

**ENHANCING THE USE OF A SCHOOL GARDEN TO IMPROVE PRACTICAL
SKILLS AMONG A-LEVEL STUDENTS OF AGRICULTURE NSANGI
SECONDARY SCHOOL IN WAKISO DISTRICT**

BY

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**A RESEARCH DISSERTATION SUBMITTED TO GRADUATE SCHOOL IN PARTIAL
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FOR THE AWARD OF MASTERS OF VOCATIONAL PEDAGOGY OF
KYAMBOGO UNIVERSITY**

DECLARATION

I, Yamumpereka Grace, the undersigned declare that this act **i** on research dissertation is an original piece of work. To the best of my knowledge, it has never **e** been wholly or partially presented to any University or Higher Institution of learning for any a **c**ademic award. All pieces of work used to develop this report have been referenced herein.

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APPROVAL

This dissertation entitled “Enhancing the use of a School Garden to improve Practical Skills among A-level students of Agriculture of Nsangi Secondary School in Wakiso district” has been submitted with our approval as the supervisors.

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DEDICATION

This dissertation is dedicated to my husband Mr. Muhumuza Wilson, and to my sons: Muhumuza Fortune, Muhumuza Eddie, Muhumuza Elijah and Muhumuza Joshua. Their patience mattered in enabling me to complete my studies.

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LIST OF ACRONYMS/ABBREVIATIONS

A-level:	Advanced Level
DAP:	Di Ammonium Phosphate
FW:	Future Workshop
GBL:	Garden Based Learning
ICT:	Information Communications Technology
Lab:	Laboratory
NCDC:	National Curriculum Development Center
Nsangi SS:	Nsangi Secondary School
UACE:	Uganda Advanced Certificate of Education
UBOS:	Uganda Bureau of Statistics
UNEB	Uganda National Examinations Board
VET	Vocational Education and Training
FANSSEA	Food And Nutrition Security for Southeast Asia
CENYC	Council on the Environment of New York City
NYC	New York City

DEFINITION OF TERMS

School garden

According to this study a school garden is a piece of land near or around the school that helps teachers to integrate hands-on activities in teaching and learning of Agriculture. The school garden offers an opportunity to students to learn from in direct experience through participating in gardening activities.

Practical skills

The practical abilities that are acquired by the students through involvement in hands on activities. In this study the students got involved in activities pertaining production of kale from seed to harvest stage.

A **Future Workshop (FW)** is defined as a participatory procedure meant to shed light on a common challenging situation, to generate visions about the future, and to discuss how these visions can realistically be implemented.

ABSTRACT

Whereas many secondary schools have gardens and farms, there is public outcry that secondary school graduate students know a lot of theory. These students lack enough practical skills more so in Agriculture; which skills would have helped them even after school. This action research study was conducted in Nsangi Secondary School to boost practical skills among students of Agriculture through rejuvenating the use of the school garden in the teaching learning processes. The objectives were to: characterize the existing agriculture teaching and learning practices in the School; identify the possible opportunities and challenges for reviving the functionality of the school garden, promote the utilization of the school garden for the teaching and learning of Agriculture and evaluate the functionality of the school garden in promoting the acquisition of practical skills among students of Agriculture at A-level.

Data was collected using interview guides, observation checklists, and focus group discussions. Coding was done to summarize the responses given by the stakeholders for analysis. Qualitative data was cleaned and summarized into themes. Quantitative data was analyzed with the aid of a computer using Microsoft Excel and SPSS as tools for analysis. The findings indicated that: the Agriculture teaching and learning practices in the school were largely theoretical and unable to equip learners with practical skills; the availability of the school garden enabled the learners to acquire skills in setting up and managing nursery beds, transplanting and care for seedlings in the seedbed. The key implementation challenges were funding for gardening activities and lack of scheduling on the school time table. Based on the findings, it was concluded that school gardens can effectively equip students with the practical skills only if well cared for as a teaching resource. It is recommended that the school garden gets funded for sustainability to be used in enhancing the practical teaching and learning of in Secondary Schools of Uganda.

CHAPTER ONE

INTRODUCTION

1.1 Overview of the study

This chapter focuses on the background to the study which is composed of four main dimensions including: the historical, theoretical, conceptual, contextual perspectives, Situation analysis, and Statement of motivation. It also contains the introduction to objectives and statement of the problem, research questions, scope, Justification of the study, and the significance of the study.

1.2 Background of the study

Agriculture is the pillar of most developing countries including Uganda. According to Vandenbosch, (2006), Agriculture is a priority sector that addresses poverty and unemployment in most of the countries of sub-Saharan Africa. It has contributed a great deal in development of most African economies, for example in Uganda, Agriculture employs over 70% of the working population, and accounts for about 24% of total Gross Domestic Product (GDP), and for close to 50% of total exports (UBOS, 2016). Agriculture is one of the Science subjects taught in secondary schools. Agriculture being a vocational subject emphasizes an aspect of skills, knowledge and attitude required in all areas of the subject for expertise in agricultural production. One of the principles of vocational Agriculture is learning by doing. The teaching and learning of Agriculture in secondary schools aims at ensuring that the learner is exposed to and taught the basic principles that are important to agricultural production in the country and exposing learners to various practical activities. These projects would help the students develop

the necessary skills and abilities required in agricultural production (Olajide et al. 2015). Agriculture teaching syllabus for A-level course in Uganda's secondary schools gives guidance as much as possible on what is to be taught. It emphasizes that teaching of Agriculture must be as practical and participatory as possible. This means that most of the learners' time should be spent on practical or actual farming activities (NCDC, 2013). Much of the dominant pedagogy for Agricultural education at Nsangi Secondary School was chalk and talk (lecture), with few demonstrations on how certain tools are used on the farm. The teaching was largely teacher-centered, dominated by factual materials, abstractions, and dictation of notes. During the research process, the participants attributed the employment of such teaching approach to lack of a functional school garden. The school had some plots of land which were being utilized by some staff members and not for students' learning. The students who once in a while used to work on these gardens were wrong doers and such acted as punishment and not learning activities. Such acts of misusing the school plots were discouraging because they could not promote practical skills acquisition but instead compromised what National curriculum development center (NCDC) requires. Ssekamwa (as cited in Olajide *et al* 2015) pointed out that the approaches employed in the teaching of Agriculture were disheartening because the Subject was taught theoretically and had failed to make a positive impact on the society. Agriculture A-level teaching syllabus emphasizes that Agriculture be taught practically, it was established that inadequate practical's are integrated in the teaching and learning of Agriculture which was attributed to lack of a functional school garden. This has in turn resulted into incompetent persons who are at a risk of seeking paid up employment due to their inability to apply the acquired skills for self-sustainability.

1.2.1 Historical Perspective

The history of Vocational Education or teaching practical skills like agriculture existed in Africa long before the coming of Western Civilization. Although school was not officially in place, there was informal education conducted at home and from the community. However the advent of Christianity and Western Civilization brought with it formal education and later vocational education (Arinaitwe, 2011). Formal vocational education training centers were set-up at each Church mission Centre to train people who would fulfill the needs of the missionaries.

The rationale of introducing vocational education including Agricultural skills was aimed at skilling persons to work in their establishments such as plantations and other Agricultural related industries the early times of the protectorate government, the colonialists picked interest in establishing agricultural research stations under the Department of Agriculture and the Department of Veterinary Services (Nienke & Clesensio, 2002). According to Nienke & Clesensio (2002), Makerere University introduced its agricultural training in the 1920s which was followed with its agricultural research in the late 1950s. In post-colonial times around the 1960s, all the national agricultural research agencies were transferred to the national government (Nienke & Clesensio, 2002)

Due to the “economic war” declared by President Idi Amin’s military regime in the late 1970s, all the British and other expatriate researchers were phased out. Consequently the military regime reduced the Agricultural research budget. In the 1979 liberation war destroyed the then existing research infrastructure which the government tried to revamp in the 1980s but all in vain due to the guerilla warfare in Uganda. In 1992, a national taskforce on agricultural research suggested to create a semi-autonomous agricultural research agency with a directive involving crops, livestock, forestry, and fisheries, hence establishing the National Agricultural Research

Organization (NARO). As time went on, unemployment issues cropped in and the importance of vocational education became evident and the government had to start promoting the teaching of vocational skills in schools ((Nienke & Clesensio, 2002)

1.2.2 Contextual Perspective

This action research was conducted to address the problem of practical skills acquisition in Agriculture at Nsangi Secondary School in Wakiso district. This study was on rejuvenation of the school garden for practical skills acquisition among A-level students at Nsangi SS. The work process analysis and the future workshop tools were used to analyze the teaching and learning processes at Nsangi Senior Secondary School. This situation analysis was conducted together with participants who included students, teachers and administrators that participated in generating the various challenges facing teaching and learning Agriculture at Nsangi Secondary School. The school offers the Uganda national curriculum. In the department of Agriculture, students' enrollment at the ordinary level is 500 and 6 at the advanced level. From situational analysis and specifically during the future workshop conducted in November.2017, it was established that most of the teaching was theoretical and therefore there was a need for an intervention to enhance practical skills acquisition in the teaching and learning of Agriculture. Having a school garden was considered one of the critical support infrastructure needed to impart practical skills in secondary school students if they were to realize knowledge and skills for self-reliance and economic development of the country. This prompted me to conduct a study on enhancing the use of a school garden to improve practical skills among the A-level students of Agriculture in the school.

blackboards, charts and apparatus are (Bachert, 1979). School gardens are ideal settings for experiential learning. Gardens have been utilized in schools in the United States since the 1890s (Smith & Motsenbocker, 2005) as cited in Stephanie & Huckestein (2008). In this study the school garden meant part of the school ground that was used as an arena for students to perform the hands-on activities for practical skills acquisition.

According to DeMarco (1997), the gardening activities can involve growing plants indoors or outdoors in a variety of ways that differ with every learner's circumstances. Plants are grown in such places as window sills, under grow-lights, in containers, around flag poles, in terrariums, or in ordinary, plowed garden plots. Effectiveness is the degree to which objectives are achieved and the extent to which targeted problems are solved.

1.3 Situation Analysis

The situation analysis was sparked off by the reflection on the vocational pedagogical approaches that the researcher was exposed to during her study in the Masters of Vocational Pedagogy program at Kyambogo University and the way teaching and learning of Agriculture as a vocational subject was being conducted at Nsangi Secondary school.

A work process analysis and a future workshop procedure were employed.

1.3.1 Work process analysis

A work process analysis was done using a work process analysis tool to establish the existing teaching and learning practices and gaps in the Agriculture department. The analysis was done using the focus group discussion to obtain the learning gaps that particularly faced the A-level students of Agriculture.

In the work process analysis, the teaching and learning process at Nsangi SS was found to have the following practices;

- Some teachers not attending to students concerns
- Teaching practical subjects theoretically
- Inadequate interaction between students and teachers
- Teachers not giving performance feedback to students in time

The gaps that affected the practical teaching of Agriculture were found to include the following;

- Lack of a school garden for teaching some practical skills
- Inadequate human resource.
- Lack of computer skills
- Inadequate teaching materials especially for practical lessons

The researcher held one-on-one interviews with the Administrators concerning gaps in the department after which the Future workshop was suggested and arranged for.

1.3.2 Future Workshop

Future Workshop was the action research model used to collect qualitative data. The idea behind Future Workshop was that a group of people cooperate to create ideas and strategies for improving the practical teaching of Agriculture. Using different data collection tools, primary data was gathered from multiple sources and all facts gathered during the 'Future Workshop' session were prioritized, triangulated and verified for action. According to Müllert and Jungk (1987), there are about five phases of "classic" futures workshop (preparation, critique, fantasy, implementation, and the follow-up phases) Refer to chapter three

It is in this future workshop that the stakeholders critically analyzed the gaps in the department. The gaps raised included;

- Limited practical sessions,
- Inadequate time for interaction of learners with the teachers,
- Limited ICT skills for both the learners and teachers,
- Negative attitude of the learners to Agriculture,
- No Discussion groups in place,
- Irregular attendance of the teachers and learners,
- Failure to complete the tasks by the learners,
- Failure of teachers to apply skills of managing large numbers of learners by the teachers.

These gaps were classified into short term, midterm and long term as shown below

Table 1: Short-, mid-, and long-term challenges identified during the research process

Short term gaps	Mid-term gaps	Long-term gaps
Inadequate practicals of agriculture	No remedial lessons	Lack of training materials
Limited ICT skills among the teachers and learners	Syllabus not covered	Admission of students with weak grades
Negative attitude towards agriculture		No Agriculture laboratory
		Inadequate human resource

Source: Primary Data from the Future Workshop

After categorizing the challenges, the participants subjected only the short-term challenges to pair wise ranking so as to qualify the problem.

Table 2: Pairwise Ranking of the gaps that Emerged out of the Stakeholders Future

Workshop

	Problem	1	2	3	scores	Ranking
	Lack of practicals		1	3	1	2
	Inadequate ICT skills			3	0	3
	Negative attitude				2	1

Source: Primary Data from the Future workshop

This was done in the interest of the time and resources available for the study. Negative attitude came up as the highly ranked problem that was greatly affecting the teaching and learning of Agriculture subject. However, it was agreed upon by the stakeholders that the issue of conducting practicals if well addressed could enhance the negative attitude that students had towards the subject. It is against this background that the stakeholders qualified the problem of practicals. The participants attributed this very problem to lack of a functional school garden which is an important tool that could be utilized to conduct some of the Agriculture practicals. On analyzing the issue of practicals the participants said that this could result in graduating students rich in theory without practical skills as would be expected of any vocational subjects. The participants raised an issue of teaching practical concepts like nursery bed preparation from the blackboard instead of doing it from the garden as required by the Agriculture syllabus. As an intervention strategy, the participants derived the need to revive the functionality of the school garden to promote practical skills among the A-level students of Agriculture.

1.4 Statement of Motivation

Nsangi Secondary School has taught Agriculture at O-level since its inception. Although A-level was in existence in 1990s with a school garden in place, by 2013 when Agriculture was introduced as a teaching subject at that level, the school garden had lost its functionality and merely used as teachers' gardens without being utilized for learning purposes. Agriculture subject has three papers and all learners do the theory papers (paper one and Paper two) as well as the practical paper three according to UNEB guidelines. Agriculture department has four qualified teachers. The school had some land that could be used as a school garden for the students' practical activities which was not optimally utilized. The school teaches the subject at O-level implying that there is a possibility of feeding A-level with Agriculture students. The administration of Nsangi SS encourages students to offer Agriculture as a subject considering that it is a passable subject and uplifts the student's performance. As someone already exposed to the different pedagogical approaches that were employed by the educators while pursuing a Masters of Vocational Pedagogy, the researcher had to conduct a study that would lead to transformation of the approaches that were being employed to teach Agriculture at Nsangi Secondary school.

1.5 Statement of the Problem

Ideally Agriculture is a vocational subject that should be taught practically on farms and in the laboratories. However, in spite of teaching the subject in Nsangi Secondary School since 1963; the school gardening land was over the time taken over by the resident staff members and teaching was only theoretical. However, during the situation analysis, the work process analysis (1.3.1) revealed that there was lack of a school garden for teaching some practical skills.

In the Future Workshop conducted (1.3.2) revealed that there was inadequate Agriculture practical teaching as the most felt gap that needed to be addressed in Nsangi SS. In the fantasy stage of the future workshop, participants were asked to suggest ways of improving practical teaching and learning of Agriculture. Among the suggestions raised was to rejuvenate the functionality of the school garden. Without rejuvenating the school garden, the participants emphasized that the Agriculture students would continue to graduate with a lot of theory and inadequate practical skills they needed outside school for self-reliance and employment in the world of work. As an intervention, the participants emphasized the need to rejuvenate the utilization of the school garden in the teaching and learning of Agriculture practical skills to the A-level students of Nsangi SS. This action research study was therefore, undertaken to rejuvenate the functionality of the school garden in the school in order to enhance practical skills acquisition among the students of A-level.

1.6 Purpose

The purpose of this study was to enhance the use of the school garden to improve the practical skills among A-level students of Agriculture at Nsangi Secondary school in Wakiso district.

1.7 Objectives to the study

The specific objectives were to:

1. Establish the existing Agriculture teaching and learning practices in Nsangi Secondary School;

2. To determine possible opportunities and challenges of rejuvenating the school garden in Nsangi Secondary School.
3. To enhance the utilization of the school garden in the teaching and learning of Agriculture at Nsangi Secondary School.
4. To evaluate the functionality of the rejuvenated school garden in promoting the acquisition of practical skills among A-level students offering Agriculture at Nsangi secondary school.

1.8 Research Questions

1. What are the existing Agriculture teaching and learning practices in Nsangi Secondary School?
2. What are the possible opportunities and challenges of rejuvenating the school garden in Nsangi Secondary School?
3. How can the utilization of the school garden in the teaching and learning of Agriculture at Nsangi Secondary School be enhanced?
4. How can the functionality of the rejuvenated school garden be evaluated?

1.9 Justification of the Study

The findings of this study addressed the main concern that was raised in the future workshop that is inadequate practical teaching of Agriculture, and contribute to innovative approaches to addressing the challenges identified in the school. It highlights on the challenges that affect the practical teaching and learning of Agriculture in the school whose solutions would lead to future improvements. Also the study could be a genesis for further study by other

researchers on the same or related topic. The study sought to identify the impact of integrating practical work for skills acquisition by students with particular reference to Nsangi secondary school. The study could inform the teaching staff and administration on the need to boost the usage of practical lessons in the teaching and learning to enable the learners acquire life practical skills after their formal education. This could be a contribution to the nation in reducing unemployment, stimulating self-employment and job creation indirectly supporting the skilling Uganda strategic plan. The Skilling Uganda Strategic plan is a paradigm shift for skills development in Uganda. It is intended to create employable skills and competencies relevant in the labour market (Skilling Uganda - BTVET Strategic Plan 2012/3-2021/2)

1.10 Scope of the Study

The scope of the study comprised of the geographical scope, content scope and time scope.

1.10.1 Geographical scope

The study was conducted at Nsangi Secondary School located in Wakiso District, 11km on Kampala-Masaka highway in Nsangi Trading Centre (see the google map extract of the study context as depicted in Appendix 1). Specifically, the department of Agriculture of Nsangi secondary school was involved in implementing this study. The reason this study was conducted at Nsangi SS was because it was my workplace and I felt that Action research would improve on the practices in the teaching and learning of Agriculture being my teaching subject.

1.10.2 Content scope

The content scope of this study was based on the study objectives. The first objective was limited to characterizing the Agriculture teaching and learning practices at Nsangi Secondary

School as experienced by the teachers and A-level students of Agriculture. Objective two was restricted to possible opportunities and challenges involved in rejuvenating the functionality of the school garden to enhance practical skills acquisition among the A-level students of Agriculture. The third objective was limited to enhancing the utilization of the school garden through documentation and analysis of the processes involved in garden based teaching and learning. Objective four concentrated on the evaluation of the functionality of the school garden.

1.10.3 Time Scope

The study was conducted within a three years period. With respect to the time frame, the study covered a six months period between 2016-2017. This is so because the A-level students that were being assessed in this study joined S.5 in the year 2016 and completed their A-level in the year 2017. The study was done from November 2016 to October 2017.

1.11 Significance of the Study

The results of this study demonstrated to the school administration and staff of Nsangi SS the necessity of reviving the functionality of the school garden if practical skill acquisition is to be enhanced among the Agriculture students. This study would be helpful in establishing the existing teaching and learning practices in Agriculture. This would inform the staff and administration of Nsangi secondary school about the existing gaps in the teaching and learning of Agriculture. It would also suggest practical interventions towards the gaps. These practical interventions would be tested by the students and the teachers to evaluate sustainability. In addition, a well-managed school garden has the potential of contributing to the school income through the sales of its products and for the upkeep of the students thereby rendering the school

self-supporting and self-reliant. It could help students to develop skills that could prepare them for self-sustainability. The results of the study can be extrapolated to suit the production of crops and animals as a demonstration farm for the school. This study would enhance student performance since there would be a direct integration of the theory and practical lessons (learning by doing).

The findings of this study will also be beneficial to researchers and students who will have interest to work on a study related to this work and equally serve as reference point. The public will benefit in such a way that the participants can transfer the skills and knowledge to their communities.

1.12 Limitations

1. This study was conducted using only Nsangi SS, in an A-level setting with limited resources. If the study was done in O-level and an area with greater resources the findings might have been different.
2. This study used a sample of only 22 A-level students who were offering Agriculture and 2 Agriculture teachers and 3 administrators to capture the existing Agriculture teaching and learning practices in Nsangi SS. To quantitative researchers, the sample may not provide a representative picture of all the students, teachers and administrators of NSS who are expected to benefit from the study. However, the goal of this study was not to generalize its findings to a larger population. It simply aimed at providing a detailed description and analysis of the teaching and learning practices which could be used to enhance an understanding of it, and possibly inspire others to undertake larger studies in the near future.

3. The project was conducted over a one-year period, beginning in the fall of 2016 and ending in 2017. Teacher and student involvement might have changed during the following school year.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses the theoretical review that depicts the theory that underpinned the study, and the literature related Agriculture teaching and learning practices. It also discusses the literature related to possible opportunities and challenges of rejuvenating the Functionality of the School Garden, enhancing the utilization of the school garden and evaluation of the rejuvenated functionality of the school garden in promoting the acquisition of Agriculture practical skills. Olaitan and Uwadiae (2003) cited in Farauta & Amuche (2013) emphasized “learning by doing” and viewed it as the only recommended approach to teaching and learning of Agriculture at secondary school level.

2.2 Theoretical Review

The theoretical review informing for this action research originated from the Experiential Learning Theory which is advanced by (Kolb 1975 in Subramaniam, 2002). Different scholars have used Experiential Learning Theory in the role of acquiring practical skills. For example, Arinaitwe (2011) conducted a study about vocational pedagogy approaches for the improvement of teaching and learning in formal vocational education in Uganda, she used the theory in which she observed that, to learn from experience is to make a backward and forward connection between what we do to things and what we enjoy or suffer from things in consequences. Arinaitwe (2011) quotes the great Roman leader Julius Caesar’s proverb that “Experience is the teacher of all things” and she perceived experience as a practical situation an individual has gone

through in life. Although she used this theory to study about vocational pedagogy approaches for the improvement of teaching and learning in formal vocational education in Uganda, the applicability of this theory in acquiring practical skills is questionable in the context of teaching and learning of Agriculture practical skills especially in Nsangi SS setting. This is because in Nsangi SS just like any other secondary schools in Uganda, tends not to consider experiential learning characterized by hands-on activities to be a fundamental part of education. However, this theory was still used to establish whether its implementation in Nsangi SS setting is highly relevant.

2.3.1 Existing Agriculture Teaching and Learning Practices

Different researchers have conducted different studies about Agricultural teaching and learning practices. For example, Okiror (2017) in his study examined the pedagogical methods used for secondary school Agriculture in Uganda, in which he found out that the teaching and learning approaches are teacher-centered and examination oriented. Okiror (2017) further found out that the current focus on national examinations is unable to engage learners in a meaningful way. The findings of Okiror do not concur with the Experiential learning theory which emphasizes learning by doing. The implication is that the teachers are not involving the students in hands-on, reflective learning. Although Okiror conducted his study in the context of secondary school Agriculture in Uganda, his study followed cross-sectional survey from 80 Agriculture teachers and 57 administrators from 60 secondary schools, randomly drawn from 25 districts in Uganda, and analyzed with descriptive statistics, this was in contrast with the action

research study methodology that is employed in this study to find out the practical intervention in Nsangi setting.

Whereas Okiror (2017) dwells much on the teaching approach, Onu & Ikehi (2013) call for the use of appropriate instructional materials. According to the authors, the teaching and learning of vocational studies such as Agricultural Science calls for the use of instructional materials during content delivery to aid learners' learning pace and retention (Onu & Ikehi, 2013).

A number of authors lend credence to Onu & Ikehi (2013) assertions explaining that instructional materials are resources or teaching materials which a teacher utilizes in the course of presenting a lesson in order to make the content of the lesson understandable to the learner (Perkins, 2009; Rush, Acton, Tolley, Marks-Maran, & Burke, 2010; Nwike & Onyejebu, 2013; Ikehi, Paradang, & Zimoghen, 2014). The authors go ahead to categorize the instructional materials as either audio, video or picture or actual object being thought.

Par & Van Horn (2006) concur with Perkins, 2009; Rush, Acton, Tolley, Marks-Maran, & Burke (2010); Nwike & Onyejebu (2013); Ikehi, Paradang, & Zimoghen (2014) on the use, essence and types of instructional materials. The duo however become more relevant to the topic under study by highlighting the use of school gardens in teaching agriculture arguing and correctly so that school gardens are used by most schools to enhance academic instruction. Other authors such as Campitelli & Gobet (2011); Lucas, Spencer, & Claxton (2012) also agree with Par & Van Horn (2006) on the vitality of the school garden but they hasten to add that it helps to explain learning content.

Par & Van Horn's (2006) assertions on the school garden are in tandem with what the 20th century scholars such as Newcomb *et al.*, (1986) and Tyler (1969) propounded about the

essence of the school garden. The 20th Century scholars argued that a good teaching strategy must base learning on inquiry, investigation, and critical study in situations in which genuine purposes, needs, and wants are experienced concluding that the school garden offers this perfect opportunity. This view on the importance of the school garden is closely shared by Anderson (1994) who noted that student outcomes are heavily dependent on a variety of learning activities made possible by the school garden.

Weston and Cranton (1986) probably had foresight when they concurred with Anderson (1994) on the importance of the school garden. According to Weston and Cranton (1986), a school garden is much more effective just like other experiential learning methods such as field/clinical experience, laboratory experience, role playing, simulations and drill. The authors however hasten to add that just like a school garden, experiential learning methods require careful planning and precision at the secondary level of they are to serve the desired purpose.

Moore (1994) also weighs in on the discussion on agriculture teaching and learning practices by giving it a time dimension. He studied the methods that have been used over the years in the teaching of Agriculture and documented three major approaches: formal steps, project approach, and problem solving approach and concluded that these approaches were used from the late 1800s to the 1980s.

Carkhuff (1981) sums up the discussion on the teaching of agriculture in secondary schools arguing that some teachers emphasize the use of question and answer techniques while others use a lot of programmed instruction. Carkhuff (1981) also acknowledges teachers that utilize the lecture method and overhead projectors in the Agri-science classroom concluding that each teacher uses a different teaching method.

2.3.2 Rejuvenating the Functionality of the School Garden

FAO (2010) defined a school gardens as areas around or near the schools, tended at least by the learners. Fruits and vegetables are the main crops that are grown in the school gardens. A series of activities are practiced with in especially bee keeping, fishery and ornamental plants and shading and small scale staple food. Different scholars have coined research regarding the establishment of school gardens, for example Rowena, Marian & Frances (2010) carried out a study on Impact of school gardening on learning in England in which the researcher found out that availability of land was crucial. Land for school gardening could be small or big. Rowena *et al.*, (2010) further found out that, the amount of space was not necessarily related to the school's location. Odrumuru (1987), in her study about the effects of school gardens on students' performance in practical Agriculture in Kampala secondary schools established that in most schools, crop areas occupied less than three hectares of land while 60% of the schools had students' projects and demonstration gardens.

The motivation for starting and/or using the school garden would in most cases come, typically, from one or two members of staff who were usually experienced gardeners themselves and who had gained the support of their head teacher to start a gardening club. In another setting, Rowena *et al.*, (2010) found out that parents were performing a role of providing advice and support. It was also found out that the head teacher played a crucial role in the establishment of the school gardens (Rowena *et al.*, 2010). In their findings, Rowena *et al.*, (2010) established that the availability of funding and budgeting for gardens were important. It should be noted that Rowena *et al.*, (2010) study majorly followed the qualitative stance which was informed by quantitative study but it was not an action research related aimed at participating in eradicating the problem which brought a need to carry out the study to bridge this gap. Furthermore, Rowena

et al., (2010) carried out the study in England other than Uganda and Nsangi in particular. This brings in a question whether their findings can be generalized in the Nsangi Secondary School setting.

Kiefer & Kemple (1998) have been among the biggest proponents of school gardens arguing correctly that the school garden brings place-based learning rooted in the ecological setting of the school and what the curriculum dictates. The duo advance that reviving school gardens needs a frank and elaborate thought on what went wrong, what is the situation and what needs need to be done to avoid a repeat of a relapse.

In addition to finding out what went wrong, Kiefer & Kemple (1998) further advance that there is need to identify an all -weather -team that will shoulder the responsibility of nurturing and flourishing the school garden. In their book *Digging Deeper*, the two authors argue that the team is needed to do the basic planning and work on the farm concluding that without a core team, the vitality, use and sustainability of the garden is at stake.

Miller (2010) resonates with Kiefer & Kemple (1998) on the essence of school gardens and goes ahead to argue that school administrators need to inculcate in students the love and respect for school gardens for sustainable agriculture education. Miller (2010), who has distinguished himself as a leading advocate of holistic education, argues that school gardens should be promoted because learners are able to see the results of growing food with their own hands; work in harmony with the forces of nature; learn basic academic skills; and learn to work cooperatively with others.

Lawson (2005) concurs with Miller (2010) on the need for school administrators to inculcate in learners the love and respect for school gardens. She argues that learners can only love the garden if they see the garden's direct link to their day to day lives. Lawson (2005) thus

chronicles about *The Edible Schoolyard*, a successful school gardening program where an organic garden and landscape is wholly integrated into the school's curriculum and lunch program. It involves the students in all aspects of farming the garden—along with preparing, serving and eating the food—as a means of awakening their interest and role in maintaining the school garden.

The proposition of farming, preparing, serving and eating food as a way of reawakening students interest in school gardens is closely shared by a number of other writers such as Orsini, Dubbeling, de Zeeuw and Gianquinto (2017) who called for innovation in the utilization of all available spaces at the school such as compounds, roof tops to establish the gardens. The editors argue that school gardens prepare students for jobs, standards, and achievement testing and should therefore be an integral part of the school.

Irving (2015) concurs with the above writers on the need for innovation. He goes a step further by beseeching schools and universities to broaden the use of school gardens by experimenting on other variables such as pollution, productivity, growing conditions so as to make learning memorable and enjoyable. Irving (2015) cites examples of educational institutions in Toronto and Paris that have made considerable research on crops and other variables to the achievement of students.

Grow NYC (2017), a sustainability resource for New Yorkers, is in tandem with Irving (2015) advances on searching for new innovative ways to revive and keep school gardens relevant. The voluntary membership organization however counsels on the need to consult students so as to get sustainable results. According to Grow NYC (2017), the students have to be consulted on the planned rejuvenation and various sections such as lunch area, along with native and flowering plants demarcated to make the school garden pleasant.

Grow NYC (2017) goes ahead of rhetoric in supporting the rejuvenation of community and school gardens. The service organization that was originally created in 1970 as the Council on the Environment of New York City (CENYC) and born out of the spirit of the first Earth Day. It offers technical assistance, school garden grants and free tools and services anyone can use in order to revive school gardens and other open spaces in the city.

2.3.3 Scaling up the utilization of the school garden

Different studies have been conducted about the utilization of school gardens as it acts as an opportunity towards teaching and learning of Agriculture. A case in point is the study conducted by Bruce, Cynthia, Denny, Kevin & Ruth (2016) whose objective was to determine the effectiveness of a master gardener–led education program for youth at a week-long summer camp in Iowa. The study established that there was an overall increase in the student’s knowledge of plants, gardening, and environmental science. This was established when the students answered more questions correctly after the gardening program was administered.

Mabie & Baker(1996a and b) cited in Justin, Mark, Dawn, Kelly & Pauline (2003) investigated the impact of school gardens on the US students’ skills and it was established that only those who participated in the experiential activities had improved on science processing skills. According to Klemmer *et al.*, (2005) cited in Justin *et al.*, hands on experiential learning is the main idea behind most school garden programs. This is concurrent with experiential learning theory which was advocated by Kolb (1975) in Subramaniam (2002) which emphasizes that doing creates an experience which leads to learning. Subramaniam (2002) in Bethel Learning Institute conducted a study which focused on student retention rates based on teaching methods and established an 11% retention for lectures, 75% for learning by doing, and 90% when

students teach other students. The above studies were conducted in Iowa and US respectively and were not necessarily investigating practical skills acquisition and therefore their findings may not be used for generalization in Uganda and Nsangi SS in particular.

Closer home, Okiror (2011) in his study of two Supervised Agricultural Experience (SAE) approaches in Uganda, found out that acquisition of knowledge and skills for vegetable growing was the most important benefit of pupils' participation in SAE gardening activities. This is in line with Rahm (2002) in Justin *et al.*, (2003) who conducted a participatory action research study of learning opportunities for inner-city youth and established that by doing the planting, harvesting and marketing in teams under adult guidance, the young people learned what gardeners and marketers do on a daily basis. Okiror's study was conducted in eight primary (elementary) schools in Uganda and sought to compare the learning achievement of pupils taught using supervised home-gardens and those taught using school gardens. This is in contrast with this study on practical skills acquisition that was conducted in one school which is in a secondary school setting.

Away from Uganda, the Food And Nutrition Security for Southeast Asia (FANSSEA) has a successful programme where different stakeholders in education come to scale up the utilization of school gardens. The knowledge sharing portal chronicles about fifty-seven (57) heads of schools and Local Government (LG) officials preparing action plans for sustaining and expanding the use of the school gardens. Under the plans, on one hand the pilot schools partner with the relevant offices in their municipalities, the province, national government, and even in the Association of the South East Asian Nations (ASEAN) while on the other hand, there is a

partnership of the pilot schools with other nearby schools and their respective communities (FANSSEA, 2017).

It also profiles how during the joint action planning, the LG representatives identified support services that each agency can provide for the initiative of scaling up the utilization of school gardens to succeed. The LG agriculture offices pledged to provide garden materials such as organic fertilizers, worms for vermicomposts, and seeds, as well as additional training for the teachers. The Municipal Nutrition Action Offices and Municipal Social Welfare Offices also assured the schools of their active support especially in involving the parents of the children in gardening programs (FANSSEA, 2017).

FAO cited in Sri Lanka (2017) also supports a programme with aspects similar to FANSSEA (2017) where the UN agency working in collaboration with the Ministry of Education implements a program to tackle health problems and the lack of awareness about the environment among school children. This programme takes education beyond the classroom, guiding students to form a relationship with nature. A manual available in both Sinhala and Tamil has been crucial to the success of the initiative, and has reached over 300,000 children across the island. In many parts of the country that continue to struggle with food insecurity and undernutrition, this initiative has supported children to take responsibility for their diets and share their learning with their families and the wider community.

Akin to FAO in Sri Lanka (2017) where programs are targeting school children to share learning with their families and the wider community, Marchione (1999) chronicles how 40 schools were selected in Dhaka, Bangladesh and given support to start school gardens. Of particular relevance to this study, students who picked great interest in the school garden

activities where supported with funds, tools and other inputs to replicate the gardens in their homes and communities (Marchione, 1999).

2.3.4 Evaluating of the school garden in promoting the acquisition of Agriculture skills

Different researchers have conducted studies in which they evaluated the effectiveness of the school garden in the acquisition of practical agriculture skills. For example Arinaitwe (2011) conducted a study among technical teacher trainees at Kyambogo University with a purpose of experimenting the vocational pedagogy approaches of teaching and learning vocational disciplines in which the researcher found out that the costs of reference books were very high and insufficient in number compared to the trainees in VET institutions and in some instances they were out dated could not fully meet the labour market demands of a technician. The researcher also found out that there were inappropriate methods of teaching employed in VET institutions which was attributed to the fact that the majority of the instructors were not pedagogically trained hence ill equipped with effective and creative ways of involving learners in the learning process.

Arinaitwe (2011) further established that the limited number of technical teachers' training institutions in the country could not produce sufficient numbers for VET institutions in the country. The low attitude towards VET as a characteristic feature amongst the VET aspirants was also isolated as another challenge (Arinaitwe, 2011). However the challenges isolated by Arinaitwe (2011) were in the setting of an institution of higher learning other than a secondary school. This makes their existence in a secondary school setting uncertain thus calling for the relevance of this study. The same researcher also generalized the study to all VET subjects rather

than being specific to Agriculture and school gardens in particular, thus the extent to which the researcher had a deeper understanding into the subject is highly debatable.

The findings in Arinaitwe (2011) do not necessarily agree with Ransford, Christina, Yuan & LIU (2015) but they nonetheless have the same line of argument. In the study conducted by Ransford, Christina, Yuan & LIU (2015) in selected Public Senior High Schools in the Cape Coast Metropolis aimed at evaluating the effectiveness of the teaching and learning of Agricultural Science, it was established that large class size, poor remuneration of teachers, difficulty in planning field trips as well as laziness and truancy on the part of teachers among others were hampering the smooth running of the teaching and learning of Agriculture.

Both Arinaitwe (2011) and Ransford *et al.*, (2015) identified that teaching and learning in VET institutions in Uganda is characterized by insufficient tools, equipment and training materials. However Ransford *et al.*, (2015) study concentrated on a sample of 78 respondents involving 60 Agricultural Science students and 18 Agricultural Science teachers from whom data was extracted using a questionnaire only and the study was not action related. The extent to which deeper understanding was obtained became the point of departure into conducting this qualitative study that involved using interviews, and observation in order to solve this.

Whereas Arinaitwe (2011) and Ransford *et al.*, (2015) concentrate on teacher training and effectiveness in relation to the use of the school garden, Okiror, Matsiko & Oonyu (2011) lauds pupil participation in school garden activities. According to the authors, pupil participation in SAEP (Supervised Agricultural Experience Approaches) gardening activities enhanced their practical skills acquisition of vegetable growing which is in contrast to other studies such as Kibwika & Tibeziinda (1998) that reported limited skills accruing to pupils.

Okiror, *et al.*, (2011) study further revealed that pupils expressed strong interest in participating in school gardening activities and this enhanced learning and the transfer of skills from the school garden to home gardens. Okiror, *et al.*, (2011) chronicles how Agriculture Clubs boast of successful school gardens offered the social energy that formed the foundation for learning the technical aspects and benefits of Agriculture in a more supportive environment of work and fun. FAO in Sri Lanka (2017) concurs with Okiror *et al.*, (2011) on the benefits of participating in school gardening including acquisition of knowledge and practical skills on crop production skills by pupils, food eaten by pupils and teachers acquisition of people oriented skills such as leadership, teamwork among others.

CHAPTER THREE

METHODOLOGY

3.1 Research Design

The Researcher engaged a participatory qualitative action research design in order to bring forth the realistic data and the story of action as it was and as it unfolded. A descriptive approach was used to obtain data through interviews, questionnaires and observations. The justification for using this research design was because it was proficient in the collection of written descriptions of personal experiences and those of the participants. The researcher used interviews, focus group discussions and the Future workshop to obtain data for objective one and four. During implementation phase, most of the data was obtained through field notes generated from observing actions of the participants; interviews; Other than written information, the researcher also used other forms of data and evidence such as photographs, voice recordings which were transcribed to get narratives that were used in presenting the findings.

3.2 Implementation of Action production objective

This study was a second cycle of action research following a study that was carried out at Nsangi SS in November 2016 to establish the existing Agriculture teaching and learning practices. The study focused on improving practical skills acquisition among the A-level students of Agriculture. A future workshop that was attended by the stakeholders of Agriculture department in the school revealed that a school garden, which is a major component in attaining practical skills was lacking in Nsangi SS. Participating stakeholders that included students, teachers, administration and parents made observations, monitored, analysed and recorded the

emerging issues from the beginning to the end during the study activities to evaluate the progress of the intended implementations deliberated upon during the FW session. At the end of the action cycle participants used observation checklists and field notes to critically reflect on how effective the proposed changes were; what the emerging issues to learn from were and, barriers to change and how these changes could be improved to make a better future. It was realized that students of Agriculture still found it difficult to relate the theory taught in class and practice. It was upon this critical reflection that the researcher sought to facilitate stakeholders in another cycle of action research aimed at enhancing practical skills acquisition through reviving the functionality of the school garden. The cyclic process of action research (AR) alternates between action and critical reflection and as the cycles progress, a greater understanding is developed through the continuous refining of methods, data and interpretation (Dick, 2007; McTaggart, 1991).

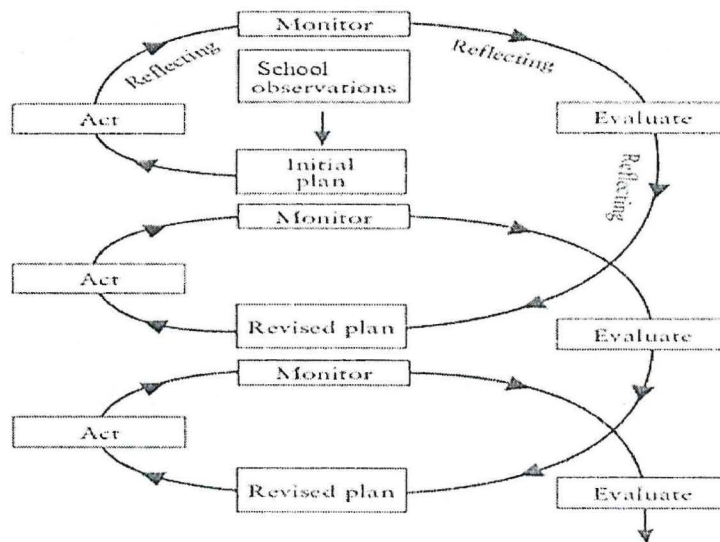


Figure 1: Action Research cycle

Source: Adapted from Kemis and McTaggart (1982)

An assessment team of Agriculture teachers was selected to act as research assistants to mitigate the limitations of the research such as time during data collection. The following steps were an important guide during implementation.

Setting up a team; when I got permission from the administrators, I contacted the Agriculture teachers, students that would be interested in the project to work on the garden planning and advisory team. Members of this team helped in setting goals and providing ideas for ways of how to integrate the garden into the curriculum. The members were informed of the need for their support at particular stages for example at planning and implementation of the teaching and learning. This team focused on improving Agriculture practical skills acquisition using the garden based teaching and learning approaches identified. The team consisted of teachers of Agriculture. I considered having Agriculture teachers because they are valuable contributors and they have a firm understanding of curricular goals. They also served the role of research assistants. The Agriculture students of A-level of Nsangi Secondary School were the study population. When students are involved in all stages of the process, they would be more devoted in the project's success and inspired to care for and respect their garden. By valuing students' opinions and encouraging them to make decisions, teachers cultivated motivated, confident, and collaborative learners.

Identifying Goals and Linking the Garden to the teaching and learning; the first step the garden team took was to identify goals for the school garden. The goals were formulated in line with the current curriculum – the garden was to be used as a tool to help accomplish learning objectives and not an added task for the students' or teachers' workload. Through brainstorming, ways to accomplish these learning objectives were established. The topics to be taught and the classes to get involved were also established.

Developing a work plan; at this level, the activity implementation schedule was made by the participants. This was made to fit within the school time table and programs. The progress assessment tools and measurable performance indicators were approved by the team. These were used within a stipulated implementation interval to aid reflection, re-planning and any possible course of action.

Identifying and Mobilizing resources; at this level, a list of agricultural materials such as planting materials, pesticides, fertilizers among others and their costs were laid out. Agricultural equipment and tools, reporting forms and funds to facilitate the research assistants were also put into consideration. Land and labour (human resource) was provided by Nsangi secondary school.

Implementing the plan; this was the project execution phase. Having identified what the school garden project needed, the team was ready to take the next step to meet those needs. Finding the resources to implement the project was a challenge, but it was also an opportunity to get more of the teachers and learners actively involved and interested in the program. Some students and teachers contributed some funds but this was not enough to meet the whole budget. This made the burden lighter as it helped us to get started. With the few resources in place, the developed work plan was ready for implementation. Students learnt about nurturing and responsibility when they participated in garden maintenance. The basic maintenance tasks included; establishing and maintaining the nursery bed, transplanting seeds to the seed bed or the main garden, watering, weeding, mulching, disease and pest management Documentation at every stage of action during implementation was done. Observations that provided relevant data to the study were documented.

Documentation of lessons learnt; these lessons included nursery bed preparation and management, the evaluations were done at different levels of implementation through observations. Challenges and successes were evaluated. Action points were recommended and would be implemented in the other phases.

Implementation methods; interactive and experiential practical approaches that were mainly student centered as were employed to this study. These helped to achieve the desired objectives.

3.3 Study Population

The study population comprised of stakeholders from Nsangi secondary school who had an interest in school gardening. These included school administrators, teachers, students and parents. These people's interest was exhibited during the Future workshop. The administrators and teachers had interest in the school garden because in their opinion it would ensure that students some Agriculture practical skills, knowledge and values that would culminate into better academic performance. The school administration in particular thought that the school garden properly aligned with the school motto which is Work and Achieve. The students anticipated to acquire skills that would enable them earn a living even after school. Parents expected the students to transfer the acquired skills to their home settings.

3.3.1 Sample Size

This study used a sample of only 22 A-level students who were offering Agriculture and 2 Agriculture teachers and 3 administrators to capture the existing Agriculture teaching and learning practices in Nsangi SS. I only involved the head teacher, the deputy head teacher in

charge of academics and the director of studies. To quantitative researchers, the sample may not provide a representative picture of all the students, teachers and administrators of NSS who are expected to benefit from the study. However, the goal of this study was not to generalize its findings to a larger population. It simply intended to provide a detailed narrative and analysis of the Agriculture teaching and learning practices which could be used to enhance an understanding of how to improve practical teaching and learning. This could possibly inspire others to undertake larger studies in the near future. Creswell (2007) advocates for small numbers of participants in qualitative studies because of the detailed information required. He articulates that the overall ability of the researcher to deliver a detailed picture diminishes with the addition of each new individual or site in qualitative research studies.

3.3.2 Sampling Technique

The study employed purposive sampling technique. The researcher intentionally selected only participants who would give the relevant information and seemed helpful at implementation phase of the study. She purposefully selected the Agriculture department teachers since they understood the central phenomenon and generally information rich. Students were sampled being the implementers of the suggested intervention. The administrators were sampled for the purposes of funding and sustainability of the project.

3.4 Data Collection Method

The data collection methods included; Several data collection means were used to generate the needed information for discussion and reflections. In accordance with the research

design and the objectives, I used interviews, focus group discussions, observations and future workshops as shown below;

3.4.1 Interviews

I interviewed students individually and in teams in which they had worked for the duration of the study. Unstructured interviews were used during the situation analysis phase and after concluding the study. Open ended questions were employed to obtain an in depth understanding regarding the participants experiences during the study. Interviews were used to elicit information regarding the strategies of improving practical skills acquisition by the students of Agriculture through rejuvenation of the school garden. The participants' responses were digitally recorded using a recorder for transcription.

3.4.2 Focus Group Discussions

Focus group discussions were employed to collect data from groups of students and teachers. They were further used as a means of stimulating the discussions to generate suggestions for revitalization of the school garden. This same method was employed to obtain information regarding the opportunities and challenges of using the school garden. As the participants influenced each other in discussing the existing Agriculture teaching and learning practices before the study, they helped to situate the problem. The participants influenced each other on the existing teaching and learning practices in Agriculture through their answers, ideas and contributions. The primary data produced using this method was transcribed into an action work plan. This data collection method energized the implementation of the suggested

interventions which aimed at enhancing practical skills acquisition through reviving of the functionality of the school garden in Nsangi Secondary School.

3.4.3 Observations

The major focus was mainly on student's actions and behaviors during and after the garden learning sessions. Observation method was used to offer a true picture for gauging student's competence on particular tasks on the garden. Altrichter *et al.*, (2008) recommends the use of an "eye for the whole situation" and a kind of intuitive "seeing" that is different from a carefully aimed "looking" while observing. This calls for critical reflections on what is being observed.

Observation method of data collection was an intuitive process where I collected primary data by observing the actions and behaviors of the participants during and after the school garden sessions. This virtually guided the interviews and focus group discussions at some point. This provided contextual information on data collected using other data collection methods. The observation method of data collection was advocated for by Altrichter *et al.*, (2008).

Photographs were taken to provide evidence for the study. This was very necessary in supplementing observation notes since it brought a true reflection of what exactly took place. It also gave the participants an opportunity to directly share their reality.

3.4.4 Future workshop

Future workshop is a participatory procedure employed in producing, collecting and communicating views and ideas on potential future developments. It enables a group of people to develop new ideas or solutions to social problems.

It was held with stakeholders to identify possible solution that was employed to enhance the practical skills amongst the A-level students. The issue of practicals was subjected to the following phases of the Future workshop; the preparation/critical phase, fantasy phase, reality/implementation phase.

i) The preparation/critical phase

During the preparation/critical phase, preliminary observation and critical reflection was instrumental to convert a broad concern to an action theme which became the main topic of the FW. In this phase, information from prospective participants (A-level students offering Agriculture) and other key stakeholders was obtained through informal and conversational unstructured interviews. These key stakeholders mutually agreed upon the FW theme (topic), participants to be invited, and the program, (methods, time schedule, rules and regulations) to guide the FW session. The venue and local facilities needed for the workshop were settled. During the critical phase the issue of practical was investigated. The participants said that Agriculture practical could be handled at laboratory or field levels. The stakeholders stressed that it was mostly the field based area that needed more attention since the lab- based one was once in a while attended to as per the students' communication. The different reasons for not handling practical adequately were established. They included; colliding time tables, inadequate tools and materials, inadequate space for gardens, inadequate human resource, lack of Agriculture laboratory, un co-operative students and teachers, animals destroying the demonstration gardens, and teachers consuming the produce from the students' demonstration gardens.

ii) Fantasy phase

During the fantasy stage, members were encouraged to express what they would wish to be done if they were to solve the problem assuming that everything was more than available. The

following were raised; put in place a well-furnished Agriculture laboratory, adequate human resource, teachers be greatly motivated, admit students with only first grades, avail accommodation facilities for both teachers and students, adequate meals be provided to the students and teachers, put modern demonstration gardens in place, avail a very well-furnished ICT lab adequate for both teachers and students.

iii) Reality (implementation) phase

During the implementation /reality phase, the ideas were adapted to reality; this was to achieve suggestions for one or more projects that would be possible to implement given the resources and time available for the study to be conducted. The time table and the demonstration gardens were taken up for further consideration. The most promising idea that was selected by the majority for implementation was establishment of a demonstration garden for teaching and learning. This was done by voting and 18 members supported establishment of the demonstration garden and 5 supported the timetable. The time table issue was left to the administration, the director of studies in particular to handle since it was also worth solving.

3.5 Instruments of Data collection

The study used Interview guide, observation checklists, and Data recording forms for focus group discussions.

3.5.1 Interview Guide

This data collection tool was used to collect data on objectives one, two and four. I used the interview guide because it contained open ended questions which were helpful in gathering information that answered some of the research questions. This tool was employed in collecting

unstructured information pertaining the existing teaching and learning practices in Agriculture, proposing interventions to enhance Agriculture practical teaching and learning at Nsangi secondary school and evaluating the functionality of the school garden.

3.5.2 Observation checklist

Observation checklist was used to collect unstructured text data and pictures taken during observations made. During the observations, photos were taken especially during the Future Workshop and implementation of school garden activities and field notes were written in the log books. This data collection tool was employed to collect data on objectives two and three. It was helpful in capturing data during implementation of school gardening activities. The observations made served the purpose of directing the reflection process, re-designing and prioritizing action points. I observed the available spaces for the school and the activities in the gardens which virtually guided the interviews and focus group discussions at some point.

3.5.3 Focus group data recording forms

This data collection tool was employed to collect data on objectives one, two and four.

3.5.4 Voice recorder

This data collection tool was used to supplement interview sessions and Focus group discussions. It was helpful in capturing an accurate record of the conversations during the interviews and focus group discussions.

3.6 Validity and Reliability

The data collection tools were reviewed with the technical guidance of the research supervisors to ensure collection of relevant and valid data. For the purpose of this research, triangulation of methods as another form of validation was also used. Triangulation was a concept perceived as the use of different methods to obtain views on the same object of the study. This concept was supported by Diane Millar who suggested that it is better for action researchers not to rely on only one source of information or on one method of data collection or on only one data collection tool (Millar, 2008). She argued that research is stronger if the information is collected in many ways and that triangulation helps in providing more meaningful data analysis.

3.7 Procedure of Data Collection

After proposal approval, I was allowed by the Kyambogo University Graduate School to conduct the research. Because the administration of Nsangi SS had earlier on allowed me to use the school facility for future workshops and the Agriculture department for his study, there was no need to obtain another permission. Data collection involved use of interviews, observations, Focus group discussions. These methods engaged A-level students offering Agriculture, teachers of Agriculture and administration.

3.7.1 Interviews

The researcher asked open-ended questions to the participants and recorded their answers. To some participants, the interview sessions were recorded and others were not comfortable with the arrangement. The researcher interviewed the students, teachers and the

administrators at the beginning of the research. Another interview phase was conducted at the end of the implementation for evaluation purposes. The questions were semi-structured; Norton, (2009) acknowledges the significance of semi structured interviews because they allow the interviewer to use probes designed to elicit further information when necessary. This aided the collection of additional data that was not provided for but deemed important to the study. Each of the participants gave their opinion about the existing teaching-learning approaches that were being used in the learning process. Individual students gave their views on what they thought was the better way to satisfy their learning demands in relation to the objectives. Individual teachers gave their views as to why the traditional approaches of teaching and learning had persisted. The data obtained from the interviews was transcribed, edited and coded for analysis.

3.7.2 Focus Group Discussions

The researcher asked a small number of general questions to groups of six participants and elicited responses from all the groups' individuals. The study gathered the homogenous research study groups. The teachers were requested to brainstorm the proposed interventions in improving the teaching and learning processes. The learners were also requested to propose the interventions. The researcher later merged the two study populations in order to have a collective and sustainable strategy appreciated by both the learners and the teachers. The researcher stimulated the discussion by posing questions concerning different groups without directly revealing the source of the data to minimize bias. A working plan was developed by the stakeholders for implementation. To make the best out of a conversation voice recording was done during the focus group discussions to capture major discussions. This made the process of conversing and interviewing, listen, at the same time making deep analysis of what was being

generated much easier. Recordings provided the researcher with an avenue for critical examination of the issues at later stages of the day. Recordings did not stand in isolation but rather acted as a backup for other methods of research. Every recording made was based on consent with the participants for ethical reasons.

3.7.3 Observations

The researcher used observations to gather open-ended, firsthand information by observing some participant behaviors, lessons and school garden activities at the research site. This gave me an opportunity to record information as it occurred in the real setting.

3.8 Data Analysis

Data analysis had a cyclical structure that was centered on planning, action and fact finding. The analysis occurred at three levels; the first aspect of data analysis, due to the nature of teaching was immediate and ongoing allowing the researcher to meet the on spot learning needs of her students with in the school. Primary data was collected from the field, edited and cleaned. The responses were then coded for analysis. Coding was done to summarize the responses given by the stakeholders for analysis. Thematic analysis technique was used to analyze qualitative data collected.

Table 3: Summary of data collection tools that were used

Research objective	Type of data	Sources of data	Instruments	Analysis
Teaching practices	Nominal and categorical	Interview	Interview guides, observation checklist	Content Discourse
Rejuvenating the functionality of the school garden	Nominal	Observations; FGDs and KII	Observation and FGD checklists, KII interview guides	Photos, processes, narratives, opinions
Scaling up the utilization of the school garden.	Nominal and categorical	Student records, Group discussions	Log books, focus group data recording forms	Narrative Discourse/dialogue.
Evaluating the effectiveness of the school garden	Nominal and categorical	Students' records, observation checklists, interviews and focus group discussions	Interview guides, observation checklist, Log books, focus group data recording forms	Framework Content

3.9 Ethical Considerations

I obtained an introductory letter from Kyambogo University. This introduced me to the study area. It also authorized me to collect data. I sought permission from Nsangi Secondary School to conduct the study in the school. The objectives of the study were communicated to the school authorities and study populations so as to allow an informed consent to the study. The

head teacher and head of the Agriculture teachers were requested to sign consent forms as a confirmation that they are willing to participate in the study. It was assumed that they would have to act in the best interest of the A-level students.

The study ensured maximum confidentiality to the study. Hence the researcher used pseudonyms other than the real names of the participants in order to keep their identities private. This was because this was strictly for academic purposes.

CHAPTER FOUR

IMPLEMENTATION AND EVALUATION OF THE FINDINGS

4.1 Introduction

This chapter presents the findings obtained from analysis of data collected during the implementation phase of the study. This chapter deals with analyses of empirical data related to improving the acquisition of practical skills through utilization of the school garden in the teaching and learning of Agriculture at Nsangi Secondary School-Wakiso. Data obtained from various sources (Interview, student records, and Group discussions, observation checklists, interviews, and focus group discussions) at different times, was analyzed qualitatively in order to demonstrate how the functionality of the school garden in the teaching and learning of Agriculture was revived to improve the student's acquisition of practical skills at Nsangi Secondary School-Wakiso. Using the thematic approach, the Researcher displayed the analyses and findings from both quantitative and qualitative data. The themes for the data analyses were derived from the issues grounded in the basic research objectives reflected in chapter one of this dissertation namely: a) Existing Agriculture teaching and learning practices in Nsangi Secondary School prior to the study. b) Rejuvenating the functionality of the school garden. c) Scaling up the utilization of the school garden. d) Evaluation of the functionality of the school garden in promoting the acquisition of practical skills among the students of A-level.

4.2 Existing Agriculture Teaching and Learning Practices

Objective one of the study sought to characterize the existing teaching and learning of Agriculture at Nsangi SS prior the study. The findings are presented as follows:

4.2.1 Teaching and learning at school level

Table 4: Participants' opinions about the teaching and learning practices in the school

observation	participant responses		
	Yes	No	Neutral
lessons mainly theoretical	9	0	0
skills acquisition secondary to exams	9	0	0
teachers recognized for the grades obtained in national exams	6	0	3
teaching is time table based	8	1	0

Table 4 shows that all the nine participants who included four students of A-level, two teachers of Agriculture, and three administrators, who responded to the study agreed that the school lessons were mainly theoretical, skills acquisition by students was secondary to national examinations, and that the teaching and learning was based on the school timetable. Six out of the nine participants indicated that teachers were recognized for the students grades obtained in the national examinations rather than the practical projects in the school. This was supported by some member whom the Researcher interviewed about how the teaching was being rewarded and he had this to say;

“Every distinction and credit obtained in your subject paper, a certain amount is accorded. This amount changes accordingly every year”.

At school level, the teaching and learning of Agriculture at Nsangi SS was mainly theoretical and this was supported by the stakeholders who said during the situational analysis that school lessons were mainly theoretical and examination oriented. The participants also said that they believed that skills acquisition was secondary to national examinations. For example, one student of the senior six class learning Agriculture (participant four) clearly said that,

“Sometimes we could learn how to prepare a nursery bed, when we are just drawing and writing in our books, instead of going to the garden to make it...so we could not understand.” This conforms to the response of participant three.

4.2.2 Teaching and learning at department level

The practices concerning the teaching and learning of Agriculture indicated that the teaching and learning at department level was more theoretical than practical. Most respondents critiqued the existing method of teaching. They all emphasized the teaching practices in place did not offer adequate exposure to enable student’s link new information with what they knew. For instance, one of the respondents said that:

“Students were not practicing what we used to teach especially, in O-level Agriculture paper two” this conforms with what Participant three complemented that, “lack of a school garden could inhibit passing of all the papers.”

In an attempt to explain the reason for the occurrence of this, the head of department attributed it to lack of relevant learning materials and tools to enable them (students) to link the theory with real life practice. On this matter, Participant three said, that “establishing a garden

wouldn't be a problem but, the lack of enough teachers, money, and other learning materials makes it difficult to put this in practice.

It was also established that teaching and learning of Agriculture was based on the timetable only. Another respondent maintained this by saying that:

"There is no extra time allocated to practicals and therefore teachers have to make it a point that the practicals and theory lessons fit in the school programme."

On interviewing the students, they isolated several shortfalls. One of the students called Participant six said that *"the time accorded to us is inadequate."* Participant four points out that *"there is limited interaction between teachers and learners."* This was supported by the students who raised an issue of not having a school garden for demonstration in the teaching of some topics that could only be well taught using the school garden. On this note another student (participant five) rhetorically asked that, *"How can you learn well things related to transplanting, when you are not having a school garden?"*

According to the observations collected using the observation checklist, the teaching process did not give adequate attention to the practical skills acquisition as required by the curriculum. Teachers mostly use chalk-and-talk method interjected by discussion method. Teachers on rare occasions carried specimen like weeds to class for practicals and took students out on study tours/trips to farms.

There were inadequate tools and equipment in the laboratories for Agriculture and the teacher had to improvise for most of them. The teaching approaches employed in schools were influenced by the timetable and the major target of completing the syllabus. The A-level Agriculture syllabus is very large but has to be covered in one and a half years. On this note,

according to participant three, *“Even at the time when the school had a garden with crops, the main focus remained on theoretical content in the school.”*

Participant four also emphasized that, *“At one time we had this school garden you are talking about. But the teachers of Agriculture still focus only on academics and grades in the school.”*

Although many of the participants indicated that there were no school gardens, one student observed that the school had some gardens, though they were belonging to staff members. On this issue, the student said that: *“...much as there are existing staff gardens, they could not be utilized for purposes of teaching and learning of Agriculture...”*

This was also emphasized by another Participant six, who had these to say,

“Much of the school land has been used by teachers for their own purposes. We have not been having a school garden for demonstration of practical skills that we learn in our classes.”

The above results showed that the practical teaching and learning of agriculture was affected by undue emphasis on national examinations where teachers are recognized for number of passes obtained by the students; limited time for teacher to student interactions and that school gardening land has been put to personal use by the teachers.

4.3 Opportunities and Challenges of rejuvenating the school garden

4.3.1 Opportunities for rejuvenating the School Garden in School

Following the work process analysis and the Future Workshop conducted at the school in November 2017, a resolution was reached towards establishment of a school garden. One immediate opportunity came from the Head teacher as the chief administrator of the institution

who acknowledged the need to establish a school garden, as teaching of Agriculture was considered theoretical. In the process of granting me permission, the head teacher who was one of the participants appreciated what a great opportunity it was that we could employ and reduce theoretical teaching in the school. *“Creating a school garden will be a great asset to the school in promoting practical teaching in the school.”* said the head teacher.

Similarly the teachers of Agriculture also observed that making the lessons practical was their great challenge. One teacher of Agriculture (participant two) for instance emphasized that *“without a school garden Agriculture had remained a theoretical subject in this school.”* Another teacher of Agriculture (participant three) also reiterated by supporting this statement that,

“It is a great opportunity we can employ to teaching practicals in our school. Creating a school garden will help us greatly to promote practical teaching in the school.”

In the Future workshop conducted in the school library which was attended by the students, teachers, and administrators, it was established that the Agriculture practical were hindered by absence of a school garden.

In this section, the researcher also presents the data which was generated during the planning phase of reviving the functionality of the school garden. Each of the steps that were taken during the establishment of the school garden constituted a sub theme as follows:

1. Selecting a school garden team
2. Identifying goals and linking the garden activities to teaching and learning
3. Developing a work plan
4. Identifying and mobilizing resources for implementation.

a. *Selecting a School Garden Team*

In order to set up a school garden, the researcher had to establish a garden team. The school garden team of Agriculture teachers, students and administrators was formulated. The teachers of Agriculture got involved in identifying goals and linking them to the practical skills acquisition. They further came up with different garden activities that students had to perform against which evaluation was based. The school garden activities were formulated in line with the curriculum and made to fit in the school programme and not an added task for the students' or teachers' workload.

b. *Identifying goals and linking the garden activities to the teaching and learning*

Through a brainstorming session, the team came up with different goals. For instance in the focus group discussion conducted with the team, they suggested to raise kale and spinach. One member of the team proposed that, *"We need to raise kale and spinach from seed to harvest..."* while another member of the group suggested growing Maize. In his statement he said that *"it does not involve a lot of activities for example mulching, watering, transplanting like kale and spinach."* Although the initial participant class of the A-level students offering Agriculture would be officially involved in the garden activities, the team members also agreed to involve students from senior two class. One member proposed that,

"I know that this is our garden as A-level class taking Agriculture. But why can't we also engage another class? If we don't involve another class it is going to be difficult when it comes to some garden activities like opening of land..."

The researcher suggested senior two class to solve this problem. According to her, it was going to give an opportunity to the senior two students because they were also studying about land preparation during that time.

It was agreed that the senior two students would participate as observers at the time when the A-level students demonstrated some of the skills they had acquired as well as handling crop production specifically nursery bed preparation. This objective was later achieved (plate 2).

c. Developing a work plan

An activity implementation schedule was collaboratively generated. One member of the department suggested that, “The implementation of activities begin with acquisition of land, primary land cultivation, nursery bed establishment and seedbed management. This was made to fit the school time table. The plan for producing kale and its work process is indicated in Appendix 2.

d. Identification and Mobilization of resources

The working team devised a list of agricultural materials. One member suggested that, “I propose that we get planting materials, pesticides, fertilizers among others and their costs.” Another member proposed including agricultural equipment and tools and funds to facilitate the participants on the budget. As far as land and labor (human resource) was concerned, school provided it. Finding the resources to implement the project was a challenge, but it was also an opportunity to get more of the teachers and learners actively involved and invested in the program. Some students and teachers contributed some funds but this was not enough to meet the whole budget. These contributions made the burden lighter as it helped the project to get started. With the few resources in place, the developed work plan was ready for implementation. Amidst the financial constraints encountered, participants went ahead with the implementation although the progress was slower than anticipated. This created some time lag between the theory which was handled in class and practice in the garden. When the researcher requested one of the participants to explain to the class the procedure of nursery bed preparation

before the actual practical, I realized that he had forgotten two of the steps .I related this situation to the effect of separating theory from practice and how it affects knowledge retention.

Lessons learnt:

1. *It is paramount to plan very well before embarking on the school garden project if success is to be achieved.*
2. *It is equally important that all stakeholders are involved if one is to tap from diverse experiences that could be of importance for sustainability purposes*

4.3.2 Challenges encountered during the planning process

There were several challenges faced during the planning phase of this project as shown below;

The teachers who owned the gardens who had not attended the future workshop found it very difficult to hand over the plots of land in their use to the Agriculture department for this study implementation.

All the hoes and some other garden tools like the slashers were discovered missing and yet they were available by the time of conducting the future workshop. This necessitated further planning for how to obtain other tools. As a way forward the S.3 were requested to report with hoes the following term.

Inadequate and late release of funding; It took a whole term without being funded and for that matter the students together with the teachers resorted to raising some funds especially for purchasing some few gardening tools like forked hoes, the watering cans, slashers and, the planting materials, and some Farmacyard manure.

4.4 Enhancing the utilization of the school garden.

In this section, the Researcher presents the documentation and analysis of results that concerned enhancement of the utilization of the school garden to enhance practical skills acquisition among the Agriculture students of A-level at Nsangi SS. This action research study involved documentation and analysis of the process that was involved in utilization of the school garden. Eight sub sections emerged out of this theme. These were relating to Land Preparation, nursery establishment and management, seed bed preparation, transplanting, crop management, weeding, and harvesting. The discoveries of the study are divulged in these narratives and photos to show the practical work within these eight subsections.

4.4.1 Land Preparation

The land was prepared by the students under the supervision of the teacher. Having obtained the required garden tools, preparation of land started with initial cultivation which involved digging the soil deep to allow better and faster root development. Aggressive perennial weeds like couch grass were removed before planting. Land was prepared early enough to expose pests to sunlight and birds. Land preparation was done on a sunny day when the land was dry to avoid soil crumbling and creation of a hard pan (Plate 3).

4.4.2 Nursery Establishment and Management

The nursery beds were established and managed by the students (Plate 4). The nursery beds were 1 meter wide and 10 meters length (so as to undertake cultural practices without injuring the plants). Because the site had heavy soils, a decision was made to use raised beds so as to prevent water logging. Manure and phosphate fertilizers, DAP in particular were applied

and worked well into the soil. This was done because manure improves the soil structure and moisture holding capacity while phosphorus helps in root development. The drills were made across the beds at a spacing of 10-15 cm apart and 2 cm deep. The choice of spacing was done to allow easy weeding of the seedlings. The seeds were mixed with sand and sown thinly and covered lightly with soil. Sand was used to obtain a better spacing within line on the nursery bed since seeds were tiny. The nursery bed was covered with a thin layer of dry grass (mulch) to avoid unearthing the seeds. This was removed after germination. A shade of 1 meter high was constructed to prevent the effect of intensity of the sun's heat on the newly emerged seedlings which were still delicate at the time. The seedlings were thinned out 2-3 cm apart and this was to avoid overcrowding of seedlings which could lead to competition for nutrients and space resulting into weak seedlings (Plate 5).

Watering was done once daily in the evening. Transplantation of the seedlings was done when they had formed five true leaves and this took a period of four weeks. During this the Nursery Establishment and Management, I observed that students were engaging in interaction approach of learning. Learning was made more interactive between students (in groups) and teachers in and out of class, thus creating a community of learners. On this note, all the teachers were in agreement that as Nursery beds were being established and managed, the cleft between the teachers and students was bridged. Participant three for instance said that, *“teaching and learning was more interactive in the garden than it was in the classroom setting.”* Yet Participant two said that,

“We can now meet the students more time and again. We can now check on the student progress, observe their behavioral patterns and address some of their concerns...”

The students felt so free to ask more question than they did in class. For example the learners were inquiring why there was need to treat the soil before the seeds were sown in the nursery beds. Another one inquired to know why we did not advocate for planting the vegetable seeds directly into the seed bed. Many of the students when asked about what they liked about Nursery Establishment and Management they emphasized that it had also encouraged independent learning. For example, one participant said that,

“It gave us more time to do a lot of independent learning through problem solving. An example is when our garden was attacked pests and I had to consult here and there to get the solution without the help of our Agriculture teacher.”

4.4.3 Seed Bed Preparation

The students ploughed the field 2 weeks in advance and 2 weeks later harrowing was done to prepare the soil to a fine tilth. Seed beds were raised to a height of about 15 cm with a length of 10m and a width of 2m. we opted for raised seed beds to create room for root development and proper drainage. It involved incorporation of rotten farmyard manure which was obtained from one of the teachers who owned a poultry enterprise. From this step, experiential learning with emphasis on learning by doing was seen as being applied by the students. It was observed that learners were actively involved in doing the activities. Participant six believed that as they prepared the seed bed, they were being empowered to learn by experience. He said that,

“As we get involved in real Seed Bed Preparation we can now internalize what we have been learning... we can even talk to each other with a lot of ease unlike the class lessons.”

Through performing the school garden activities, sharing their experiences, and personal reflections and ideas about activities brought about learning.

4.4.4 Transplanting

Before transplanting, the nursery bed was watered to soften the soil and this was done in the evening. This was then followed by the transplanting process where seedlings were planted to the same depth (2cm) as in the nursery. A spacing of 60cmx45cm was used.

As this stage was taking place, it was observed that the participants developed multiple skills. For example, participant four said,

“I have not only learnt physical tasks such as digging, weeding and hoeing, but also to developing the skills needed for such tasks as transplanting tiny seedlings and tying tomatoes to canes.”

4.4.5 Crop management

DAP fertilizer was applied during transplanting (1 teaspoonful per hole) and two weeks later *Vegamax* was sprayed to boost the vegetative growth. The fertilizers replenish the soil with important minerals lacking in the soil. As far as crop management is concerned, it was observed that there was meaningful transfer of knowledge. Therefore, during the study, Agriculture learning did not only take place inside classes, laboratories but also in the school garden.

On interviewing one of the teacher participants about the experience of utilizing the garden in the teaching and learning he had this to say;

“The experiences obtained by taking the students to the school garden and encouraging them to undertake investigative work like identification of some weeds and pests involved a different kind of pedagogy. Students took greater control over their own learning and the teacher’s role became more facilitative. Teachers reported that students learnt some precautionary issues concerning their conduct when they are in the garden and during application of some of the Agricultural inputs”.

4.4.6 Weeding

Weeding was manually done using hands to uproot the upcoming weeds. The weeds were ably uprooted manually because the ground was soft enough. This was because of the incorporation of the manure at the stage of land preparation. The reason for weeding was to reduce competition for nutrients between seedlings and weeds, and also to reduce pests and disease infestation.

4.4.7 Mulching

Students mulched the garden using dry grass as a means of conserving the moisture in the soil during dry periods and controlling soil erosion on rainy days. They mulched because it increases organic matter in the soil and suppresses splashing of rain and spread of diseases (Plate 6).

4.4.8 Harvesting

Harvesting of kale took place after the plant had developed about eight leaves but the outer leaves were the ones normally plucked. The outer leaves of the Kale plant were removed as they matured, to give a continuous cycle of growth. The leaves that were bright green and fresh were harvested as opposed to yellow leaves when harvesting. The reason was that yellowish leaves produce an undesirable taste, and their wilting appearance is unappetizing. On sporting what had been harvested teachers sported lifelong benefits. For instance, Participant four said that “it is good to utilize the garden because to some students it was a way of building flexibility to protect against life’s potential challenges.” He specifically said that if they were to dropout of school, they would employ the skills acquired to survive.



Figure 2: Demonstration of nursery bed preparation



Figure 3: Students designing the school garden



Figure 4: Shows a student sowing kale seeds



Figure 5: Thinning the seedlings



Figure 6: Mulching

Figures 2 – 6: Utilization of the school garden for practical skill acquisition by students (source; primary data from the field)

4.5 Evaluating the rejuvenated functionality of the school garden

Evaluation provided answers to questions about whether the study program was successful in meeting the targeted objectives for continued use. The purpose of evaluation was to inform action. It is on this ground that the researcher presents analysis of data revealing the degree to which the school garden tool became successful in enhancing practical skills acquisition among the A-level students of Agriculture in the School. This gave an idea whether the school garden was an effective tool for continued use to facilitate the practical skills acquisition by the students or not. This was done while reflecting on the previous teaching and learning approaches that were being used for the practical skills acquisition. In response to the above, an evaluation meeting with participating students and teachers was conducted to identify success and some areas that needed improvement in as far as the school garden project was concerned. The researcher also issued to the participants questionnaires for evaluation of the effectiveness of the school garden in the study. Further evaluation was done through observations and one –on- one interview. This was done to compare information from different sources for triangulation purposes. As a way of assessing the learners the researcher tasked them to practically demonstrate to the senior two students the initial stages of how to prepare a tomato and a cabbage nursery beds. Since they had knowledge of producing kale and spinach, they welcomed the idea of growing cabbages and tomatoes. They were able to apply the knowledge they used to raise kale and spinach to raising cabbage and tomatoes. The Researcher also set for them some questions to answer in a form that needed them to use information that they had studied using the school garden. The following were the questionnaire findings from the evaluation process of the effectiveness of the school garden in enhancing practical skills acquisition among the students of A-level Agriculture in the school. The questionnaires were

filled and at the same time the researcher probed students further about their position concerning the answered questions. This was possible because the participants were few. Three core themes emerged out of this theme. These included: evaluating the effectiveness of the school garden, appraising the indicators for school garden sustainability, challenges encountered and evaluating the teaching approaches used during the study implementation phase. Findings are presented in the Tables below.

4.5.1 Evaluation of functionality of a School Garden

When the participants were asked to rate the functionality of rejuvenated school garden, they responded differently as shown in the table below.

Table 5: Evaluation of functionality of a School Garden (n = 09)

Activity statement	Able	Not able
Learners able to identify garden tools	7	2
Learners able to establish the school garden	9	0
Learners able to set up and manage nursery beds	9	0
Learners able to transplant seedlings from the nursery to the seed bed	9	0
Learners able to identify diseases and pests in the garden	5	4

The results in figure 3 shows the evaluation of the school garden in promoting practical skills acquisition. Able meant that the skill was successfully acquired and not Able meant that the skill needed revisiting. At the time of evaluation only nine student participants responded because this was the number that persisted to the end of the study. From the evaluation exercise, the school garden enabled students acquire some practical skills pertaining to production of kale. *All the nine (09) student participants indicated that with the presence of the school garden, the learners acquired skills on how to set up and manage nursery beds, transplant seedlings from the nursery bed to the seed bed, with minimum supervision.* However, five out of the nine (5 out of 9) participants indicated that even with the school garden in place, the learners were not able to apply the good agricultural practices. When asked why some of the participants could not apply the good Agricultural practices, they answered that, *they needed more exposure to the practical if all the good Agricultural practices were to be mastered. They said that more was still needed in the area of integrated pest management and some other sustainable Agriculture practices like composting.* These were noted as something worth studying in other research cycles. Seven participants indicated that they were satisfied with identifying the garden tools that were required for the study. They also said they could ably identify the type of fertilizers to use for particular crops. However, they said that they needed more exposure with different crops.

The five student participants appreciated that the school garden gave them an opportunity to deal with the garden challenges. This was related to the participants who said that learners understood the disease prevention mechanisms in the garden. I relate these two because diseases were one of the problems encountered during the garden project.

4.5.2 Evaluating Sustainability of a School Garden.

Once a school garden was established, one of the biggest challenges keeping the garden going. When the student participants were asked to rate the indicators for school garden sustainability, the following findings in the Table below were indicated;

Table 6: Indicators reported for sustainability of school gardening in the School

Sustainability Indicator	Student participants' response	
	Satisfied	Dissatisfied
School garden for practical skills demonstration in existence	4	1
School garden owned and managed by learners	5	0
School management of Nsangi SS support the school gardening idea	3	2
Planting materials and equipment available	4	1
Assessment on mastery of agricultural practices based on gardening	2	3
Learners know good Agricultural practices	3	2

During this study the above were agreed that once achieved would enhance sustainability; having managed to acquire some plot of land on the school grounds for the purpose of establishing a school garden was taken to be a sign of success and sustainability. During evaluation four participants were satisfied and one of them was not satisfied, he explained that *since the acquisition was not yet put in writing then it was not sustainable.*

It was also indicated that since the school garden was observed to be owned and managed by learners. This was regarded to be an indicator of sustainability because even after

the research study implementation, the students continued to involve themselves in garden activities with the facilitation of teachers. Another indicator of sustainability that was considered was the school management of Nsangi SS being able to support the school garden for practical skills acquisition. Three participants indicated that with the school management involvement, sustainability was guaranteed. However, the remaining two participants were not satisfied and the reason given was: *“the bureaucracy involved in obtaining the resources for practical subjects was a problem because of delayed funding issues not only for Agriculture but also for other practical subjects”*.

This meant that with the support of the school management in place there is guarantee maintaining gardens when school is not in session.

4.5.3 Challenges encountered during implementation

There were several challenges faced during the implementation phase of this project. Upon implementation of the study intervention, participants encountered several challenges. In this section I present the challenges that were encountered in the course of utilizing the school garden in enhancing practical skills acquisition among the A-level students of Agriculture. The teachers faced the challenge of inadequate and late release of funding to buy planting materials. For example, Participant three explained, that *“we would have done better than this if we had enough money to buy quality seeds...”* Another challenge isolated by the participants was the inadequate garden tools and equipment. Participant five observed that, *“We could have done this garden earlier, but we did not have hoes and other tools to kick start it.”* Participant four lamented that, *“We also lack equipment like the forked hoes, the watering cans, slashers and a few others for garden use!”* The tools for opening up the land were another issue at the

implementation phase but this was reported in the planning meeting. This was however solved through a brainstorming session in which the dean of students suggested that,

“We shall inform parents of senior three to report with hoes the next term... We shall try to improvise where ever possible... Provision of simple demonstrations tools like hoes, pangas, watering cans, fertilizers among others by the school will also be of help to equip students with practical skills to survive after school.”

The students also reported the lack of safety and protective wears like gumboots, overalls and gloves to protect their uniforms from dirt. For example, Participant four grumbled that,

“One day I soiled my uniform, yet it was in the morning... but I had to spend the whole day at school while the uniform was dirty.”

During the implementation phase of this study, the participants said that it was hectic and time consuming. This was also raised as a big problem during the situation analysis. But in order to deal with the issue of human resource participants agreed to only deal with what the syllabus required so that it did not become an extra burden on the facilitators. Management of the school garden especially during holidays was another sensitive issue. This was so because the senior six student participants were studying during the holidays and claimed to be very busy most of the time. The students also reported Vandalism of the garden by the students; this was a great demotivation from the non-participating students; this was so especially after classes when they would ascertain that the study participants are out of the school premises. Participant four for instance lamented that, *“one day when we reported to school, found when some of our crops had been uprooted and stolen”*

4.5.3 Evaluation of the teaching approaches used during the study implementation phase

This section presents the different pedagogical approaches which were used in the implementation phase of this study. whose aim was to improve practical skills acquisition through revival of the functionality of the school garden. This functionality was revived through utilizing the garden during the teaching and learning of Agriculture. The approaches employed during implementation were interactive, experiential and collaborative.

4.5.3.1 The interactive approach

This approach took precedence right from the stage of situation analysis from where the participants raised a gap of inadequate interaction between the students, teachers and administration. This study brought about opportunities for interactions especially during the interviews, focus group discussions and the future workshop conducted during the situation analysis to implementation and evaluation. During practical teaching on the school garden the learners got an opportunity of interacting with the teachers on a more relaxed ground where there were no classroom boundaries and rules of no moving and talking in class as mentioned by one of the student participants. When I interviewed one of the participants about what he liked most about the school garden-based learning during evaluation stage, he stated the following;

At least I asked many questions without any cause for fear because we are outside there in our garden. I actually did not know that teachers could be more friendly when we were outside the classroom.

During the study evaluation I made the participants to demonstrate some of the acquired skills to the students of O-level from where it was observed by one participant 4 that,

“this kind of interaction as an entity enhanced acquisition of other skills inclusive of communication, listening, and presentation.”

4.5.3.2 Experiential approach

In the process of implementation, students were actively involved in carrying out various school garden activities. With reference to the underlying theory, the learners were learning from the experiences drawn from the activities they got involved in during the school garden learning sessions. These activities were in conformity with experiential learning theory as advocated by Kolb (1948) which emphasizes that it is through doing that learning occurs through the experience drawn by the learner. With the experience drawn the learners benefitted by becoming lifelong learners. This was based on the conclusion from the interview conducted with participant 4 about what he benefited from the school garden-based learning activities and the response was as follows;

I have gained a skill of vegetable production especially nursery bed preparation. I never thought I could also step by step be able to raise kale from the level of seed to harvest. This has created confidence in me that one can actually earn from such garden activities because we sold the vegetables and we were able to earn money which we used to produce tomatoes. I will actually do this thing at home because now I'm more confident about it.

Lessons learnt:

1. It is of great importance for teachers to utilize a school garden if the students are to link what they study theoretically in class with the practice.

2. With adequate practice in the school garden activities the students will fit more in the world of work.

4. 6 Summary

In this chapter, the researcher presents data according to the four objectives. The findings indicate that teaching of Agriculture was more theoretical than practical. The findings also point out that the teaching of Agriculture is based on the school time table and not awarded extra time for practical sessions. This study suggests that with the presence of the school garden, to a greater extent made the learners acquire skills on how to set up and manage nursery beds, transplant seedlings from the nursery bed to the seed bed, with minimum supervision. After establishing the school garden, several benefits were obtained towards making teaching and learning practical although there were challenges.

CHAPTER FIVE
DISCUSSION OF FINDINGS, SUMMARY, CONCLUSIONS AND
RECOMMENDATIONS

5.1 Introduction

This chapter analyses, and examines the findings obtained from this study. This chapter also delineates the implications of the results of improving the acquisition of practical skills through reviving the functionality of the school garden. In this chapter suggestions for future research and to the stakeholders are also provided. The purpose of this action research was aimed at improving the acquisition of practical skills by A-level students of Agriculture at Nsangi SS. During implementation phase, most of the data was obtained through field notes generated from observing actions of the participants and reflective logs; interviews; The researcher also used other forms of data and evidence such as photographs, voice recordings (needs to be reflected in data collection tools also).

The objectives which shaped this study were to (a) Characterize the existing Agriculture teaching and learning practices in Nsangi Secondary School; (b) Rejuvenate the functionality of the school garden for the teaching and learning of Agriculture in Nsangi Secondary School; (c) Enhance the utilization of the school garden in the teaching and learning of Agriculture at Nsangi Secondary School; and (d) Evaluate the functionality of the rejuvenated school garden in promoting the acquisition of practical skills among students of Agriculture at A-level.

5.2 Discussion

5.2.1 Existing Agriculture Teaching and Learning Practices at Nsangi SS

The Future Workshop held at Nsangi SS (1.3.2) established that poor performance in Agriculture was rooted in theoretical teaching. The findings also indicated that the teaching and learning of Agriculture was based on the timetable only. The type of teaching that existed before establishing a school garden was not conforming to the Experiential Learning Theory which emphasizes learning by doing. The implication was that the teachers were not involving the students in hands-on reflective learning. These findings corroborated with Okiror (2011) who reported that gardening activities enhanced students' practical skills acquisition and school gardens were worth establishing.

The findings also revealed that the lessons were theoretical and exam oriented and that teaching was based on school timetable. These findings were found to be the case by the stakeholders during the work process analysis (1.3.1) situational analysis that school lessons were mainly theoretical and examination oriented. The participants also indicated that they believed that skills acquisition was secondary to national examinations. These findings were in line with Okiror (2011) and Onu & Ikehi (2013) who went into detail describing the current teaching methods which could be aided complete with teaching materials designed for the classroom. This teaching method has become a common concern for senior educationists who blame the current school administrators that only focus on passing national examinations and not the knowledge obtained by students for replication in their life after school (Okiror 2011).

5.2.2 Possible opportunities and challenges of Rejuvenating the functionality of the school garden

The results from the study show that a teacher of Agriculture was important in instituting innovations that could help to rejuvenate the functionality of the school garden. In the context of Nsangi Secondary School, the participants at the Future Workshop (1.3.2) ranked the negative attitude of the students and teachers as the major problem that was greatly affecting the teaching and learning of the subject. The Agriculture teachers were challenged to embark on the practical teaching of the subject where a functional school garden could be a solution to the anomaly. These findings concur with Rowena *et al.*, (2010) who reported that the motivation to rejuvenate a school garden would in most cases also come, typically, from one or two members of staff who were usually experienced gardeners themselves and who had gained the support of their head teacher to start a gardening club.

The finding established that having a functioning school garden was hinged on the availability of free land at school. This finding is closely shared by previous authors such as Rowena *et al.*, (2010) who wrote that the availability of land was crucial and that such land for school gardening could be small or big. This is in line with Odrumuru (1987) whose findings considered land a prerequisite for not only crop growing but also students' projects and demonstration gardens. The findings in this study suggest that land was also instrumental for the agriculture teaching. This became the reason why both land and labor (human resource) were provided by the school. The existence of land is a tool for promoting experiential learning as the students are in position to practice in person hence promoting learning. Analysis of the practices that existed at Nsangi Secondary School before this study revealed that although land was available and gardens were in place, they were not necessarily used for learning. This became a

basis for rejuvenating the functionality of the school garden that would be used for promoting Agriculture teaching and learning practices.

The findings support the arguments of Experiential Learning Theory that make a backward and forward connection between what we do to things and what we enjoy or suffer from in consequence (Arinaitwe, 2011). This is because establishment of the school garden involved a series of tedious but rewarding learning activities whose steps involved: selecting a school garden team, identifying goals and linking the garden activities to the teaching and learning, developing a work plan, identifying and mobilizing resources for implementation.

5.2.3 Enhancing the utilization of the school garden

The findings revealed that learning involved interactions, observations, reflections and collaboration which became possible on the school garden. These were the experiences in the practical sessions the students of Nsangi SS went through. During the teaching and learning of Agriculture at the school, the students were involved in land preparation, nursery establishment and management, seedbed preparation, transplanting, crop management, weeding and harvesting. The students could interact, observe, reflect and also collaborate. The study findings and practical experiences at Nsangi SS were inline with a number of authors such as Bruce *et al.*, (2016) who called for the utilization of the school garden in the teaching and learning of Agriculture if students were to get practical skills and knowledge of plants, gardening, and environmental science. The findings also suggest that, although theoretical teaching existed before this action research, the interventions made to utilize the school garden in the teaching and learning of agriculture could solve the anomaly. This is because the findings indicate that, during nursery establishment and management, students were learning through interaction.

Learning was made more interactive between students (in groups) and teachers in and out of class, thus creating a community of learners. The findings also underscored that through performing the school garden activities, sharing their experiences and personal reflections and ideas about activities; learning could take place. Independent learning was also encouraged during the utilization of the school garden in the teaching and learning of agriculture.

5.2.4 Evaluation of the functionality of the school garden

The findings of the study showed that, involvement in the gardening activities enhanced student's practical skills acquisition (table 5). These findings augur well with Okiror (2011) who reported that pupils' participation in gardening activities enhanced their practical skills acquisition of vegetable growing. This conforms to the findings of this study which showed that all the nine (9) participants indicated that with the presence of the school garden, the learners acquired skills on how to set up and manage nursery beds, transplant seedlings from the nursery bed to the seed bed, with minimum supervision. However, some of the students(5 out of 9) indicated that even with the school garden in place, the learners were not able to apply the good agricultural practices. They indicated that they said that they needed more exposure to the practical if all the good Agricultural practices were to be mastered. They said that more was still needed in the area of integrated pest management and some other sustainable Agriculture practices like composting. This was noted as something worth studying in other research cycles. The findings also showed that, there was a great conformity between the study findings and the Experiential Learning Theory since students remarked that teaching and learning was more interactive in the garden than it was in the classroom setting.

To further appreciate the effectiveness of the school garden in the practical acquisition of agriculture skills, respondents were given an opportunity to share the challenges they faced. The study established a multiplicity of challenges encountered during the process of promoting the acquisition of practical skills by A-level students of Agriculture. During the actual implementation phase, some issues that were encountered included the following; inadequate human resource, during the implementation phase of this study. The participants said that it was hectic and time consuming. This was also raised as a big problem during the situation analysis, although it was finally solved. Management of the school garden especially during holidays was another challenging issue. This was so because the senior six student participants were studying during the holidays and very busy most of the time. The participants also isolated the challenge of inadequate garden tools and equipment, inadequate and late release of funding to buy planting materials. This conforms to literature which reveals that in implementing the projects of the vocational subjects, it was found to be demanding in terms of time, money equipment, material and space (Mavis & Stanford, 2014).

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

The purpose of this study was to enhance the use of the school garden to improve the practical skills among A-level students of Agriculture at Nsangi Secondary school in Wakiso district. This study was guided by the following objectives; Establish the existing Agriculture teaching and learning practices in Nsangi Secondary School; To determine possible opportunities and challenges of rejuvenating the school garden in Nsangi Secondary School; To enhance the utilization of the school garden in the teaching and learning of Agriculture at Nsangi Secondary School; Evaluate the rejuvenated functionality of the school garden in promoting the acquisition of practical skills among A-level students offering Agriculture at Nsangi secondary school. Interviews, Focus group discussions and observations were employed to collect data. The following were the evaluation findings;

Teaching of Agriculture was more theoretical than practical. The findings also point out that the teaching of Agriculture was based on the school time table and not awarded extra time for practical sessions. This study revealed that with the presence of the school garden, to a greater extent made the learners acquire skills on how to set up and manage nursery beds, transplant seedlings from the nursery bed to the seed bed, with minimum supervision. After establishing the school garden, several benefits were obtained towards making teaching and learning practical although there were challenges.

6.2 Conclusions

Basing on the above findings, the following conclusions were made:

The dominant pedagogy for Agricultural education in the school was chalk and talk (lecture), with few demonstrations on how certain tools are used on the farm. The teaching was largely teacher-centered, dominated by factual materials, abstractions, and dictation of notes. It is this against this background that there was a drive to this study with a rationale of improving the acquisition of practical skills by students of agriculture through utilization of the school garden in the teaching and learning of Agriculture;

Regarding the rejuvenation of the functionality of the school garden, it is paramount to plan very well before embarking on the school garden project if success is to be achieved. It is equally important that all stakeholders are involved if one is to tap from diverse experiences that could be of importance for sustainability purposes.

On the enhancement of the utilization of the school garden, this is made possible by selecting a work team, identifying goals and linking the garden activities to the teaching and learning, developing a work plan, identifying and mobilizing resources for the implementation of interventions.

Regarding the evaluation of the rejuvenated functionality of the school garden, learners acquired skills on how to set up and manage nursery beds, transplant seedlings from the nursery bed to the seed bed with minimum supervision. However, even with the school garden in place, some learners were not able to apply the good agricultural practices because they needed continuous exposure to the common agricultural practices employed on the farm.

6.3 Recommendations

Based on the above conclusions, the following recommendations are made:

1. Agriculture teachers in secondary schools such as Nsangi S.S. should integrate school gardening activities in their school timetables to facilitate the practical teaching and acquisition of agriculture skills the students;
2. School administrators and policy makers in the Ministry of Education and Sports should provide tools, seeds and other inputs to facilitate the teaching and learning of agriculture through gardening;
3. The management of school gardens be sustained through a school gardening team involving the teachers, school administrators, students and parents which should meet regularly to advise the agriculture teachers;
4. Students should be involved in all activities of the cropping cycle in their school gardens in order to acquire a variety of practical skills they will need after school;
5. Since this study was limited to school gardening, further research should include the teaching and learning of animal husbandry skills.

REFERENCES

- Altrichter, H., et.al. (2008). *Teachers investigate their work: An introduction to Action research across professions*. New York: Routledge.
- Anderson, L. W. (1994). Attitude, measurement of In. T. Husen (ed.). *The International Encyclopedia of Education* (2nd ed.), 1. Oxford: Pergamon
- Arinaitwe, D. (2011). *Vocational Pedagogy Approaches for the improvement of teaching and learning in formal Vocational Education in Uganda. A case study of Kyambogo University*. Unpublished Research Thesis, Kyambogo University, Kampala, Uganda.
- Bachert, R. (1976). *History and analysis of the school garden movement in America, 1890-1910*. Unpublished doctoral dissertation, Indiana University, Bloomington, IN.
- Bruce, J.B., Cynthia, H., Denny, S., Kevin, D. & Ruth, L. (2016). Master gardener –led lessons increase knowledge in gardening and environmental science for Iowa summer camp youth. *Journal of Extension*, 54(5), 1077-5315.
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). California, United States of America: SAGE Publications. Retrieved from: <http://ncbaeryk.yolasite.com/resources/John%20W.%20Creswell>.
- Darko, R. O., Offei-Ansah, C., Yuan, S., Liu, J. P. (2015). Challenges in the teaching and learning of agricultural science in selected public senior high schools in the Cape Coast Metropolis. *Agricultural Science*, 3(1), 13-20. <http://dx.doi.org/10.12735/as.v3i1p13>
- Desmond, D., Grieshop, J., & Subramaniam, A. (2002). *Revisiting Garden -based learning in basic education*. FAO and UNESCO International Institute for Educational Planning.

- DeMarco, L. W. (1997). *The factors affecting elementary school teachers' integration of school gardening into the curriculum*. Unpublished doctoral dissertation, Virginia Polytechnic and State University, Blacksburg, VA.
- Farauta, K. G. & Amuche C. I. (2013). *Implementation of Agricultural science curriculum in Taraba state school system: Imperatives for students' occupational skills acquisition* *Journal of education and practice*.
- Irving, T. (2015). *A bumper crop atop U of T engineering's sky garden*. *U of T Engineering News*, 15 Oct. Available at: <http://news.engineering.utoronto.ca/sky-garden-a-bumper-crop-from-this-u-of-t-engineering-rooftop/>. Accessed 30 Dec 2016.
- Justin, D., Mark, R., Dawn, S., Kelly, T. & Pauline, B. (2003). *Improving the understanding of food, farming and land management amongst school children*. Literature review, RR422
- Kiefer, J. & Kemple, M. (1998). *Digging deeper: integrating youth gardens into schools & communities: a comprehensive guide*. Montpelier, VT, Food Works, Common Roots Press.
- Lawson, L. (2005). *City Bountiful. A Century of Community Gardening in the United States*. University of California Press, Berkeley, California, USA.
- Marchione, Thomas, J. (Ed.) (1999). *Scaling-up, scaling-down: Capacities for overcoming malnutrition in developing countries*. New Jersey: Gordon and Breach
- Mavis, R. C. & Stanford, M. (2014). *Obstacles in the path of implementing Technical /vocational Education in Zimbabwean secondary schools* *Journal of Emerging trends in Educational Research and policy Studies* 557-565.
- McTaggart, R. (1991). Principles for participatory action research. *Adult Education Quarterly*, 41(3), 168-187.

- Millar, (2008). Does Practical really work? A study of the effectiveness of practical work as a teaching and learning method in school science. *International Journal of science education, 30(14)*, 1945-1969.
- Mojekwu, I. (2010). *Work skills required by secondary school graduates for success in yam production and processing enterprises in Anambra state*.
- Moore, G. E. (1994). *Teaching Methodologies in Agricultural Education: A Historical Analysis*. Proceedings of the 21st Annual National Agricultural Education Research Meeting, 21, 230-235.
- NCDC, (2013). *Agriculture Teaching Syllabus*. Kampala.
- Newcomb, L. H., McCracken, D., & Warmbrod, R. (1986). *Methods of Teaching Agriculture*. Danville, IL: Interstate Printers and Publishers. Anderson, 1994.
- Nienke, M. B. & Clesensio, T. (2002). *Uganda*. (ASTI Country Brief No. 1). Washington, U.S.A. Agricultural Science and Technology Indicators. Retrieved from: <http://www.ASTI.cgiar.org>.
- Odrumuru, J. A. (1987). *The effects of Quality of School Farms on Students Performance in Practical Agriculture in Kampala Secondary Schools*. MED dissertation, Makerere University.
- Ofoegbu, T. O, Uche, D. Asogwa & Madu Bah, (2015). Application of vedeo taped instructional approach for acquisition of slashing and raking skills in practical Agriculture science. *International Journal of Educational Science & Reseach (IJESR) 15-22*.
- Okiror, J. J. Geoff, H., & Mark, W. (2017). Enhancing students' engagement in Vocational Agriscience and after school careers in Agricultural business: A case study of Uganda. *International Journal of Vocational and Technical Education, 9(3)*, 20-30doi10.5897/IJVTE 201.

- Okiror, J., Biryabaho, F., & Oonyu, J. (2011). *Just How Much Can School Pupils Learn from School Gardening? A Study of Two Supervised Agricultural Experience Approaches in Uganda*. Makerere University, Uganda.
- Okiror, J., & Otabong, D. (2015). *Factors influencing career choice among undergraduate Students in an African university context: The Case of Agriculture Students at Makerere*.
- Olajide, K., Odoma, M. O., Okechukwu, F. I. R., Okhaimoh, K. I. (2015). Problems of teaching Agriculture practicals in Secondary schools in delta state Nigeria. *International Journal of Innovative Education Research*, 3(2) 7-12, April-June 2015.
- Onu, F. M. & Ikehi, M. E. (2013). Factors influencing students' choice to study agricultural science in south-south, Nigeria. *Journal of Agriculture and Biodiversity Research*, 2(4), 80-86.
- Orsini, F., Dubbeling, M., de Zeeuw, H., Gianquinto, G. (Eds.) (2017). *Rooftop Urban Agriculture*. Springer International Publishing.
- Principal Research work commissioned by the World Bank on Agricultural Education and Training in Sub-Saharan Africa. Nairobi: World Agroforestry Centre (ICRAF).
- Ransford, O. D, Christina, O. A., Yuan, S. & LIU, J. (2015). Challenges in teaching and learning of agricultural science in selected public senior High schools in the cape coast Metropolis. *Agricultural Journal*, 3, Issue 1(2015), 13-20. DOI: 10.12735/as.v3i1p13
- Rowena, P., Marian, M. & Frances, R. (2010). *Impact of school gardening on learning*. National Foundation for research, Retrieved from <http://www.nfer.ac.uk>
- Skilling Uganda - BTVET Strategic Plan, (2012/3-2021/2).
- Ssekamwa, J. C. (1997). *History and Development of Education in Uganda*. Kampala, Uganda: Fountain Publishers.

- Stephanie, L. H. (2008) *Experiential Learning in School Gardens and Other Outdoor Environments: A Survey of Needs for Supplemental Programs*.
- Tyler, R. W. (1969). *Basic Principles of Curriculum and Instruction*. Chicago, IL: The University of Chicago Press.
- Uganda Bureau of Statistics (2016). *National Population and Housing Census 2014-Main Report, Kampala, Uganda*. Retrieved from UBOS website: <http://ubos.org.ug>.
- Vandenbosch, T. (2006). *Post-Primary Education & Training in sub-Saharan Africa*.
- Weston, C., & Cranton, P. A. (1986). Selecting Instructional Strategies. *The Journal of Higher Education*. 57 (3), 259-288.

APPENDICES

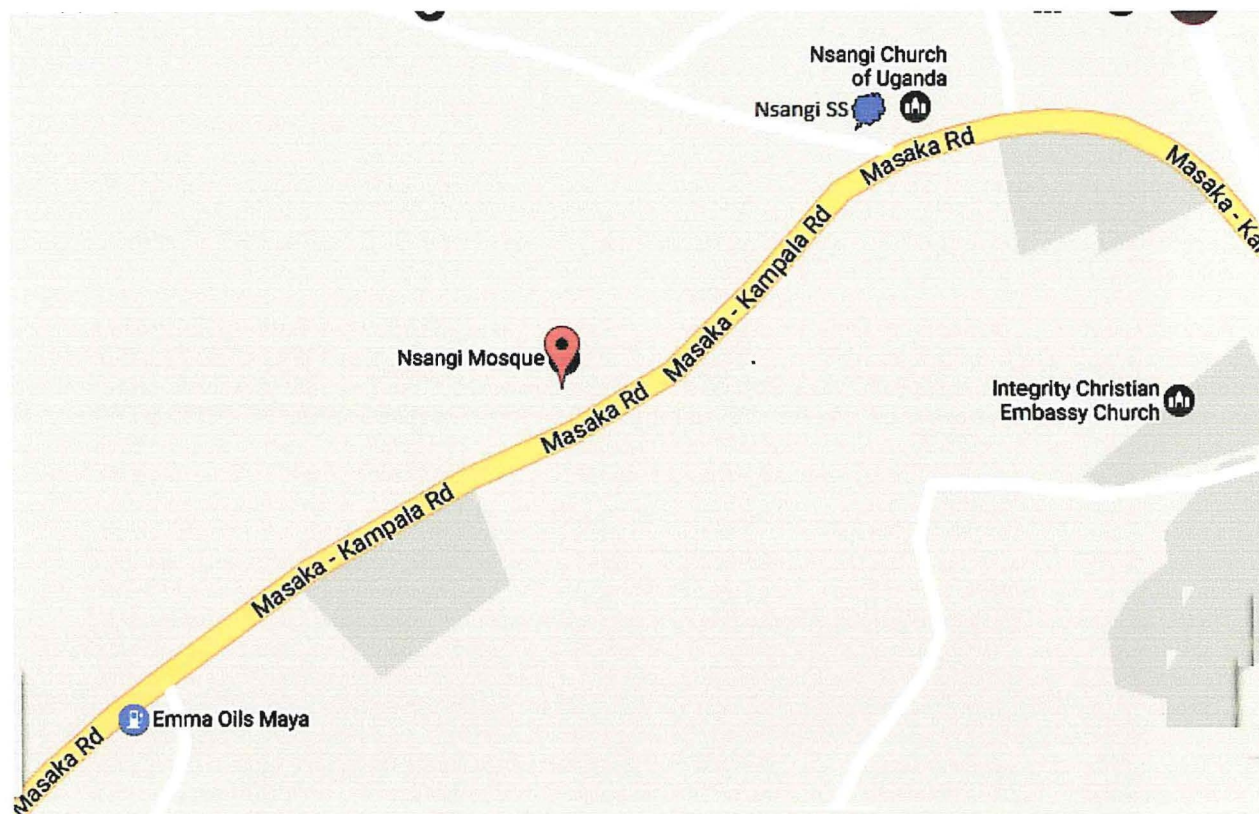
APPENDIX I:

**PARTICIPANTS DURING A SITUATION ANALYSIS HELD AT NSANGI
SECONDARY SCHOOL ON THE 10TH NOVEMBER 2016 USING THE FUTURE
WORKSHOP.**



APPENDIX II

MAP SHOWING THE STUDY SITE AT NSANGI SS



Extracted from the Google maps and modified to suit the study

APPENDIX III

WORK PROCESS ANALYSIS FOR PRODUCING KALE

STEPS INVOLVED	ACTIVITIES INVOLVED	DATE
Step one	PLANNING	February 2017
Step two	<p>LAND PREPARATION</p> <ul style="list-style-type: none"> • Initial cultivation should be deep to allow better and faster root development. Aggressive perennial weeds should be removed before planting. • Early land preparation is recommended to expose pests to sunlight and birds. Land should be dry to avoid soil crumbling and creation of a hard pan. • Incorporating of crop residue can significantly increase the soil organic content. 	March 2017

Step three	<p data-bbox="384 203 831 232">NURSERY ESTABLISHMENT</p> <p data-bbox="384 277 1270 383">Kale seeds are sown into nursery structures like open land, wooden, plastic or seeding trays.</p> <p data-bbox="384 423 999 456">Open field nursery establishment Procedure</p> <ol data-bbox="384 499 1270 1850" style="list-style-type: none"> <li data-bbox="384 499 1270 604">1. Site nursery where vegetables in the same family as kale have not been grown for 2 years. <li data-bbox="384 645 1270 898">2. The nursery beds should be about 1 meter wide (so as to undertake cultural practices without injuring the plants) and of the required length. In wet areas and sites with heavy soils, raised beds are recommended to prevent water logging. <li data-bbox="384 938 1270 1335">3. Manure and phosphate fertilizers like DAP should be applied and worked well into the soil. Manure improves the soil structure and moisture holding while phosphorus helps in root development. A nitrogen fertilizer like CAN is top dressed two weeks after germination only on poor soils since excessive nitrogen results to weak plants. <li data-bbox="384 1375 1270 1480">4. The drills are made across the beds at a spacing of 10-15cm apart and 2cm deep. <li data-bbox="384 1520 1270 1774">5. The seeds should be sown thinly and covered lightly with soil. Cover the nursery bed with a thin layer of dry grass (mulch) to avoid unearthing the seeds. This is removed after germination. <li data-bbox="384 1814 1270 1850">6. In hot areas, a shade (about 1m high) is necessary. However, 	March 2017
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	<p>excessive watering and shade favors the development of powdery mildews.</p> <p>7. The seedlings should be thinned out to 2-3cm apart. Crowded seedlings compete for nutrients and space resulting into weak seedlings. Crowding also creates conducive environment for damping off disease.</p> <p>8. Water once or twice daily. Irregular watering also promotes dumping off disease. Pests and diseases in the nursery should be controlled to ensure healthy seedlings.</p> <p>9. The seedlings are transplanted when four to five true leaves are formed. This takes a period of about four weeks.</p>	
Step four	<p>MAIN SITE PREPARATION</p> <ul style="list-style-type: none"> • The field should be ploughed 2-3 weeks in advance at least 8 inches deeper • Harrow the field 2-3 weeks later after ploughing • Prepare soil to a fine tilth • Raised beds recommended for root development and proper drainage • Bed width of 1 meter and a convenient length not exceeding 100 meters and a height of 15 centimeters • Incorporate well rotten farm yard manure. 	March 2017

Step five	<p>TRANSPLANTING</p> <ul style="list-style-type: none"> • Seedlings ready for transplanting after 4-6 weeks in the nursery, depending on temperatures • Best time for planting is late in the evening when sun is cool or on a cloudy day • Wet the seedlings an hour before transplanting. • Plant to the same depth as in the nursery 	April 2017 and May 2017
Step six	<p>SPACING</p> <ul style="list-style-type: none"> • Varies with varieties: 60cm x 60cm for large-headed varieties, 60cm x 45cm for medium sized and 30cm x 30cm for small heads 	
Step seven	<p>CROP MANAGEMENT</p> <ul style="list-style-type: none"> • Apply DAP or TSP fertilizer during transplanting (1 teaspoonful/hole) • Top dress crop two weeks after transplanting with 1 teaspoonful of CAN per plant • Apply a second topdressing at same rate when leaves begin to fold • Too much CAN results in loose heads or no head formation <p>NB: Soil analysis recommended.</p>	
Step eight	<p>MANURING</p> <ul style="list-style-type: none"> • Necessary to improve soil structure and to slowly provide extra nutrients 	

	<ul style="list-style-type: none"> • Done at planting 	
Step nine	<p>WEEDING</p> <ul style="list-style-type: none"> • Keep fields free of weeds to reduce competition for nutrients, light and space • Also to reduce pests and disease infestation 	May 2017
Step ten	<p>MULCHING</p> <ul style="list-style-type: none"> • Increases organic matter in the soil • Conserves soil moisture • Prevents soil erosion • Suppresses splashing of rain or irrigation water and spread of diseases • Good during dry periods 	May 2017
Step eleven	<p>HARVESTING</p> <ul style="list-style-type: none"> • Kale is a hearty vegetable that prefers the cold weather and if cared for correctly can produce a surplus of leaves throughout every season. • The time frame for harvesting kale is a personal decision, loosely based on flavor preferences. For those that require a lighter side to kale's taste, younger leaves will suffice. • But for those that like the more pungent and bold flavor of kale, the matured leaves of fall are preferable. • Pick what you need throughout the season. Kale can be harvested soon after the plants begin to grow leaves. 	June 2017 and July 2017

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|---|--|
| <ul style="list-style-type: none">• Younger leaves can be a tasty addition to some salads, and the more mature leaves become more flavorful as they grow.• Remove the outer leaves of the Kale plant as it matures, for a continuous cycle of growth. The center of the kale plant containing the bud will continue to produce fresh leaves when the outer ones are removed.• By following this rule of thumb, you can expect a vast amount of kale production to suit your needs.• Choose leaves that are bright green and fresh, as opposed to yellowed leaves, when harvesting kale for eating.• The yellowish leaves can produce an undesirable taste, and their limp appearance may be unappetizing. | |
|---|--|

APPENDIX IV

THE TEACHING LEARNING PROCESS OF STUDENTS

Steps	Activity involved	Equipment used	Competence
Admission of students into the school	<ul style="list-style-type: none"> -Students apply for admission while others are admitted through Joint Admissions Board. -Students are admitted on the basis of their performance. -Payment of admission fees. -Capturing the bio data of the students by filling the student bio data form. -Students fill a form of rules and regulations and sign them. - Students are guided on choice of subject combination. 	<ul style="list-style-type: none"> -Pens -Computers -Stationery 	<ul style="list-style-type: none"> -Knowledge of requirements of admission -Computer literacy especially the teacher -Career guidance skills -Knowledge of the school regulations by the teachers
Orientation	<ul style="list-style-type: none"> -Touring around school -Converged together and oriented on school regulations, the different offices in school. -Guided on the school routine -Distribution of uniforms to students 	<ul style="list-style-type: none"> -Rules and regulation booklets 	
	<p>Orientation in the Agriculture Department</p>	<ul style="list-style-type: none"> -Manilas 	<ul style="list-style-type: none"> -Knowledge

	<p>Taught how to use the different equipment including the safety equipment.</p> <p>-Allocation of plots for Demonstration classes and encouraged into formation of discussion groups.</p> <p>-Oriented about the syllabus and the examination papers to be done in the school.</p>	<p>-Markers</p> <p>-And chalk board</p>	<p>syllabus of Agriculture</p>
<p>Teaching and learning in the Agriculture department</p> <p>Theoretical learning.</p> <p>Practical learning</p>	<p>-Theoretical learning is done in the classroom. Through; guided discussions with the teachers. Discovery learning through research and the lecture method.</p> <p>-Teachers make schemes of work as well lesson plans</p> <p>-Conducting of lessons</p> <p>The teachers use demonstration in the laboratory and in Gardens for practical learning</p> <p>-Teachers write requisition for the specimens to use and students write out the procedures they are supposed to follow during the practical.</p> <p>-Purchasing ingredients and conducting of</p>	<p>-Text books</p> <p>-Exercise books</p> <p>-pens</p> <p>-Chalk board</p> <p>-Teaching aids</p> <p>-Pens</p> <p>-Ruled papers</p> <p>-Text books</p> <p>-Exercise books</p>	<p>-Knowledge of the different teaching methodologies by the teachers</p> <p>- skill in making schemes of work and lesson plans</p> <p>-Knowledge of the specimen prices</p>

	the lessons is by the teachers		
Assessment and evaluation	<ul style="list-style-type: none"> -Setting of exams (practical and theoretical) -Conducting of exams Practical exam; -Planning of students, a week earlier before the practical. -Marking of exams -Returning of scripts to students -Doing corrections in class -Evaluation of students' performance through grading in class. 	<ul style="list-style-type: none"> -Examination sheets -Pens 	Assessment skills planning

APPENDIX V

TIME FRAME FOR THE STUDY

Date	Activity
November & December 2016	Situational Analysis Future Workshop and Proposal Development
February 2017	Setting up a Garden Team
February 2017	Developing a Work Plan
March 2017	Mobilizing Resources
April 2017	Implementing the Plan
May 2017	Data Collection
May & June 2017	Data Analysis and Management
July & August 2017	Report Writing and Presentation for Peer Review
September & October 2017	Report Dissemination And Defense

APPENDIX VI
CONSENT FORM

Part I: Consent

Consent form for the study participants on Promotion of practical skills acquisition in teaching and learning of Agriculture at Nsangi Secondary School.

Introduction

I am YAMUMPEREKA Grace a student of Kyambogo University pursuing a master’s Degree in Vocational Pedagogy. I am carrying out an action research on promotion of Competence Based Teaching and Learning of Agriculture at Nsangi Secondary School. This participatory study is trying to improve the practical skills among Agriculture students through establishment of school gardens at Nsangi secondary school.

You are requested to participate in this academic study and I was be grateful if you spare some time to voluntarily participate in this research project

Your responses in this study will strictly be used for this academic work and I will ensure maximum confidentiality. You are free to participate and or withdraw from the study at any point of the cascade without giving reason.

In case of any further inquiries regarding the study, you are free to reach the principal researcher YAMUMPEREKA **GRACE** using contact telephone number +256(0)776638136 / 703975217.

.....	
Participants signature/thumbprint	Date	
.....
Name of Investigator	Signature	Date

APPENDIX VII**FOCUS GROUP DISCUSSION GUIDE FOR TEACHERS AND STUDENTS****Introduction**

This is a follow up of the Future Workshop held to discuss the teaching and learning of Agriculture in Nsangi S. S. The workshop participants agreed to improve skills acquisition by students through Garden-Based Teaching Approaches. You were identified as key stakeholders in implementing the desired changes. Please let us discuss the progress so far made, opportunities and challenges of implementing school garden based learning in the school. Answer the questions as honestly as possible. The responses are confidential and will be used for research purposes only

1. What are the existing Agriculture teaching and learning practices in Nsangi secondary school?
 - a. Before the changes
 - b. After the changes
 - c. Which specific changes have been introduced?

2. How was the SGB teaching and learning of Agriculture
 - a. Designed in the school?
 - b. How was it implemented?
 - c. What were the challenges encountered?
 - i. By the school administrators?
 - ii. By the teachers?
 - iii. By the Students?
 - d. How could it be improved?

1. How has the School Garden been effective in enhancing the acquisition of practical skills among students of A-level?
2. What did you like about the school gardens established?
3. What was interesting about learning by Garden based learning?
4. What learning outcomes or benefits did you get from GBL?
5. Do you think that your teacher did a good job while implementing GBL?
6. What other comments/ suggestions would you like to make about GBL in the school?

Thank you for your contribution

APPENDIX VIII

OBSERVATION GUIDE

Introduction

The participants at the Future Workshop resolved to implement instructional changes in Nsangi S. S in order to improve skills acquisition by students of Agriculture. This observation checklist is meant to verify the extent to which the changes have been implemented.

Colleagues set out to observe the following key events and scenarios

1. Cooperative learning in the student groups
2. Dialogue during misunderstandings in students' groups
3. Students sense of autonomy and initiative
4. Students level of creativity and innovation
5. Students' level of organization and coordination
6. Students have a sense of responsibility and attention paid to details
7. Teacher's supervision of GBL activities

APPENDIX IX**INTERVIEW GUIDE FOR THE ADMINISTRATORS****Introduction**

This is a follow up of the Future Workshop held to discuss the teaching and learning of Agriculture in Nsangi S. S. The workshop participants agreed to improve skills acquisition by students through Garden Based Teaching Approaches. You were identified as key stakeholders in implementing the desired changes. Please tell me about the progress so far made, opportunities and challenges of implementing Garden based teaching in the school. Answer the questions as honestly as possible. The responses are confidential and was be used for research purposes only

1. What is your view about teaching and learning of practical subjects at Nsangi SS?
2. Are you aware of the Gardens that were established by the A-level Agriculture class?
3. Comment about the possible learning outcomes of learners from GBTL activities
4. In which areas do you think teachers of Nsangi SS need to improve?
5. What challenges have you noted with teaching and learning by Garden based approaches?
6. Do you think that teaching that is Garden based is sustainable at Nsangi?
7. Suggest a way forward for Nsangi amidst all the challenges

	<p>Make a requisition for funding school garden activities</p>	<p>It took a whole term without being funded and for that matter the students together with the teachers resorted to raising some funds especially for purchasing some few gardening tools, the planting materials, and some Farmyard manure.</p>	<p>This could have been an attitude issue on the side of the administration.</p>
		<p>Some students complained of inadequate tools as something very demoralizing when it comes to garden work</p> <p>Some students were alleging that they do a lot of digging at home and doing it at school is not what they expected since they are capable of cramming things and reproduce them during exams</p> <p>-other students say that it very time consuming.</p> <p>S.6 students claimed to be very busy preparing themselves for several academic tests they have to do every now and then as would be expected of a candidate. Only two were active though not as those of S.5.</p> <p>Others think it is okay for them to get involved in the activities and they even offered to provide the spinach seedlings for planting.</p>	
		<p>Some students volunteered in taking care of the gardens during the holidays.</p>	

APPENDIX X

ANALYSIS OF THE PREVIOUS PROCESS OF TEACHING AGRICULTURE AT
NSANGI SS

Duties	Planning	Teaching	Assessment and evaluation of learners	Guide and counsel learners
Activities	<ul style="list-style-type: none"> -Make schemes of work and lesson plans -organize teaching aids - do research 	<ul style="list-style-type: none"> -conducting lessons and remedial work according to the set time table -set tasks for the learners -facilitate learning -put demonstration gardens in place 	<ul style="list-style-type: none"> - carry out continuous assessment and evaluation of learners' performance. - setting, administering and marking internal and external exams - keep and maintain the class records (of work, progress reports. 	<ul style="list-style-type: none"> -identifying needs of different learners -arranging for counselling and guidance session
Tools and materials needed	<ul style="list-style-type: none"> Stationary -Computer Teaching aids 	<ul style="list-style-type: none"> -Computer, Teaching aids Pens 	<ul style="list-style-type: none"> Stationary, Computer, pens, reference books, internet 	<ul style="list-style-type: none"> Counselling room/space Refreshments

	Pens Internet Reference books	Internet, projector, school garden, Garden tools and planting materials		Some stationary and pens
Competences required	Curriculum comprehension/knowledge and interpretation. -Record keeping -computer literacy skills Psychological skills -organizational skill. Ability to collaborate or network with others	-Pedagogical skills -safety and precautionary measures -good communication and interpersonal skill -computer literacy skill -time management -Life skills e.g. motivating learners	Record keeping skills -curriculum comprehension and interpretation - computer literacy skill - time management	Guidance and counselling skills - psychological skills -support for special needs students -good communication and interpersonal skill

Duties	Planning	Teaching	Assessment and evaluation of learners	Guide and counsel learners
Quality assurance	<ul style="list-style-type: none"> -schemes of work for different classes and subjects in place -lesson plans in place -different text books and internet in place 	<ul style="list-style-type: none"> Teachers attendance forms signed for every lesson taught -teachers lesson supervision done at least twice in a term for every subject by the head of department. Compensation of lessons that are not taught according to the set time table -Record of work in place 	<ul style="list-style-type: none"> - Learners books are checked regularly to ensure that they are marked. Learners scripts are first handed to the DOS's office before they are given to the learners 	<ul style="list-style-type: none"> Class meetings should be conducted 2 times a term.
Gaps	<ul style="list-style-type: none"> No text books for reference -no access to internet -Lack of computer skills -lack teaching 	<ul style="list-style-type: none"> -no school garden for teaching, inadequate tools and planting materials. - no access to internet -Lack of computer skills -lack teaching materials especially for practical lessons 	<ul style="list-style-type: none"> -Some teachers don't give the students feedback on their performance in time. -Some students 	

	materials especially for practical lessons	-lack of proper communication makes the teachers miss some lessons.	don't turn up for the exams -Some times the question papers are not typed and printed in time. -Examination timetables change without informing concerned teachers	
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PERSONAL REFLECTION LOG

RESPONSIBLE PERSONEL	ACTIVITY	EXPERIENCE	REFLECTION
Teachers and Administration	Handing over the school pieces of land for students utilization for school gardens	The teachers who owned the gardens who had not attended the future workshop found it very difficult to hand over the plots of land in their use to the department	Further sensitization had to be done in order to avoid conflict from the staff members who were using the school land.
Agriculture teachers and students	-Plan to establish the school garden. -Identify the tools that would be used during the process -identify what to be grown, source of the planting materials.	-it took a while for the learners and the teachers to establish their own gardens because the staffs using them had not harvested their crops. -for the issue of the tools, all the hoes and some other tools were discovered missing and yet they were available by the time of conducting the first the future workshop. As a way forward the S.3 were to report with hoes the following term as indicated in the end of term circular.	This in a way helped learners to know that when things do not go the way they expect them they have to be patient. For the issues of missing tools, the learners and teachers learnt that it would have been much in order for the departmental tools and equipment to be stored by the department itself.

ACTIVITY	EXPERIENCE	REFLECTION
<p>Student's sharing on garden activities-reports. The reason was to help students reflect on their reports to bring about learning, and also for them to share their experiences in similar or different tasks</p>	<p>The learners had left out the "why" aspect in their sharing. For example, why certain things are done as they did for example why there was need for mulching and why it should be with dry and not fresh grass/staff why the nursery bed must be having a shed at a certain point during management.</p>	<p>Without this "why" aspect, it is difficult for the students to reflect and realize the learning points. In this case routine activities may be performed or replicated just with the aim of getting them done without critical thinking.</p> <p>-This also necessitates continuous probing questions by the teachers as facilitators of learning.</p>
	<p>-There is a lot of evidence of learning as students relate theory and practice, but agriculture being a science subject, some facts needed to be supported with scientific evidence.</p>	<p>There is still need for the students to set up experimental tasks to concretize some assertions. For example, one student stated that once the field is attacked by pests, alcohol in its high concentration could eliminate them but we did not offer chance to prove himself right due to limited time we had that very day and also bearing in mind that the school does not</p>

		allow alcohol to penetrate the school premises, instead students used the pesticide we had at hand
	I was still able to recognize that CBTL necessitates the use of the driving question which must be open ended but requiring students to use high order thinking skills to create a response; But what about the intellectually handicapped students... how do they fit in the process?	I relate this to the study objectives; does it meet the objective or it deviates because if the purpose is to increase the learning out comes by the learners, then it would not be good to base measurement on cognitive abilities alone. But I was of the view that the nature of the question should depend on the agreed set objectives between the learners and the teacher and what works at classroom level for the participant
Teaching learning strategies employed on the school garden	Team work and collaboration; Each individual member of the group was expected to play particular roles and contribute towards the success of the school garden establishment Interactive teaching and learning	