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ICT INTEGRATION IN THE IMPLEMENTATION OF THE AGRICULTURE AND NUTRITION CURRICULUM: ENHANCING LEARNER'S MASTERY OF POST-HARVEST PRACTICES AND FOOD HANDLING TECHNIQUES AT JUNIOR SCHOOLS IN KENYA

(Research article)

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Abstract

Education is considered as a catalyst for achieving social and economic change and for this reason, many nations across the globe, Kenya inclusive have adopted competence-based approach to education which aims at equipping learners with skills necessary in addressing emerging societal challenges such as Post Harvest Losses (PHL) and poor Food Handling Techniques (FHT). ICT being one of the main components of that should be integrated when implementing Competence Based Education at Junior school level in Kenya, it is expected that it should propel learners to acquire good PHP and FHT. This study, therefore, sought to explore the extent to which ICT integration in the implementation of Agriculture and Nutrition curriculum by teachers to enhance learner's mastery of post-harvest practices and food handling techniques at the Junior school in Kenya. Mixed methods research design was adopted in the study. Simple random sampling was used to select a total of 121 teachers from the 642 Junior schools in Kakamega north Sub-County. Content analysis checklist and a questionnaire were used for data collection. Data gathered from content analysis checklist was analysed both qualitatively while that which was collected from Agriculture teachers was analysed quantitatively using SPSS version 26. The study established that JSS Agriculture and Nutrition curriculum designs have sufficiently recommended ICT integration on the content covering PHP and FHT. However, most agriculture teachers at Junior school were found not to have sufficiently integrated ICT when teaching Agriculture and Nutrition subject content to help learners master PHP and FHT.

Keywords: Junior School; Curriculum, Agriculture and Nutrition; ICT Intergration

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1. Introduction

One of the main but yet most ignored global quagmire towards the attainment of the United Nations (UN) second Sustainable Development Goal (SDG) of ending hunger, achieving food security, improved nutrition and sustainable agriculture is food loss and waste as a result of post-harvest losses (PHL) and poor food handling techniques (Elik et al., 2019; FAO, 2023; Gogo et al., 2017). FAO (2023) defines PHL as the decrease in quantity or quality of food that happens between harvesting and consumption and can occur at any point in the supply chain, from the field to the plate. On the other hand, the International Fund for Agricultural Development (IFAD, 2023) defines it as the measurable quantitative and qualitative food loss in the postharvest system. This system comprises interconnected activities from the time of harvest through crop processing, transportation, marketing and food preparation, to the final decision by the consumer to eat or discard the food. The decrease in either quality or quantity of the food produce not only aggravates food insecurity but also culminates to economic losses depriving farmers and other stakeholders along the agricultural value chain of maximum profits. Figure 1 gives a visual depiction of various forms of PHL along the agricultural value chain.

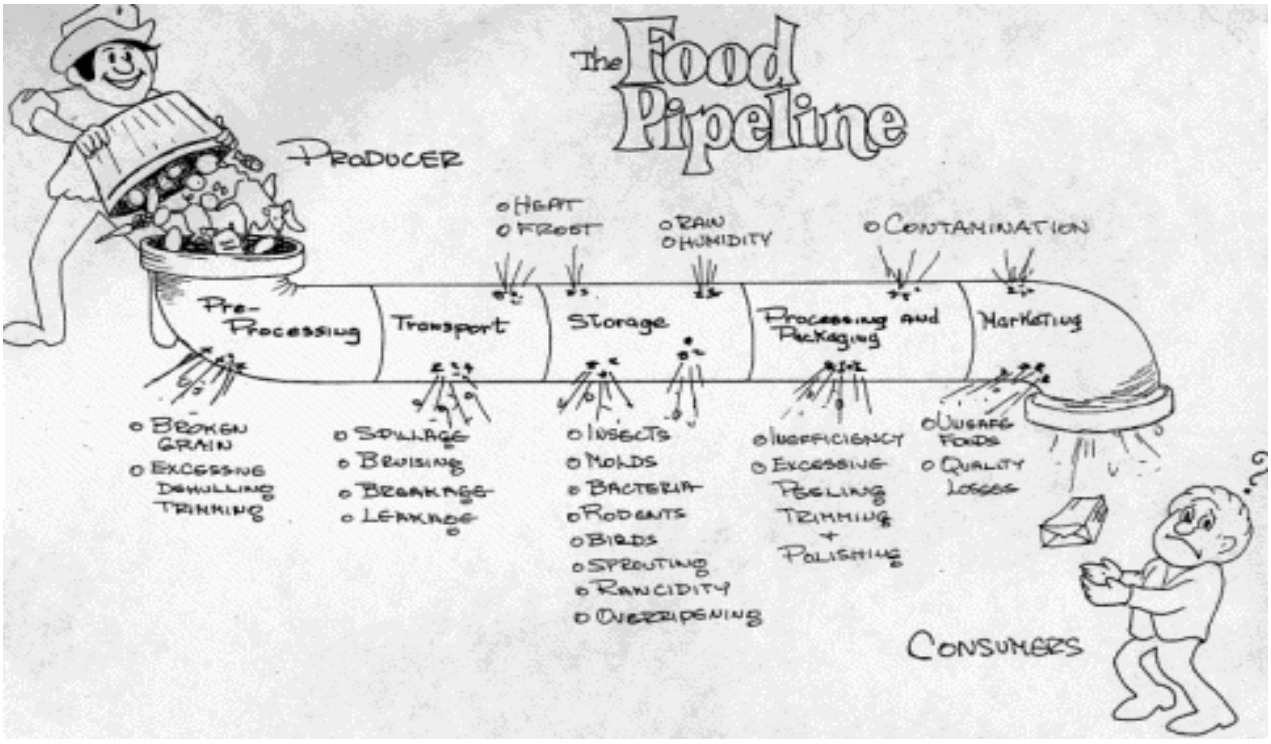

Figure 1: Depiction of various PHL along the agricultural value chain Source: FAO (2023)

In Kenya for instance, it is estimated that approximately 1.5 million metric tonnes valued at approximately 4 billion US$ out of the 3.6million metric tonnes of the maize produced locally lost annually due to PHL. The dairy sector losses approximately 95 million litres of milk valued at approximately 22.4 million US$. (Koskei et al., 2020; Njoroge et al., 2019).The Kenyan government has made laudable efforts in improving food production through various means such as improving extension services, introduction of high yielding crop varieties, launching irrigation projects and provision of subsidized fertilizers (Boulanger et al. 2018; Lynam & Mukhwana, 2020; Radeny et al., 2022; Omondi et al., 2023). However, the issue of PHL has not been given much consideration. A report by the Republic of Kenya (2024) highlighted that with such high levels of economic losses emanating from PHL, alleviation of poverty and achievement of food security in Kenya will remain to be a pipe dream. Finding possible solutions to a problem always begin with establishing the root cause. The causes of PHL can be categorized into two; environmental causes and human causes. The main environmental cause of PHL is poor weather conditions specifically excessive humidity which has been known to aggravate rotting in grains such as maize and temperature fluctuations which have been established to cause microbial growth leading to spoilage in dairy and meat products (Mwangi et al., 2017). There are however quite a number of human related causes along the agricultural value chain which according to Elik et al. (2019) include;

> *''Harvesting of the produce at the wrong stage of maturity or using the inappropriate technique, poor storage such as leaking stores which encourages mould, insect, fungal and rodent attack, poor transportation techniques and poor processing methods'' (pg.9)*

Human causes which encompass technology and socio-economic trends generally contribute the most to PHL as Kiaya (2017) affirmed that the environmental causes can easily be controlled by use of modern technologies. A study by Ndirangu et al.(2017) established that modern technology integration and utilization along the agricultural value chain remains to be the key stumbling block towards realization of efficiency along the agricultural value chain in Kenya. Improving on the level of skills and knowledge pertaining to PHL among various stakeholders along the agricultural value chain can perhaps salvage this dire situation. Education is considered as a catalyst for socio-economic change as it is meant to address existing societal hurdles by imparting relevant knowledge, skills and attitudes among the learners who are perceived to be the future of the society (Kyule, 2017; Manyasi et al., 2019; Recha et al., 2024). The socio-economic progress and ability to tackle emerging challenges in any given country is therefore hinged on the quality of its education system. In this 21st century, the Competence-Based Education (CBE) system is emerging as the most suitable for imparting practical skills to the learners. Finland, Luxembourg, Germany, the United States of America, South Korea, Australia, Netherlands and the United Kingdom are some of the notable countries that have adopted the CBE (Muchira et al., 2023;Karani et al., 2021).

Kenya like majority of the other UN member states espoused to achieving the United Nations SDGs especially of ending poverty and hunger deemed it fit to shift from the previous 8-4-4 system to the CBE. The CBE aims at instilling core competencies which include; critical thinking, creativity, collaboration, communication and digital literacy in order to adequately prepare the learner for the world of work (Ogembo, 2025; Abdullahi, 2019; Ndambuki et al. 2024). Unlike in the 8-4-4 system (meaning education system that comprised of 8 years primary school, 4 years secondary school and 4 years of tertiary education), the CBE has given special consideration to Agriculture subject as it is considered to be a core subject at the Junior school level. ICT integration cuts across all the learning areas in the CBE as it is not only perceived as a perfect means of achieving digital literacy but also presents a variety of learning experiences to the learners with much ease (Murithi &Yoo, 2021; Ndambuki et al., 2024). Like the other learning areas, the Competency Based Agriculture (CBA) Curriculum recommends the integration of ICT. With PHL being a quagmire to the achievement of food security in Kenya, the CBA at the Junior school level has included a number of strands addressing it. This study therefore sought to establish the contribution of ICT integration on improving the level of skill acquisition in post-harvest practices and food handling techniques among the Junior school students.

1.1 Statement of the Problem

The exponential growth of the human population is putting much pressure on the agri-food system to provide sufficient food. Amidst emerging challenges facing agricultural productivity such as shrinkage of farmland, soil degradation, climate change and pollution, efforts should not only be geared towards bolstering the level of production but also safeguarding the produce from the time of harvest until it gets to the consumer. Even though the Kenyan government through the Ministry of Agriculture has made laudable efforts in enhancing food security through such means as provision of subsidized fertilizers, post-harvest losses and poor food handling techniques remain to be a main quagmire. Vast quantities of human food and livestock feed are rendered unfit for consumption annually due to poor handling and storage mainly due to poor technical-know how among the farmers. Teaching and learning of Agriculture at the school level is aimed at equipping learners with practical skills and technical know-how in preparation for future opportunities in the agricultural sector. With ICT integration being a crucial component of the CBA, this study explored how teachers make use of ICT to enhance learners' mastery of post-harvest practices and food handling techniques at the JSS level in Kenya.

1.2 Objectives of the Study

Objectives of this study were to;

i. Analyse the ICT integration in Agriculture and Nutrition content covering PHP and FHT at the Junior school level in Kenya.
ii. Determine extent to which Agriculture Teachers integrate ICT during teaching and learning of agriculture and Nutrition subject to enhance learner's mastery of PHP and FHT at the Junior school level in Kenya.

1.3 Research Questions

This study sought to answer the following research questions.

i. To which extent is ICT integrated in Agriculture and Nutrition content covering PHP and FHT at the Junior school level in Kenya.
ii. To which extent does Agriculture Teachers integrate ICT during teaching and learning of agriculture and Nutrition subject to enhance learner's mastery of PHP and FHT at the Junior school level in Kenya.

2. Literature Review

The rapid advancement in technology has necessitated the use of ICT in our daily activities. Lawrence and Tar (2018) posit that there is a growing demand on educational institutions to integrate ICT in order to impart digital literacy skills which are considered crucial in this digital era. ICT encompasses a variety of technologies utilized during the handling and communication of information and their role, specifically in education (Lawrence & Tar, 2018). Ghavifekr et al. (2016) outlined that the common examples of ICT tools and facilities in education include; laptops, e-readers, Personal Computers, tablets, internet, intranet, software applications, digital recording equipment, projection technologies, mobile phones, desktops and many other emerging gadgets.

The adoption and integration of ICT during the curriculum implementation process presents an array of opportunities to the curriculum implementers (Teachers) as well as the learners. The UNESCO (2017) report outlined the following importance of ICT integration in education;

> *'' Providing opportunities for students to learn from local and international experts, providing opportunities for students to develop global understanding and cultural sensitivity through collaborating and cooperating with students from other countries, assisting students in accessing digital information efficiently and effectively, supporting student-centered and self-directed learning, providing a creative learning environment, improving and enhancing teaching and learning quality, supporting teaching by facilitating access to course content, promoting problem solving and develop critical high-order thinking skills, improving communication skills, motivating and engage learners, collaborative and cooperative Learning and tailoring Learning to the Learner'' (pg.15)*

Owing to the importance of ICT integration in education, developed nations have made laudable efforts in making it an integral part of the mainstream education system. China, Sweden, USA, UK, Philippines, South Korea, Germany, Pakistan, Indonesia, Malaysia and France are some of the notable examples of countries that have fully integrated ICT in their mainstream national curricular (Hidayati, 2016;Wu et al. 2019;Boholano, 2017;Salam et al. 2017;Ekberg &Gao, 2018;Lawrence & Tar, 2018). These countries support ICT integration in education through various means such as organizing for teacher training to enhance efficiency and provision and maintenance of ICT facilities in learning institutions. Taking a look at the United Kingdom for instance, the government expenditure on ICT in schools was approximately 2.5 billion pounds based on the financial report for the year 2008-2009 (Lawrence & Tar, 2018). Ghavifekr et al.(2016) posit that in Malaysia, training of pre-service teachers on pedagogical ICT integration is considered as a prerequisite before entry into the teaching career.

In Africa, countries like Ghana, South Africa, Nigeria among many others are making strides in ICT integration, although still grappling with numerous challenges such as inadequate ICT facilities due to high student enrolment, poor internet and electricity connectivity, poor pedagogical techniques due to poor teacher training on ICT integration (Akpabio & Ogiriki, 2017; Muchiri et al., 2018). It is not quite surprising that the education system in most African states is unable to produce self-reliant graduates capable of finding long-lasting solutions to the pertinent challenges facing the continent such as food insecurity. Jjuuko et al.(2019) castigated the curricula in most African nations as being obsolete and unable to integrate emerging issues. It is with response to this, that majority of the African nations; Kenya inclusive have begun shifting to the CBE which aims at integrating emerging issues such as digital literacy into the curricula.

Unlike the previous 8-4-4 system, CBE tends to give special consideration to ICT integration in all learning areas across all learning levels. Among these learning areas is Agriculture and Nutrition area at Junior school level. As outlined by the Kenya Institute of Curriculum Development (2022), one of the objectives of teaching Agriculture at the Junior school level is to enable the learner to apply existing and emerging technology in agriculture, digital and media resources to enhance sustainable agricultural practices. To achieve this stated objective, there are suggested learning activities at the start of each topic requiring the teacher to guide learners through the specified agricultural practices by use of digital devices such as computers, tablets, mobile phones and many others. Besides these suggested learning activities, there is an entire topic on agriculture and technology in both grades 7 and 8. In grade 7, this topic entails exposing learners to the use of modern farming methods and value-addition techniques. In grade 8, the topic exposes learners to the use of ICT in accessing agriculture support services such as extension, weather forecast, banking, veterinary services

and market information. Nyaboke et al.(2021) deem this type of interactive learning as appropriate for preparing learners for future agriculture-related careers. In summary, it is expected that ICT should be incorporated when teaching to help learners master various skills and competencies in Agriculture and nutrition subject at JSS. It was upon this background that this study narrowed down to determine the extent to which Agriculture Teachers integrate ICT during teaching and learning of agriculture and Nutrition subject to enhance learner's mastery of PHP and FHT at the Junior school level in Kenya.

2.1 Conceptual Framework

This study sought to determine extent to which Agriculture Teachers integrate ICT during teaching and learning of agriculture and Nutrition subject to enhance learner's mastery of PHP and FHT at the Junior school level in Kenya. Integration of ICT during teaching and learning of Agriculture and Nutrition subject by agriculture teachers was therefore the independent variable and was likely to influence learners' mastery of PHP and FHT which formed the dependent variable in the study. Integration of ICT during teaching and learning of Agriculture and Nutrition subject (independent variable) was indicated by the extent to which Agriculture and Nutrition content involving PHP and FHT has been integrated with ICT. It was also indicated by the extent to which agriculture teachers integrate of ICT when teaching to help learners master Post-Harvest Practices and Food Handling. Figure 1 below presents summary of the conceptual framework.

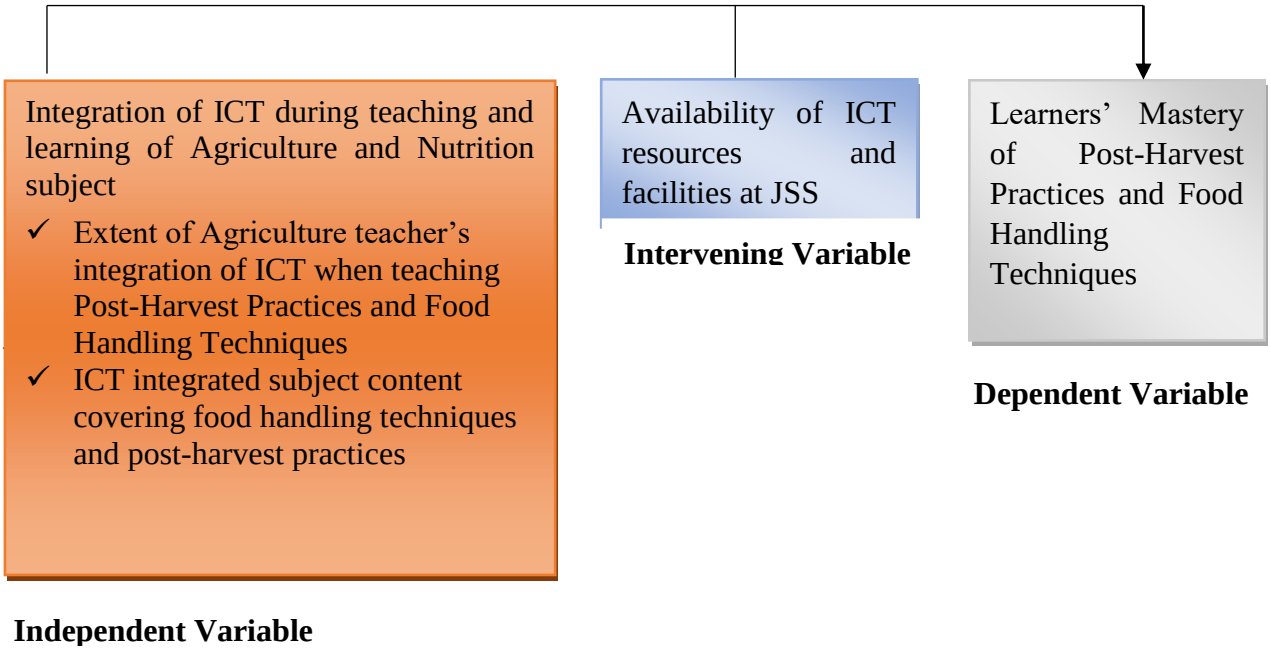

Figure 2: Conceptual Framework Showing Relationship Between Variables in the Study

3. Methodology

3.1 Research Design

This study adopted the mixed methods research design. This is because this design is most appropriate because it allows the researcher to combine both quantitative and qualitative research methods in a single study (Mugenda & Mugenda, 2003). This design therefore allowed the researcher to explore and collect data from Junior Secondary Agriculture and Nutrition Curriculum designs and also use questionnaires to gather data from teachers at the same time. Therefore, this design was deemed to be appropriate in determining the extent of ICT integration during teaching and learning of Agriculture and Nutrition subject to enhance learner's mastery of PHP and FHT at Junior School level in Kenya.

3.2 Sampling and Sample Size

Agriculture teachers at Junior schools at Kakamega North Sub-County formed the sampling frame in this study. Simple random sampling was used to sample a total of 121 schools to participate in the study from a total of 642 Junior school in Kakamega North Sub-County. On selection of teachers to participate in the study, random sampling through simple balloting was used to sample only one agriculture teacher from each of the sampled schools to participate in the study. Therefore, the total sample size for the teachers comprised of 121 respondents. Selection of the above sample size was in line with recommendations by (Borg et al., 2003) that survey studies should comprise of at least 100 respondents.

3.3 Data Collection and Analysis

Questionnaires and content analysis checklist were used to gather data of importance in this study. Questionnaires were used to gather data from agriculture teachers on the extent to which they integrate ICT during teaching of Agriculture and Nutrition content for learner's mastery of PHP and FHT at Junior schools. Content analysis checklist was used to asses' extent to which is ICT integrated in Agriculture and Nutrition content covering PHP and FHT at the Junior school level. Data gathered using the content analysis checklist was analysed qualitatively while data collected from agriculture teachers using questionnaires was analysed quantitatively using Statistical Package for Social Sciences (SPSS) version 26.

4. Results and Discussion

4.1 ICT Integration in Agriculture and Nutrition Content Covering PHP and FHT at the Junior School Level

The first objective of the study was to analyse the content of the Agriculture and Nutrition Syllabus covering content on post-harvest practices and food handling techniques at the Junior school level that requires ICT integration. Content analysis was used. The JSS agriculture curriculum presents its content in form of strands which are further sub-divided into sub-strands. The study established that there are 4 similar strands across the three grades which include; Conservation of resources, Food production processes, Hygiene practices and Production techniques. These strands are further divided into 36 sub-strands. The reduction in subject matter content and repetition of similar topics as it is the case in JSS Agriculture not only encourages learner-centred approach in teaching but also enhances skill acquisition (Biswas et al., 2020). Analysis on the curriculum design's content was done to filter those sub-strands requiring ICT integration in the teaching and learning of Post-Harvest Practices and Food Handling Techniques on each strand across the three grades. Time allocated to teach each sub-strand was also included to also inform on the extent on contribution to PHP and FHT. Table 2 below presents a summary.

Table 1: JSS Agriculture Curriculum ICT Integrated Sub-Strands Covering PHP and FHT

Grade	Strands	Sub-Strands	Specific Learning Outcomes (Objectives)	Lessons
7	Conservation of Resources	Controlling Soil Pollution	N/A	N/A
		Construction of Water Retention Structures	N/A	N/A
		Conserving Food Nutrients	3	9
		Growing Trees	N/A	N/A
	Food Production Processes	Selected Crop Management Practices	N/A	N/A
		Preparing Animal Products	3	9
		Cooking Food	3	9
	Hygiene Practices	None	N/A	N/A
	Production Techniques	Knitting Skills	N/A	N/A
		Constructing Framed	N/A	N/A

		Suspended Garden		
		Adding Value to Crop Produce	3	8
		Making home-made soap	N/A	N/A
8	Conservation of Resources	Water Harvesting and Storage	3	9
	Food Production Processes	Kitchen and Backyard Gardening	N/A	N/A
		Poultry Rearing in a Fold	N/A	N/A
		Preparation of Animal Products	4	9
		Preserving Animal Products	4	9
		Cooking: Preparing a Balanced Meal	4	11
	Hygiene Practices	None	N/A	N/A
	Production Techniques	Sewing Skill: Constructing Household Items	N/A	N/A
		Constructing Innovative animal Waterer	N/A	N/A
		ICT Support Services	3	9
9	Conservation of Resources	Conservation of Animal Feed (Hay)	3	12
		Integrated Farming	N/A	N/A
	Food Production Processes	Organic Gardening	N/A	N/A
		Storage of Crop Produce	4	14
		Cooking using Flour Mixtures	4	9
	Hygiene Practices	None	N/A	N/A
	Production Techniques	Grafting in Plants	N/A	N/A
		Homemade Sun-Dryer	3	13
Total	**12**	**12 out of a total of 36 sub-strands**	**44 out of 116**	**130 out of 360**

Source: (KICD Junior Secondary Curriculum Designs, 2024)

Analytically, 33 percent of the Sub-Strands, 38 percent of the specific learning outcomes aim at instilling skills in PHP and FHT to the learner. A total of 130 lessons which represents 36

percent of the total learning hours were dedicated towards the same. At grade 7 and 8, the Sub-Strand on preparing animal products focuses on preparation and storage of honey and eggs. This is likely to improve on the youth involvement in poultry and apiculture sectors. The Sub-Strand on preserving animal products takes the learners through a practical guide on preservation of milk and meat. Emphasis have been laid on cost-effective methods that are deemed suitable for small scale farming such as boiling, fermenting and home-cooling techniques for milk and salting, boiling, drying and smoking for fish. The Sub-Strand on conservation of hay aims at equipping learners with hands-on skill on preparation and conservation of this type of animal feed through various methods such as baled hay making, standing forage and stacking. With majority of the landmass in Kenya being considered as ASAL, livestock farming forms an integral part of the country's economy thus skills on proper feeding of livestock need to be prioritized (Chepng & Boit, 2015). The Sub-Strand on Storage of Crop Produce introduces the learners to preparation of storage structures in readiness for storage. The learners are further taken through ways of managing the stored produce such as checking on moisture content, ensuring ventilation, controlling rodents and disposing off spoilt produce. Digital literacy cuts across all these Sub-Strands as the teacher is expected to guide learners on how to access information from the internet using various ICT gadgets. If well implemented, then this will be an auspicious start for producing graduates with sufficient skills and knowledge in PHP and FHT.

4.2 Extent to Which Agriculture Teachers Integrate ICT During Teaching and Learning of Agriculture and Nutrition Subject

The study further probed to establish the frequency to which agriculture teachers integrate ICT when teaching the content that was identified in Table 1 to help learners master PHP and FHT during the implementation of CBA. The data was analysed and presented in Table 2.

Table 2: Extent of ICT Integration When Teaching by Agriculture Teachers

Sub-strand Covering PHP and FHT	**Rate of ICT Integration**				
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Conserving food nutrients	121	1.00	5.00	1.9000	.73786
Preparing animal products	121	1.00	5.00	1.6000	.51640
Water harvesting and storage	121	1.00	5.00	1.9000	.73786
Preserving of animal products	121	1.00	5.00	1.5000	.70711
Conservation of animal feed	121	1.00	5.00	1.6000	.51640
Adding value to crop produce	121	1.00	5.00	1.5000	.52705
Cooking food	121	1.00	5.00	1.2000	.42164
ICT support services	121	1.00	5.00	1.6000	.51640
Storage of crop produce	121	1.00	5.00	1.2000	.42164

Constructing and making use of a home-made sun-dryer for preserving vegetables	121	1.00	5.00	1.3000	.48305

The researcher first developed a scale running from 1-5, that was used to measure the extent to which agriculture teachers integrate ICT when teaching the Agriculture and Nutrition content to help learners master PHP and FHT. Any item that scored a mean of between 1-1.50 was categorised as very low, 1.51-2.51 as low, 2.52-3.52 as moderate, 3.53-4.53 as high and 4.54-5.00 as very high. Upon analysis of the findings in Table 2 it was noted that there was very little integration of ICT by agriculture teachers when teaching most of the sub-strand covering PHP and FHT. These sub-strands which recorded very low means included; preserving of animal products and adding value to crop produce recording both means of 1.5, cooking food and storage of crop produce recording means of 1.2 and constructing and making use of a home- made sun-dryer for preserving vegetables recording a mean of 1.3. The other sub strands had their means lying between 1.51-2.51 suggesting that there was low integration of ICT by teachers when teaching. These were; conserving food nutrients, preparing animal products, water harvesting and storage, conservation of animal feed and ICT support services. The above findings were in line with findings by Ndambuki et al. (2024) that there is little integration of ICT by teachers when teaching agriculture and nutrition subject at JSS in Kenya. According to Karani et al. (2022) this could have been contributed by the presence of insufficient ICT facilities at JSS available for teaching. In addition, study by Muchiri et al. (2022) linked little integration of ICT when teaching agriculture subject to lack of know-how on the use of various ICT facilitates by most teachers.

Agriculture teachers were further asked to indicate the extent to which they expose learners to the following specific ICT related areas during teaching of Agriculture and Nutrition subject content to help them master PHP and FHT. The results were analysed and presented in Table 3 below.

Table 3: Extent of Agriculture Learners' Exposure to Various ICT Related Areas

ICT Area		**Frequency of Exposure During Agriculture Lessons**					
		Never	**Rarely**	**Sometimes**	**Often**	**Very Often**	**Total**
Guiding learners to learn from online tutoring platforms	Freq	86	29	6	0	0	121
	%	71.1	24	4.9	0	0	100
Use of internet for research on PHP and FHT	Freq	72	26	10	8	5	121
	%	59.5	21.5	8.3	6.6	4.1	100
Guiding learners to interact with different ICT facilities	Freq	65	33	15	4	4	121
	%	53.7	27.2	12.4	3.3	3.3	100
Using Video Assisted	Freq	46	50	14	7	4	121

Learning when teaching	%	38	41.3	11.6	5.8	3.3	100

The findings on Table 3 above indicated that learners were not sufficiently exposed to ICT related platforms or areas by agriculture teachers when learning to help them master PHP and FHT. For example, on guiding learners to learn from online tutoring platforms 71.1% of agriculture teachers never guided learners to learn from online tutoring systems such as educake, Kahoot and others during agriculture lessons. In addition, the findings further informed that none of the teachers guided learners either often or very often. On guiding learners to use internet to search for information of PHP and FHT, the study noted that 59.5% never guided learners, 21.5% guided rarely, 8.3% guided sometimes while only 6.6% and 4.1% guided often and very often respectively. This indicated that learners were not sufficiently guided to learn from online tutoring systems carry out internet research to learn more about PHP and FHT when learning Agriculture and Nutrition content at JSS. The findings in this study concurred with findings by Apolo et al. (2020) in that most agriculture teachers do not sufficiently guide learners to use internet to research various areas of study in class. This could be attributed to lack of internet connectivity in schools for use in learning and lack of knowledge by most teachers on how to use digital devices to facilitate online learning and research during learning (Ndambuki et al., 2024a).

On guiding learners to interact with ICT facilities when learning to learn more about PHP and FHT very few teachers guided learners either often or very often (3.3%). Most teachers were found not to have guided learners at all. Study by (Karani, 2023) and (Nyikadzino, 2023) pointed out similar findings which they linked to lack of sufficient ICT facilities in schools that has caused little interaction of learners with ICT facilities during learning. However, similar study that was done by (Tejedor et al., 2020) in Ecuador, Italy and Spain found out that lack of learner's interaction with ICT facilities during learning may lead to low acquisition of skills. Therefore, similarly this may lead low learner's mastery of PHP and FHT. When asked on the frequency of involving Video Assisted Learning still majority of agriculture teachers insufficiently employed the technique when teaching. Only 5.8% and 3.3% of teachers guided learners often and very often respectively. The findings were contrary to the views of (Recha et al., 2024) that learning by seeing through use of videos boots learner's mastery of skills in agriculture subject. However, insufficient learner's exposure to videos during learning of Agriculture and Nutrition content related to PHP and FHT can be linked to lack of ICT facilities in schools for use in carrying out video simulations during learning (Barasa, 2022).

5.0 Conclusions and Recommendations

Based on the findings this study concluded that, Agriculture and Nutrition curriculum designs has sufficiently recommended ICT integration on the content covering PHP and FHT. This would help learners master skills on PHP and FHT. However, despite the curriculum designs

recommending for ICT integration, most agriculture teachers at Junior school still have not sufficiently integrated ICT when teaching Agriculture and Nutrition subject content to help learners master PHP and FHT. This could have been led by lack of enough ICT facilities in JSS for learning, lack of reliable internet connectivity and lack of enough knowledge by teachers on how to use various digital devices to integrate ICT in teaching. This study therefore recommended that agriculture teachers at Junior school to make use of the available digital devices such as mobile phones when teaching to help learners master PHP and FHT. In addition, Government of Kenya should equip Junior schools with sufficient ICT facilities for use during learning to help learners master various skills in Agriculture and Nutrition subject but not limited to PHP and FHT.

Declaration of Conflict of Interest

Authors declare no conflict of interest

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