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Research Article

Relevancy of Modern Agriculture Education on Students' Farming Practical Skills in Secondary Schools of Kabujogera Town Council, Kitagwenda District

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Abstract

Despite the importance of agriculture education, it has recently been approved that agriculture students still lack practical skills and this could be attributed to poor delivery of methods on modern agriculture education and other numerous challenge like retention rates of students, lack of interest from the learners, lack of practical time/opportunities, limited funding for agriculture practicals, and low passion by agriculture teachers. The study was about the relevancy of modern agriculture education on students' farming practical skills in secondary schools in Kabujogera Town council, Kitagwenda district. It was guided by three specific objectives which were to; examine different methods of modern agriculture education taught in secondary schools, identify the challenges experienced in modern agriculture education in secondary schools, evaluate the strategies to enhance modern agriculture education in order to improve practical skills among secondary students. The study employed a cross-sectional study design that used both quantitative and qualitative approaches. The study used a sample size of 248. The study used questionnaires and interview guide to collect data. The data collected was analysed using Statistical Package for Social Scientists. The study concluded that modern agricultural education methods had significant relationship with improving students' farming practical skills. These included; utilization of modern agricultural inputs (x^2 = 8.305, p=0.005), Use of improved farm machines (x^2 = 6.048, p=0.001), Pre and Post-harvest handling (x^2 = 4.985, p= 0.026), and use of modern resistant crop varieties (x^2 = 4.120, p=0.004). The study concluded that there were significant challenges experienced in modern agriculture education. These included; limited modern agricultural in puts at [p = 0.001], lack of resources to use [p = 0.005], poor motivation among students and teachers [p = 0.003], limited school farm size [p = 0.001] and poor learning environment [p = 0.004]. The study finally concluded that strategies to enhance modern agriculture education had significant association with improving student's farming practical skills. Such as; agriculture tours and field trips (p=.027), class discussion student involvement (p=.029), use of practical demonstration method (p=.004) and recruitment of experienced agriculture teachers (p=.028). The study recommended that; there should be training and re-training among teachers and students of agricultural science on use of modern agricultural education technology. Secondary schools should ensure establishment of enough demonstration farms that students would constantly visit in order to copy much on how to do agriculture practical work to improve their skills and experience.

Keywords

Relevancy, Modern Agriculture Education, Farming Practical Skills

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1. Introduction

Globally, the 21st Century had created a new focus on Career and Technical Education (CTE) which streamlines modernization of agriculture, in order to prepare students with enough scientific skills for the workforce and post-secondary education in USA [13]. "Students in today's culture must develop a variety of skills outside the narrow occupational skills focused on historical Career and Technical Education (CTE) programs [13]. Modern agricultural education programs were designed and developed to offer students the chance to obtain innovative content knowledge and practical skills required to succeed in post-secondary education, and the workplace [4].

In sub-Saharan Africa, the agricultural sector is still the dominant provider of employment, and it remains crucial for economic growth. Moreover in most parts of Africa modern agriculture is still a critical issue and therefore food production will continue to be a major focus of agricultural education and training institutions [18]. The rationale for offering agriculture to secondary school students counter the apparent negative attitude to farming by many secondary school students, whose occupational choices are often limited, and thus exposing them to the knowledge and skills that they would require in agricultural production, should they choose to become farmers [1].

In Africa, Agricultural education and training in secondary institutions will play a strategic role in helping to prepare Africa's rapidly growing youth populations for productive careers in the growing segments of the agri-food system [16]. This examines the twin challenges facing Agricultural education institutions as they strive to simultaneously accommodate growing enrollments and shifting skills needed by students to get involved in agriculture as their source of self-employment after studies [16].

In East Africa, the teaching of agriculture particularly in Kenya and Tanzania is expected to promote the acquisition of skills for self-reliance in farming [10, 19]. It is viewed as particularly critical for the development of East African countries as agriculture is the main economic activity in most parts in East Africa [15]. The overall objective of the agriculture education is the development of basic agricultural skills relevant to Kenya and the learners' home environment.

In Uganda, the agricultural sector accounts for 24% of the national GDP and employs almost 60% of the country's youth labour force [18] While its critical relevance in the Uganda's economy is indisputable, agriculture's capacity to produce enough food and create more jobs that are decent is under threat owing largely to limited human resource capabilities . Agriculture stands out as the greatest source of livelihood to the greater percentage of the population [17]. 36% of the economy's GDP is derived from agriculture, 31% of the economy's export value is from agriculture and the sector is employing about 81% of the total labour force of which 56% are small scale subsistence farmers based in the rural areas [6]. In the fight to improve these farmers' lives, increase on their standards of living, there has been a struggle by the government to tackle agriculture problems from the grass roots [20]. Leaving weather factors constant, the greatest problems of subsistence farming have been poor yields, pests and diseases, poor farming methods and poor soil conservation measures. The secondary agriculture syllabus aims to impart practical skills to the students. However, modern agriculture is taught theoretically in the classroom since most schools do not have enough resources for practical skills on modern farming [11]. These demand a lot of funds which may be difficult for many Secondary schools to secure in order to facilitate the practical teaching of the subject.

2. Research Objectives

The general objective of the study was to assess the relevancy of Modern Agriculture Education on students' farming practical skills in secondary schools in Kabujogera Town council, Kitagwenda district. The specific objectives were to; examine different methods of Modern Agriculture taught in secondary schools, identify the challenges experienced in modern agriculture education in secondary schools and evaluate the strategies to enhance modern agriculture education in order to improve practical skills among secondary students in the study area.

3. Justification of the Study

The study is important in that there is a need to improve the quality of secondary education as expansion increases at a rate that outstrips the country's economic ability to meet agricultural students' needs. Secondary education has to be adaptive and creative to enable individuals acquire knowledge, skills and attitudes which permitted them to effectively participate in the development of their society. In addition, by addressing the question of correspondence between the content of agricultural curriculum, school instruction and agricultural practice, this study addresses the potential multiplier effect of modern agricultural education. Finally, it is hoped that this work will result in some practical implications for education policy and practice, for curriculum development and/or the use of school plots for economic gains.

4. Methods and Materials

The study was conducted in Kabujogera Town council, Kitagwenda district.

This study used a cross-sectional survey design which adopts mixed methods. A cross-sectional study predominantly used structured questionnaires and interview schedule for data collection with the intent of generalizing from a sample to a

population. A survey design was appropriate because it enabled the researcher to obtain pertinent and precise information from the respondents to establish the relevancy of modern agriculture education on students farming practical skills in secondary schools in Kabujogera Town council, Kitagwenda district. The design adopted both quantitative (statistical) and qualitative (attitudes and opinions) approaches for data collection.

The study was conducted on representative sample of 250 respondents. An optimum sample was one which fulfilled the requirements of efficiency, representativeness, reliability and flexibility [9]. The sample size was determined using Solvins 1965 formula.

The study used simple random sampling and purposive sampling techniques to arrive at selected number of respondents. Simple random sampling was used to select students and purposive sampling was employed to select agriculture teachers and some administrators because teachers were believed to be having high level of agriculture knowledge offered to students under investigation and administrators were considered because they had knowledge on students' enrollment and performance records.

A semi-structured questionnaire and interview guide were used to collect data. All instruments were checked and data collected was coded and entered into SPPSS version 22.0 software package for cleaning and analysis. Both descriptive and inferential statistics were generated and used to interpret the study findings. All the results were presented in tables.

5. Results

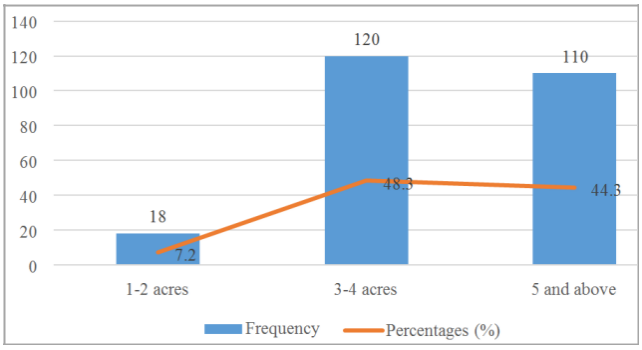

Figure 1. *Showing the size of the land in acres.*

Table 1. *Socio-demographic characteristics of respondents.*

Variable	Category	Frequency	Percentage
Gender	Male	128	52
	Female	120	48
Marital status	Never married	232	94
	Married	13	5.2
	Divorced	03	1.2
	Minimum	Maximum	Mean ±SD
Age in years	12	60	35.84 ±8.229
Education in years	8	16	10.72 ±4.169

According to the findings in table 1 above, 52% of the respondents were male and 48% were female. The dominance of males in the study depicts the laborious nature of modern agricultural education technologies which are taken to be more of male rated than female. Results in the table also indicated that the majority of the respondents were single 94%, and 5.2% were married, 1.2% were divorced and neither of the respondents were widowed. In relation to age of respondents, mean age distribution among respondents were 16 years with the youngest aged 12 and the oldest 60. Most respondent's surveyed belonged to productive age of 13-35 years which is a young vibrant productive age group hence justifying their active involvement in modern agricultural education to sustain their livelihoods. In table 1, Average number of years in school were ten (senior three) with a minimum of 8 and a maximum of 16 years (university degree). A bigger part of the study respondents were still secondary education students. This perhaps explains the uptake and use of modern agricultural education to help them acquire adequate agricultural related practical skills in the area.

The study results revealed that majority of the respondents 120 (48.3%) had 3-4 acres of land under agricultural production, 110 (44.3%) revealed 5 acres and above, 18 (7.2%) revealed 1-2acres. This implied that agricultural students had where to transform their modern agricultural theories into agricultural practical sessions to enhance their farming practical skills.

Table 2. *Modern agricultural equipment to use in secondary schools (multiple responses).*

Category	Frequency	Percent
Irrigation pumps and guns	49	13.5
Castration equipment	80	22

	Category	Frequency	Percent
Valid	Inorganic and organic fertilizers	105	28.8
	Mechanization equipment	31	8.5
	Dehorning equipment	63	17.3
	Soil pH indicator solution	36	9.9
	Total	364	100.0

As can be seen from table 2. Majority 28.8% of the respondents mentioned Inorganic and organic fertilizers, 22% talked of castration equipment like forceps and elastrator tools, 13.5% revealed irrigation pumps and guns, 17.3% talked of dehorning saw and iron, 9.9% talked of Soil pH indicator solution while the least number of respondents 8.5% talked of mechanization equipment like sprayers and harvesters.

Table 3. *Correlation matrix between Modern agricultural methods and improvement of farming practical skills.*

Modern agricultural methods	Farming practical skills	
	Chi-Square	p-value
Monoculture	2.317	0.314
Utilization of modern agricultural inputs	8.305	0.005
Use of improved farm machines	6.048	0.001
Use of irrigation equipment	5.480	0.065
Use of biotechnology	3.519	0.471
Pre and Post-harvest handling	4.985	0.026
Use of modern resistant crop varieties	4.120	0.004

Results on the correlation analysis between modern agricultural methods taught and improvement of farming practical skills measured at 5% level of probability where significant relationship was seen and are presented in table 5. At bivariate level, utilization of modern agricultural inputs (x^2 = 8.305, p=0.005), Use of improved farm machines (x^2 = 6.048, p=0.001), Pre and Post-harvest handling (x^2 = 4.985,

p= 0.026), and use of modern resistant crop varieties (x^2 = 4.120, p=0.004). Other methods like use of biotechnology, monoculture and use of irrigation equipment respectively showed no significant association with improving students' farming practical skills at; (x^2=3.519, p=0.471, x^2=2.317, p=0.314 and x^2=5.480, p=0.065.

Challenges Experienced in Modern Agriculture Education in Secondary Schools in Kabujogera Town Council, Kitagwenda District

Table 4. *Parameter estimates for the challenges experienced in modern agricultural education in secondary schools.*

Variables	Value	AOR (95% C.I)	P-value
Limited modern agricultural in puts	Yes	0.978 (0.169 - 54.570)	0.001
	No	1	
Lack of resources to use	Yes	0.333(0.104 - 34.088)	0.005
	No	1	

Variables	Value	AOR (95% C.I)	P-value
Poor motivation among students and teachers	Yes	0.676 (0.150 - 76.330)	0.003
	No	1	
Lack of technical expertize	Yes	1.808 (0.818 - 28.267)	0.142
	No	1	
Poor school infrastructure	Yes	2.122 (0.103 - 6.113)	0.235
	No	1	
Limited school farm size	Yes	0.943 (1.121 - 45.518)	0.001
	No	1	
Poor time management	Yes	0.322 (0.103 - 3.514)	0.130
	No	1	
Poor learning environment	Yes	0.858 (0.218 - 3.267)	0.004
	No	1	

Source*:* computer output (SPSS) analysis, 2023

Results of the logistic regression model of challenges experienced in modern agricultural education in secondary schools in Kabujogera Town council were presented in table 4. The log odds explained the probabilities of the outcome as a result of a limiting explanatory variables. Significant challenges were interpreted at 95% confidence interval and 5% level of significance. Of the eight (8) challenges postulated, only five (5) challenges remained significant and these included; limited modern agricultural in puts, poor school infrastructure, poor motivation among students and teachers, limited school farm size and poor learning environment.

Limited modern agricultural in puts was a significant challenge associated with the modern agricultural education and improvement of students farming practical skills. Schools with limited agricultural in puts were 0.97 times less likely to improve students' farming practical skills [AOR = 0.978; (95% CI: 0.169 - 54.570, p = 0.001].

Lack of resources to use was presented as significant challenge towards modern agricultural education. Schools with limited resources were 0.3 times less likely to improve students' farming practical skills compared to those with adequate resources [AOR = 0.333; (95% CI: 0.104 - 34.088, p = 0.005]. Poor motivation among students and teachers was a significant predictor in modern agricultural education and students farming practical skills at 5% level of significance. Secondary schools with poor motivation were 0.676 times less likely to improve students' farming practical skills compared to those with better motivation [AOR = 0.676; (95% CI: 0.150 - 76.330, p = 0.003].

Limited school farm size had a significant influence on modern agricultural education at 5% level of significance. Schools with small farm size were 0.94 times less likely to improve students farming practical skills compared to those with large plots [AOR = 0.943; (95% CI: 1.121 - 45.518, p = 0.001].

Lastly, poor learning environment acted as another significant challenge in modern agricultural education in secondary schools in Kabujogera town council at 5% level of significance. The poorer the learning environment, the lower the chances of improving students farming practical skills. In other words secondary schools which had poor learning environment were 0.86 times less likely to improve students' farming practical skills [AOR = 0.858; (95% CI: 0.218 - 3.267, p = 0.004]. Other challenges like poor school infrastructure, lack of technical expertise and poor time management respectively were not significant challenges at [p = 0.23, p=0.142, p=0.130].

Table 5. *How often students learn agricultural practical session in a term.*

Category	Frequency	Percent
Every weekend	05	02
Daily basis	03	01

Category	Frequency	Percent
Twice a month	190	77
Thrice a term	50	20
Total	248	100

The study results revealed that majority of respondents constituting to 77% said that agricultural practical sessions are learnt twice a month in a term, 20% revealed learning agricultural practical sessions thrice a term, 2% revealed every weekend and 1% revealed daily basis.

Table 6. *Regression output for the strategies to enhance modern agriculture education.*

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
(Constant)	1117.913	1.845		9 9.709	.000
Agriculture tours and field trips	3.029	1.036	.136	1.795	.027
Class discussion student involvement	2.025	1.232	.158	2.792	.029
Use of student centered approach	-.056	.070	-.126	-.796	.427
Use of practical demonstration method	4.066	1.152	.201	-2.273	.004
Extra funding to agriculture education	-.193	.214	-.114	-.900	.369
Recruitment of experienced agriculture teachers	2.216	1.199	.166	1.083	.028

Regression results for the strategies to enhance modern agriculture education to improve on practical farming schools were presented in Table 6 above. Among the six hypothesized strategies, four were found to be statistically significant. These included; agriculture tours and field trips (p=.027). This strategy had a significant influence on improving students farming practical skills by 3.02 chances. Class discussion student involvement (p=.029), this strategy had a significant influence on improving students farming practical skills by 2.02 chances. Use of practical demonstration method (p=.004), this strategy significantly contributed to improving students farming practical skills by 4 chances and recruitment of experienced agriculture teachers (p=.028), this strategy has strong significant association with improvement of students' farming practical skills. Use of student centered approach and extra funding to agriculture education had no significant influence in improving students' farming practical skills at 5% level of significance; (p=.427; p=.369).

6. Discussions

The study discovered different methods of Modern Agriculture taught in secondary schools in Kabujogera Town council, Kitagwenda district; The study results revealed utilization of modern agricultural inputs (x^2 = 8.305, p=0.005). This showed a significant influence in improving students' farming practical skills by 8 chances. The inputs revealed were like fertilizers, agrochemicals and improved seeds as this helps to create awareness to agricultural science students on modern inputs available to them for efficient farm productivity. This finding is in agreement with [7] who in their study reported that effective application of fertilizers and pesticides remains to be a big challenge in agriculture especially when it comes to the determination of what fertilizer works best for different plants, when to apply, as well as at what quantities.

The study results revealed use of improved farm machines (x^2 = 6.048, p=0.001). This had significant influence on improving students' practical skills by 6 chances. This implied that students had higher chances of improving on their skills since the study of farm machine use was more of hands on than theory. This finding can be compared with [8] who in his study revealed that there is an increasing cost of labor, which calls for better approaches to ensure less cost on labor.

The study results also revealed use of biotechnology (x^2=3.519, p=0.471). This showed no significant association

with improving students' farming practical skills because respondents/students revealed that biotechnology is more of theory than practical and this was attributed to limited resources to use that are related to use of biotechnology in farming. This finding is in line with [3], who explained that genetic engineering/biotechnology is carried out to increase the resistance of certain crops to farm inputs such the application of herbicides.

The study further revealed that there were challenges experienced in modern agriculture education in secondary schools of Kabujogera Town Council, Kitagwenda district; the study results revealed that lack of resources to use was presented as significant challenge towards modern agricultural education. Secondary schools with limited resources were 0.3 times less likely to improve students' farming practical skills compared to those with adequate resources at [AOR = 0.333; p = 0.005]. Results further revealed that agriculture latest textbooks are in scanty and this has lessened students' chances of improving skills because they have limited theory that could be transformed to practical part of agriculture. This finding is consistent with [1] who in his survey found out that there were few agriculture textbooks compared to the number of agriculture students in class. The same author reported that ratio appeared to be one textbook per every three students. In addition to using textbook, teachers should use teaching aids to facilitate their teaching of modern agriculture.

The study established that poor motivation among students and teachers was a significant predictor in modern agricultural education and students farming practical skills at 5% level of significance. Secondary schools with poor motivation were 0.676 times less likely to improve students' farming practical skills compared to those with better motivation [AOR = 0.676, p = 0.003]. Teachers and parents can compare this finding with [5] who in their study revealed that student progressive performance in school is determined by his or her motivation.

The study results indicated that poor learning environment acted as another significant challenge in modern agricultural education in secondary schools in Kabujogera town council at 5% level of significance. The poorer the learning environment, the lower the chances of improving students farming practical skills. In other words secondary schools which had poor learning environment were 0.85 times less likely to improve students' farming practical skills [AOR = 0.858; p = 0.004]. This finding can be compared with [10] who in their study established that the environment of a given school plays a significant role in the teaching processes. In areas where there is insecurity, learners can never concentrate in class. The climate of the area also affects the teaching and learning of agriculture as a subject.

The study results revealed poor time management was among non-significant challenges at [p= 0.23]. respondents revealed that the amount of time allocated to a given subject has some effect on learner's understanding of what is being taught. This finding can be compared with [20] which says in his study that overcrowding in agriculture lessons and overloading of agriculture teachers affects their performance and efficiency in teaching agriculture.

The study established there were also strategies to enhance modern agriculture education in order to improve practical skills among secondary students; the study results revealed emphasizing agriculture tours and field trips. This strategy had a significant influence on improving students farming practical skills at (p=.027). This finding can be compared with [5] who in their study reported that field trips to agricultural centers, industries, farmlands, etc., where students get firsthand experience and practice of the theoretical methods of agriculture, could prove to be very helpful. However, assignments, write-ups, and projects must be given to students to aid them to participate effectively in the field trips to enhance hands on practical skills.

The study results established that class discussion and student involvement had a significant influence on improving students farming practical skills, as this is a primary teaching method in agriculture and allows the teacher to stimulate critical thinking on the learners. This finding is in line with [12] who explained that this strategy also helps the teacher establish a rapport with the students, demonstrating an appreciation of their contributions and challenging them to think more deeply and to articulate their ideas more clearly.

The study results revealed use of practical demonstration method, this strategy significantly contributed to improving students farming practical skills at (p=.004). This finding concurs with [14] who revealed that this method increases students' interest and understanding and consequently promotes high achievement rate. The same authors explained that demonstration procedures in agriculture may include machine milking, how to preserve fish, how to graft or how to install drip irrigation in home gardens.

The study results also revealed that student centered approach contributes to improvement of students' farming practical skills. This strategy further helped students acquire and apply knowledge and skills to define and solve realistic problems using a process of extended inquiry. This finding agrees with [2] who in their study reported that class projects are therefore student-centered, following standards, parameters, and milestones clearly identified by the teacher. The same authors revealed that project teaching method is based on the conviction that learning by doing, discussing in groups, and revisiting ideas and experiences are superior ways of gaining a better understanding of one's environment.

7. Conclusion

The study concluded that modern agricultural education methods had significant relationship with improving students' farming practical skills in secondary schools of Kabujogera Town council in Kitagwenda district. Significant methods included; utilization of modern agricultural inputs (x^2 = 8.305, p=0.005), Use of improved farm machines (x^2 = 6.048, p=0.001), Pre and Post-harvest handling (x^2 = 4.985, p=

0.026), and use of modern resistant crop varieties (x^2 = 4.120, p=0.004). The study further concluded that there were significant challenges experienced in modern agriculture education in secondary schools of Kabujogera Town Council, Kitagwenda district. These included; limited modern agricultural in puts at [p = 0.001], lack of resources to use [p = 0.005], poor motivation among students and teachers [p = 0.003], limited school farm size [p = 0.001] and poor learning environment [p = 0.004]. The study finally concluded that strategies to enhance modern agriculture education had significant association with improving student's farming practical skills. Such strategies were; agriculture tours and field trips (p=.027), class discussion student involvement (p=.029), use of practical demonstration method (p=.004) and recruitment of experienced agriculture teachers (p=.028).

8. Recommendations

Based on the findings, the study recommends the following;

There should be training and re-training of teachers and students of agricultural science on use of modern agricultural technology for teaching and learning in secondary schools.

The government should provide necessary inputs and farm machineries for teaching and learning agricultural science. Secondary schools should ensure establishment of enough demonstration farms that students would constantly visit in order to copy much on how to do agriculture practical work to improve their skills and experience.

Agricultural science students should go for field-trips and excursion in technology oriented farms to enhance and further boost their motivation from agriculture.

Government should fund and invest in agricultural education programmes in secondary schools particularly private ones so as to equip teachers and students with agricultural practical skills.

Agricultural teachers need to learn early in their careers to be effective in their teaching and provide a dynamic experience for their students. These experiences are gained through networking with resources outside the typical classroom setting, professional relationships equips the teachers with content and opportunities for student to engage in the relevant hands-on learning.

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Conflicts of Interest

The authors declare no conflict of interest

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