically, within competence-based agricultural education, this theory holds particular relevance. Experiential Learning Theory aligns seamlessly with the essence of hands-on learning, a fundamental aspect of agricultural education's ethos (Bradford et al., 2019). The theory's foundational stage is centered on direct experiences—students engaging in agricultural practices, undertaking farm work, and immersing themselves in real-world scenarios. These experiences serve as the bedrock, facilitating a deeper understanding of agricultural concepts. Subsequently, students engage in reflective observation, analyzing the outcomes, challenges, and successes encountered during these hands-on activities. This phase allows for critical examination and evaluation of agricultural practices and their implications, which are pivotal in competency development (Morris, 2020). Moving forward, the abstract conceptualization stage involves students extracting principles and theories from their reflections and experiences. Here, they derive broader agricultural concepts, link them to theoretical frameworks, and understand the fundamental principles behind various agricultural practices (Pherson-Geyser et al., 2020). This theoretical understanding significantly contributes to competence development. Finally, ELT emphasizes active experimentation, wherein students apply derived concepts in novel agricultural contexts. They experiment with innovative farming methods, employ problem-solving strategies, and implement learned techniques based on their conceptualizations. This stage fosters innovation, adaptability, and the practical application of acquired knowledge, all crucial components of competence within the agricultural sector (Chiu, 2019).

This study aims to address a critical issue within the realm of Competence-Based Education by focusing on the integration of competencies within the teaching of Grade Four Agriculture in public primary schools across Kenya. Despite the emphasis on competency-based learning, there remains a gap in understanding the extent to which these essential skills are being effectively incorporated into the Grade Four Agriculture curriculum and teaching methodologies. The research questions of the study are as follows:

i. To what extent are Competence-Based Grade Four Agriculture teaching competencies integrated into the curriculum of public primary schools in Njoro Sub-County, Kenya?
ii. What teaching methodologies are commonly employed in public primary schools for Grade Four Agriculture?
iii. How frequently are innovative teaching resources, methods, such as project-based learning, problem-solving approaches, project methods, ICT tools, and agricultural field trips, utilized in Grade Four Agriculture classes in public primary schools within Njoro Sub-County?

3. Method

The study utilized a descriptive research design employing a quantitative approach to gather and analyze data on the integration of Competence-Based Grade Four Agriculture teaching competencies in public primary schools in Njoro Sub-County, Kenya. This location was chosen due to its suitability for assessing these competencies. A census method was employed to collect data from 96 public primary schools scattered across the interior and exterior regions of Njoro Sub-County. The survey questionnaire designed by the researcher and containing closed-ended items aligned with the study objectives, was used for data collection. The questionnaire demonstrated a reliability of 0.743, as measured by Cronbach's Alpha. The gathered data underwent analysis using descriptive statistics, primarily percentages, and was organized, coded, and processed using statistical software (SPSS version 25). The outcomes were presented in tabular form, offering a clear depiction of the findings. Results.

4. Results

Table 1. The extent of inculcating Competencies in Teaching Competency-Based Grade Four Agriculture

Approach/device	Competence	How they were measured	Not used	Rarely	Sometimes	Mostly used	Very often
Question and answer	Effective communication, collaboration & self-efficacy	Determining organic wastes in soil, taking care of growing fruits, consulting on storage procedures,	-	-	14.6%	47.9%	37.5%
Discussion	Collaboration, communication	Consulting on growing crops, handling animals, and storage of crop produce	-	-	30.2	59.4%	10.4%
Group work	Collaboration	Preparation of container gardens, development of container gardens	-	-	25.0%	54.2%	20.8%
Role-play	Communication, critical thinking, problem solving and self-efficacy	Presentations on sale output from container garden project, Making scarecrows, establishing i generating projects	3.1%	20.8%	54.8%	10.4%	10.8%
Agricultue Field trip	Problem-solving andcritical thinking	Organizing filed visits in relation the three strands in agriculture	28.1%	19.8%	38.5%	9.4%	4.2%
Problem-solving	Critical thinking, collaboration, communication	Participating in activities for own nutritional supplement, student contribution to crop production	3.1%	(3.1%	59.4%	28.1%	6.3%
Debating	Communication, collaboration, self-efficacy, critical thinking and problem-solving	Participating in activities forown nutritional supplement, Presentations on sale output from container garden project.	8.9%	43.2%	37.5%	7.3%	3.1%)
Project	Problem-solving, critical thinking, andcollaboration	Making scarecrows, establishing income generating pr ojects,	6.3%	13.5 %	33.3%	37.5%	9.4%)

		producing own foods					
Class Presentations	Self-efficacy, communication and collaboration	presentations using digital photo	29.2%	37.5 %	24.0%	3.1%	6.3%
Practical	Problem-solving, Critical thinking, collaboration	Conserving scarce water for irrigation, keeping small wild animals	53.1%	7.3%	21.9%	8.3%	9.4%
Tablets	Digital literacy, communication, collaboration, problem-solving and critical thinking	Taking pictures, storing photos and presenting photos in t classroom	41.2%	5.6 %	22.1%	9.4%	11.7%
Laptop	Digital literacy, communication, collaboration, problem-solving and critical thinking	Searching information on innovative gardening, storing pictures of crops and animals	61.6%	12.5 %	13.1%	9.7%	3.1%
Smartphones	Digital literacy, communication, collaboration, problem-solving and critical thinking	Searching information on innovative gardening, storing pictures of crops and animals	9.3%	10.4 %	17.0%	55.2%	8.1%
Critical thinking	Problem-solving	Identifying vegetable cereals, soil differentiation, and developing appropriate container gardens to solve land problem	3.1%	41.7 %	35.4%	13.5%	6.3%

5. Discussion

Table 1 indicates that the most used teaching approaches used by grade four teachers of agriculture were question and answer (85.4%), discussion (69.8%, and group work (75%) which promote effective communication, collaboration, and networking. The possible reason for the three approaches being dominant could be that the teachers are CBE compliant whereby they are assigning grade four learners' assignments in groups where they discuss. A study by Lukindo, (2016) that aimed at exploring teaching CBE in Tanzania revealed that teachers despite teacher being aware of CBE rubrics, taught mostly by the question and concessionary project and problem solving due to limited resources. Critical thinking and debating were rarely used. The possible reason could be that the learner's cognitive level has not developed to upper primary since they have transited from grade three. In addition, most schools could be having a single agriculture lesson that lasts 35 minutes thus making it difficult for a teacher to schedule a debate. A study conducted in South Africa indicated that teaching grade 3 learners through class presentations and role-play was a challenge for many teachers due to the limited time per lesson (Phala & Hugo, 2022). This implies that teachers shift the focus from practical teaching to theoretical teaching to cover the syllabus when they have less number of hours allocated per lesson.

Practical was never conducted by at least (53.1%). This study found that much of the teacher training sessions were theoretical and the trainers were not competent. This implies that the teachers were not exposed to hands-on activities something that may have made teachers conduct teaching without practice. In addition, (61.6%) and 41.2% of teachers never used laptops and tablets respectively. The findings of this study are in tandem with a study conducted on evaluating teachers' competence in the utilization of ICT in classroom instruction by Omariba (2022). Information and communication technology (ICT) is a requirement of the curriculum implementation. Omariba (2022) cited that the lack of ICT skills is a challenge among primary school teachers whereby the majority of the teachers are unable to integrate ICT-related tools into classroom instruction due to theoretical training of teachers. In some schools, agriculture teachers said that the tablets had a low clarity and learners were straining to use them. However,

at least 71% of teachers cited that they used their smartphones in teaching whereby they could take pictures and watch videos in the teaching of agriculture. The high usage of smartphones could be that teachersare more conversant with smartphones than tablets and laptops. A study by (Kinyua, 2021) on ICTintegration in teaching and learning revealed despite the availability of power and the internet in schools, teachers opted to use their mobile phones as an innovative strategy since the internet was limited toadministration officers.

A study by Madondo (2021) in Zimbabwe revealed that most schools had a 1:79 teacher-student ratio per class thus making use of tablets a challenge. Conducting projects, practicals and classroom presentations was also difficult since one teacher did not manage a population of 79 students. The teaching approach used by teachers in classroom instruction is greatly dependent on the way teachers are trained. For instance, CBE implementation in Kuwait is a challenge since teachers do not embrace a learner-centered approach. Teachers were found to be inclined towards lecture and question-answer methods since they were not exposed to more learner-centered approaches (Alajmi, 2021).

The MoE recommends that learners visit the communities for agriculture field trips if the school doesn't manage to organize field trips away from school (Ministry of Education, 2018). Grade four teachersof agriculture were asked if they exposed learners to agriculture field trips. At least 28.1% nevertook learners on agriculture field trips. A study by Sitali-Mubanga et al. (2018) on an evaluation of why teachers do not conduct academic field trips cited that students of lower classes shift their attention from learning to playing thus interfering with the learning process. In addition, it was observed that conducting field trips was quite expensive. The inability of teachers to expose learners to field trips leads to reduced student self-inspiration and makes learning less concrete. Studentswho attend field trips are more exposed and creative since they connect abstract and concrete objects (Markowitz et al., 2018). Therefore, 12.6% of students who mostly attended field trips aremore likely to be more competent in academics and be better problem solvers because of field trip exposure. Based on the findings, group work, discussion, question, and answer methods werecommonly used across all schools. This implies that the students are likely to acquire collaboration, networking, and effective communication

competencies. In addition, critical thinking, problem-solving, and ICT utilization were limited which may limit the acquisition of innovation and digital literacy among grade Four learners.

6. Conclusions

The study's examination of teaching approaches in grade four agricultural education within the competence-based framework has highlighted prevalent methods and their associated challenges. Notably, question and answer sessions, discussions, and group work were commonly used, fostering effective communication, collaboration, and networking among learners. However, the dominance of these approaches raises concerns about the limited integration of critical thinking, problem-solving, and ICT utilization, potentially hindering the acquisition of crucial competencies. The findings underscore various constraints in adopting diverse teaching methodologies. Limited resources and inadequate teacher training often lead to a preference for traditional teaching methods. The scarcity of practical sessions arises from theoretical training that lacks practical exposure, hindering teachers' ability to conduct hands-on activities. Furthermore, the constrained use of ICT tools, such as laptops and tablets, aligns with broader challenges faced by teachers, including discomfort with provided equipment and insufficient training in ICT integration. The prevalent use of personal smartphones suggests a familiarity that could potentially be leveraged for educational purposes. Field trips, recommended by educational authorities, face hurdles due to financial constraints and student engagement issues. However, studies indicate the significant positive impact of such trips on academic competence, creativity, and problem-solving skills, emphasizing their value in holistic learning experiences.

6.0 Recommendations

Enhancing teacher-training programs to encompass diverse pedagogical methods aligned with CBE, specifically emphasizing practical teaching approaches, is crucial. There's a need to allocate resources for hands-on activities, ICT integration, and field trip opportunities. Advocating for curriculum revisions that emphasize critical thinking, problem-solving, and digital literacy within agricultural education is essential. Encouraging a shift toward learner-centered teaching approaches will empower students to actively engage in their learning. Moreover, fostering collaborations between educational institutions and relevant stakeholders

can enrich the educational experience, ensuring a comprehensive development of competencies under the CBE framework.

7. Implications

The study's outcomes have profound implications for the implementation of competencies within Competence-Based Education (CBE) in agricultural education. The prevalent use of traditional teaching methods, such as question-answer sessions and discussions, indicates a need to diversify pedagogical approaches in line with CBE principles. Bridging the gap between theoretical learning and practical application is crucial; enhancing teacher training and providing resources for hands-on activities can better align classroom teaching with real-world agricultural practices, a fundamental tenet of CBE. Additionally, there is a pressing need to strengthen the integration of Information and Communication Technology (ICT) in agricultural education. Teachers' preference for personal smartphones over provided ICT tools underscores the necessity for comprehensive training and effective ICT utilization strategies. The use of smartphones implies trainers advocate for use of the resources available. Encouraging learner-centered approaches that promote critical thinking, problem-solving, and student engagement would align more closely with CBE objectives, empowering learners to take an active role in their education. Addressing resource constraints, especially for practical resources and field trip opportunities, is vital to providing holistic and experiential learning experiences essential for CBE's ethos.

Declaration of Conflicting Interests and Ethics

The authors declare no conflict of interest.

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