DETERMINANTS OF EFFECTIVE TEACHING AND LEARNING OF AGRICULTURAL SCIENCE IN SECONDARY SCHOOLS OF EKITI STATE, NIGERIA

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Abstract: *The study looked into the factors that influence successful agricultural science teaching and learning in secondary schools in Ado Local Government Area, Ekiti State, Nigeria. It specifically examined the socioeconomic characteristics of agricultural science teachers in the study area; identified various factors influencing effective agricultural teaching and learning; analyzed the factors and examined respondents' perceptions of the factors that determine effective teaching and learning. A multi-stage selection strategy was utilized to choose one hundred (100) respondents from the research area's fifty (50) secondary schools. The determinants of effective teaching and learning were examined using a linear regression model, and it was discovered that student attitudes, student-teacher relationships, teacher skills and abilities, parental roles, psychological and health-related factors, and students' perceptions of agricultural science are all significant at the 5% level of confidence interval, indicating importance in terms of effective teaching and learning of the subject. Factors such as school resources, social status, study skill development, and teaching-learning methods are unimportant in the effective teaching and learning of agricultural science. The Education Perceptive Index (EPI) was used to assess respondents' perceptions of effective teaching and learning, and the availability of a school farm and an agricultural science laboratory to make Agricultural Science more interesting to teach and learn ranked first (11.60%) in the study area. This is closely followed by students' positive attitudes toward agricultural science as a topic; parental supply of educational resources to assist their children or wards; and usage of the library for capturing crucial points/notes during class. The percentages of responders stressing these assertions are 11.23%, 11.15%, and 10.83%, respectively. Furthermore, 10.57% of instructors stated that students' good attitudes toward agricultural science motivates them, boosting successful teaching.*

Keywords: Teaching, Learning, Education, Perception, Agricultural Science.

INTRODUCTION

The Latin words ager, which means "field," and culture, which means "cultivation," are the origin of the word "agriculture." The science of cultivating land for agricultural produce and animal husbandry for human use is referred to as agriculture (Ndomi, 2018) and it also entails the production of food, fiber, and fuel, as well as the marketing of the products for human use (Olamie, 2015). Agriculture, as one of the science courses taught in high school, is an essential subject and an excellent tool for self-sufficiency (Ige et al., 2016). Agriculture is integrated into secondary school curriculum material because of its instructional value and relevance to the requirements of the individual learner and society as a whole (Ogunleye, 2002). Apart from addressing concerns of food

security and the development of various companies and jobs, the requirement for agricultural science to be taught in secondary schools extends to managing economic challenges that may arise as the population grows.

Students' performance in external tests has been declining over the last decade, and enrollment in Agricultural Science has also been declining (West Africa Examination Council Chief Examiner report 2009). According to Abimbola and Balschweid (2013), the Chief Examiners' Report for 2008-2012 on Agricultural Science demonstrates little progress in applicants as compared to prior years. As a result, there is a need to investigate the causes of poor performance, as this may have ramifications for the economy in a variety of ways (Betz and Taylor, 2006). Studies have been done to look into the reasons why students perform poorly in agriculture and other subjects; furthermore, based on Adegoke's findings in 2002, he demonstrated that the most common factor in all reports includes inadequate teaching strategies used by the teachers; and Usman and Memeh's findings in 2007 revealed that students' background, students' lack of interests, students' negative attitudes towards agriculture, teacher related factors like poor teacher preparation, unqualified agricultural science teachers, inadequate instructional materials, poor teaching methods and lack of exposure to different agricultural experiences had negatively affect agricultural science achievement in secondary schools.

These factors prompted this study to investigate and assess the determinants of effective agricultural teaching and learning from the perspective of instructors, with a focus on the consequences on students' performance. In other words, the reduction of negative factors in teaching and learning. Agriculture in secondary schools continues to be a source of adequate education and re-orientation of students in order to reinforce effectiveness. Education is seen as a critical component of national development, and this cannot be done without long-term investments in human capital via teaching and learning. According to Kapur (2018), education is a critical factor that not only impacts required skills, but also instills abilities and information in individuals. It improves tactics that help women and men to survive in tough environments.

Teaching is the process of imparting information and skills to pupils or students. The gain of skills, information, and experience from the teachers is another definition of learning. The secondary school learning process happens inside the four walls of the classroom while adhering to the topic's curriculum; yet, successful subject learning is induced or impacted by several elements that are both human and material. Agriculture's essential position to livelihood is the people's continuous survival, making it imperative to explore the variables impacting efficient teaching and learning of the disciplines. Effective learning has been defined as getting the intended outcome from students following information impartation by experts in agricultural education and practice (Fink, 2013).

Resultantly, the knowledge of Agriculture through effective teaching and learning of the subject in the Secondary School becomes important as the Secondary School education is a foundation on which the tertiary institutions rest in the admission requirements of their students. In addition to the fact that knowledge of agriculture in the secondary school prepares the students to become, to some extent, self-reliant and dependable members of the nation's society, the students are prospective professional teachers, custodians of knowledge and disseminators of agricultural practice (Angela, 2020).

According to general comments made by people, including teachers, despite the availability of professionally certified teachers, a conducive teaching and learning environment (Ntibi and Edoho, 2017), and regular payment of teachers' salaries, the teaching-learning process of Agricultural science has not produced the desired results. Only a few students expressed an interest in agriculture as a job or for future study (Usman and Memeh, 2007). Similarly, there is the issue of mass unemployment among secondary and tertiary institution graduates throughout the country, which is causing social, political, and economic problems such as robbery, protests, hooliganism, cyber fraud, kidnapping,

and many other vices that could be enticed to develop an interest in and practice agriculture. This validates the adage that the "devil finds work for an idle hand." It is common information, observation, and critical that some influencing elements be stressed in order for students to learn efficiently. Because agricultural science is so essential in secondary schools in Ekiti State and throughout Nigeria, it is critical to identify characteristics of good instruction in order to improve them. It is critical to highlight that this study will give the chance to get first-hand information and in-depth understanding of the components required to affect or increase successful agricultural science learning by students in secondary schools in the study area.

LITERATURE REVIEW

Teaching of agricultural science at the secondary school requires a sound background in theory and practical aspects by the teachers of agriculture. The 6-3-3- 4 system in Nigeria requires that agriculture be taught as pre-vocational subject at the primary and junior secondary schools and as a vocational subject in senior secondary school level (National Policy on Education, 2004). The relationship between teaching and learning is at the heart of the education process. Each teacher and student is an individual and as such will have their own ideas and preferences with regards to teaching approaches and how they like to learn. It should never be assumed that because you have clear intended outcomes for a session that you teach this will necessarily be what pupils will learn. Each of us responds differently to learning situations. Some, for example, will enjoy learning in mathematics lessons and will respond to mathematical ideas with ease, while finding reading difficult; others will respond well in practical learning situations, while finding the accumulation of information from graphical representation difficult. Good teachers have recognized the challenges presented by these factors for a long time and have learned to plan their lessons in ways which address a range of preferred learning styles and which present opportunities for students to tackle learning in a variety of ways (Alton-Lee, 2003).

Odubiya (1991) suggests that it is not always easy to define good teaching practice. Teachers may appear to be well organized and Teaching and learning are complex processes that are subject to many social, cultural and economic influences. In order to succeed, effective teachers need to vary their teaching approaches, to be adaptable and to be vigilant in gauging how students respond to their teaching style; the resources they use and the environment in which they are working (Wolk, 2001). Learning takes place when children can do, understand or know something which previously they could not achieve or did not know.

While much of what is learned in schools comes from the formal process of teaching, there is much which students learn that can be described as incidental or for which no direct planning takes place. In addition to learning about subjects or developing specific skills in school, students engage in learning as a social process through which they engage with others, learning how to play a role as a member of a team and collaborating in solving problems. This is an important part of learning and provides a foundation for students to become effective learners.

The philosophy of the National Policy of Education (2004) recommends the inclusion of Agricultural science as a core subject in the school subjects. It is therefore, very important that technically and professionally competent Agricultural science teachers are required to carry out the objective of Agricultural education in our schools. Teachers who possess technical and professional training in Agriculture would go a long way in stimulating interest in the youths who decide to take up Agriculture either as a vocation or discipline. The employment of non-agricultural graduates and adult education personnel to teach Agricultural science in our schools are responsible for various misconceptions about Agriculture. Qualified teachers of Agricultural science that are well trained in the field of Agricultural science have to be employed to handle the subject so that greater productivity can be attained. Lack of necessary competency in handling the subject by the teachers has resulted in the production of primary school graduates with negative attitude towards agriculture and related occupations.

It is impossible to overstate the importance of having good agricultural science teachers available in the new educational system. Teachers are critical to the success of any educational program; thus, effective and competent teachers with the qualifications necessary to manage agricultural science instruction efficiently are required; otherwise, the curriculum may not fulfill its objectives (Adamson & Darling-Hammond, 2011). A certified agricultural science teacher would be familiar with both the subject content and the approach he will employ during the teaching-learning process. The majority of unskilled agricultural science instructors fail because they lack confidence and the capacity to properly teach and organize practicals during the teaching-learning processes. Olaitan (1984) confirmed that agricultural science professors may be more accountable for the ineffectiveness of the agricultural science teaching-learning process poor most of our secondary schools.

Some views held by the agricultural science teachers about their ineffectiveness in the teaching-learning process are here understated.

1. A teacher may be over worked in the school being an agricultural teacher, a labour master, a house master, and a health officer or the student adviser.
2. In some cases, the students, other teachers and the Principal do not appreciate their efforts because they are very hard working.
3. They feel underpaid for all their efforts in the schools.
4. They feel that they spend most of their time for the development of the school and a very little time for their own family.

The teaching of agricultural science in secondary schools has to be improved despite the aforementioned difficulties experienced by agriculture teachers. The teachers of agricultural science in particular need to be aware of cutting-edge teaching strategies that improve the efficient instruction of agricultural science in the classroom.

METHODOLOGY

Study Area

Ekiti State was chosen for the study because of its educational value. Ado, Irepodun-Ifelodun, Ijero, Efon-Alaye, Moba, Ikole, Ido-Osi, Ilejemeje, Oye, Ise/Orun, Emure, Gbonyi, Ekiti East (Omuo), Ikere, Ekiti South West, and Ekiti West are the 16 local government areas in the State. Ekiti State is located between latitudes 7°25' and 80°5'N and longitudes 4°45' and 5°46' east of the equator. The state is bordered to the north by Kwara and Kogi States, and to the west by Osun State. Edo State borders Ekiti State to the east, and Ondo State borders it to the south. It has a total land area of 5887.890 square kilometers. Ekiti State is a landlocked state, having no coastal boundary with an estimated population of 2.40 million persons (National Population Commission, 2006). Moreover, the land is buoyant in agricultural resources whereby teaching and learning of agriculture is quite preponderant in the area.

Sampling techniques

The sample strategy utilized for the study was multi-stage, with fifty secondary schools chosen at random from a mix of private and public secondary schools. At the first stage, Ekiti State was chosen because of its educational value in Nigeria; and at the second stage, ten (10) LGAs were chosen from among the sixteen (16) LGAs in Ekiti State, and these are: Ado; Ise/Orun; Ijero; Irepodun-Ifelodun, Oye; Ikere; Gbonyin; Emure; Ido Osi, and Ekiti South West, using structured questionnaire coupled with schedule interview to collect data. At the third stage, a random sampling of five (5) secondary schools, with two (2) respondents (Agricultural Science Teachers) were chosen from each school within the selected LGA, to make up a total of one hundred (100) respondents. The study relied on primary data. Personal, socioeconomic, effective teaching and learning characteristics, as well as other pertinent issues, were collected as primary data. The data was gathered quantitatively using a one-on-one contact survey. The socioeconomic characteristics of the respondents in the research area were examined using descriptive statistics, namely frequency and percentage. The Education Perceptive Index was used to rate respondents' perceptions of successful

teaching and learning of agricultural science, and the Regression model was used to analyze the factors that influence effective teaching and learning.

Method of Data Analysis

The survey was descriptive in nature. A descriptive survey allows you to collect data from a reasonably large number of instances at one time in order to draw conclusions and generalizations from the sample research. The structured questionnaire was utilized to collect data for this study. For the study of the data obtained, two basic analytical techniques were used. These are as follows:

1. Descriptive frequencies
2. Analysis of regression

Descriptive Analysis of the Data

The analysis prioritizes the frequency distribution of teachers' socioeconomic characteristics in the local government area toward several elements that may or may not influence agricultural science teaching and learning in secondary schools.

Regression analysis

Linear Regression was employed in the analysis. The variables of effective agricultural science teaching and learning in secondary schools in the research area were investigated using regression analysis. Regression is used to examine the relationship between two variables, 'x' and 'y,' as well as the relationship between several independent variables.

The linear regression model that was utilized is

$$Y= ßo + ß_1X_1 + ß_2X_2 + ß_3X_3 + \ldots\ldots\ldots + ßmXm + ei$$

Where:

Y = dependent variable

ßo = constant or intercept

e = Error term or stochastic term

ßi - ßm= Standardized Regression coefficient

X_1 -Xm = Explanatory variables

Determination of Effective Teaching and Learning

The approach developed by Ilesanmi and Afolabi (2020) with reference to measuring adoption by weighing the many enhanced cocoa technologies, was utilized to determine the effective teaching and learning of agriculture. As a result, we weighted the various teaching and learning approaches using experts and model teachers to determine their effectiveness, and then the dependent variable was generated. The weights were assigned depending on how frequently the strategies were used by teachers.

Table 1.Teaching and Learning Methods and Its Share Weights

EFFECTIVE TEACHING AND LEARNING METHODS	WEIGHTS	METHOD OF RATING
Attitude of the students	0.1	Very good = 0.05, Good = 0.03, Poor = 0.02
School resources	0.1	Demonstration Farm = 0.04, Equipment = 0.02, Laboratory = 0.02, Teaching aid = 0.02
Student- teacher relationship	0.1	Very good = 0.05, Good = 0.03, Poor = 0.02, Bad = 0
Skills and abilities of the teachers	0.1	Critical thinking = 0.02, Communication = 0.02, Patience/confidence = 0.02, Organization = 0.02, Time management = 0.02
Role of parents	0.1	Motivation = 0.02, Provision of Educational resources = 0.02, Focus on needs of wards = 0.02, Discipline = 0.02, Parent Teacher relationship = 0.02
Social status	0.1	Group study = 0.04, High self esteem = 0.03, Parent social status = 0.03
Psychological and health related factors	0.1	Health = 0.02, Physical ability = 0.01, Boldness/courageous = 0.02, Extra curriculum activities = 0.05
Development of study skills	0.1	Note taking = 0.02, Critical thinking = 0.02, Use of library = 0.02, Night reading = 0.02, Cramming = 0.02

Teaching- learning methods	0.1	Demonstration = 0.025, Pictorial display = 0.025, Dictation = 0.025, Verbal explanation = 0.025
Students' Perception toward Agricultural Science	0.1	Very useful = 0.06, Useful = 0.04, Not useful = 0
	1.0	

Source: Computed with educational experts.

Definition of Variables

Dependent Variables

In this study, the dependent variable is the Factors Index (FI), which reflects numerous successful techniques of teaching and learning Agricultural science. One of the strategies utilized in the case of factors impacting agricultural education and learning is the factor index. In this example, the factor index is a continuous dependent variable (Yi). For non-factors, the dependent variable was zero, while for factors, it ranged from 0 to 1 (with 1 indicating 100% effective teaching and learning).

Independent Variables or Explanatory Variables

The explanatory variables of interest in this study include those that are assumed to have an influence on teaching and learning, as well as the effectiveness of factors affecting learning of the subject. These include personal and socio-economic characteristics, technical and institutional variables (Xi):

X_1 = Attitude of the Students
X_2 = School Resources
X_3 = Student Teacher Relationship
X_4 = Skills and Abilities of the Teacher
X_5 = Role of Parents
X_6 = Social Status
X_7 = Psychological and health related factors
X_8 = Development of Study skills
X_9 = Teaching- learning methods
X_{10} = Students' Perception on Agricultural Science.

Education Perceptive Index (EPI)

This was used to gain access to good agricultural science teaching and learning in secondary schools in the study area based on perception. Knowing this offers for a better understanding of the potential areas of action by the government or other stakeholders in the area. The Education Perceptive Index (EPI) was created by ranking the respondents' perceptions of some constructive remarks on teaching and learning of Agricultural Science. The extent of EPI use was expressed on a five-point scale, with scores of 5, 4, 3, 2, and 1 indicating strongly agree, agree, undecided, disagree, and strongly disagree, respectively. The EPI score formula was adapted from Islam and Kashem (1999), who measured the usage of ethno-veterinary medicine in cattle management and rearing. Ilesanmi and Ojo (2020) used the Perceptive Use Index to rank the techniques followed by cocoa improved technology adopters. These were changed to obtain the EPI as follows:

$$EPI = N_5X_1 + N_4X_2 + N_3X_3 + N_2X_4 + N_1X_5$$

Where:
EPI = Education Perceptive Index
N_5 = Number of teachers strongly agree to EPI
N_4 = Number of teachers agree to EPI
N_3 = Number of teachers undecided to EPI
N_2 = Number of teachers disagree to EPI
N_1 = Number of teachers strongly disagree to EPI
X_1 = Scale point for strongly agree
X_2 = Scale point for agree
X_3 = Scale point for undecided
X_4 = Scale point for disagree
X_5 = Scale point for strongly disagree

The EPI was employed in a ranking order to reflect each EPI's relative position in terms of teachers' perceptions of effective teaching and learning.

FINDINGS AND DISCUSSION

Table 2 revealed that the majority of respondents (50%), were adults between the ages of 31 and 40. Female instructors also make up the majority of the population (53%) in the research area. The findings revealed that (16%) of respondents have their NCE, (72%) have their B.Sc/ B. Ed, 7% have their M.Ed, and 5% have their Ph.D. Furthermore, (70%) of respondents agreed that having a demonstration farm at their school is a significant aspect for effective learning. And, according to the survey, (96%) of the respondents believed that there is appropriate cordiality with the students; similarly, (88%) of the respondents said that the students' attitude toward learning agriculture science is encouraging. Parents inspiring their children has been demonstrated by (83%) of respondents that most pupils are inspired to study at school by their parents. Furthermore, as noticed, (83%) of respondents agreed that parents give educational materials for their children. This improves student performance and aids in the effective learning of agricultural science. Furthermore, (79%) of respondents thought that having strong self-esteem is a vital aspect for any student who wants to have a modest or average social circle. Approximately (85%) of respondents believed the students' parents have a high social status. 59% of respondents identified the use of libraries as one of the factors influencing agricultural science teaching and learning, emphasizing that students and teachers were updating themselves through the use of libraries and increasing their knowledge in new agricultural technologies and educational innovations.

Table 2: Socio Economic Characteristics of the Respondents

Characteristics	**Frequency**	**Percentage**
Age group		
21- 30	28	28.0
31-40	50	50.0
41- 50	19	19.0
51- 60	3	3.0
Sex		
Male	47	47.0
Female	53	53.0
Level of Education		
NCE	16	16.0
BSC/BED	72	72.0
MED	7	7.0
PhD	5	5.0
Cordiality with students		
Adequate	96	96.0
Inadequate	4	4.0
Attitude of the students		
Encouraging	88	88.0
Not encouraging	12	12.0
Motivation by Parents		
Motivated	83	83.0
Not motivated	17	17.0
Provision of Educational Materials		
Provided	83	83.0

Not provided	17	17.0
Assessing Students' Self Esteem		
High self-esteem	79	79.0
Low self-esteem	21	21.0
Parents Social Status		
High status	85	85.0
Low status	15	15.0
Use of library		
Using	59	59.0
Not Using	41	41.0

Source: Computed from field survey, 2021

Interpretation of the Tables

Table 3: The R Square Table

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.902[a]	.814	.793	.054286	.814	38.132	10	87	.000

R and R square values are provided in the table 3. The R value (the "R" Column) displays the simple correlation and is 0.902. This suggests a high degree of correlation. The R square value (the "R" square column) reflects how much of the overall variance in the dependent variable (effective teaching and learning) can be explained by the independent variables (X1...Xn), which is 81.4%. The R square is greater than 0.3, indicating a good best fit and statistical significance. The modified R-square illustrates the generalization of the findings, with a value of 0.793, which is close to 0.814. The random disturbance term could be responsible for the unexplained percentage (error term).

Table 4: The Coefficient Table

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.001	.044		.027	.978
	Attitude of the Students	2.335	.597	.223	3.915	.000
	School Resources	.670	.236	.149	2.844	.006
	Student Teacher Relationships	2.004	.656	.176	3.055	.003
	Skills and Abilities of the teacher	1.385	.254	.275	5.459	.000
	Role of parents	.823	.238	.228	3.462	.001
	Social Status	.678	.300	.167	2.257	.027
	Psychological and Health Related factors	1.400	.467	.158	3.001	.004
	Development of study skills	.108	.073	.072	1.487	.141
	Teaching - learning methods	.082	.056	.070	1.467	.146
	Students' Perceptions toward Agricultural science	1.424	.367	.210	3.879	.000

Regression analysis on effective teaching and learning

The regression model is being used to show the degree to which independent variables explains the variation in the dependent variable. The model is specified below:
Linear form:

$$Y= f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10})$$

Model:

$$Y = ß_0+ ß_1X_1 +ß_2X_2 + ß_3X_3 + ß_4X_4 + ß_3X_3 + ß_6X_6 +ß_7X_7+ ß_8X_8 + ß_9X_9+ ß_{10}X_{10}$$

Where:
$ß_0$ = constant
$ß_1$= Standardized regression coefficient
X_1 = Attitude of the Students**
X_2 = School Resources
X_3 = Student -Teacher Relationship**
X_4 = Skills and Abilities of the Teacher**
X_5 = Role of Parents**
X_6 = Social Status
X_7 = Psychological and health related factors**
X_8 = Development of Study skills
X_9 = Teaching- learning methods
X_{10} = Students' Perceptions on Agricultural Science**
***** = significant at 5% level***

The standardized coefficient would be used to find the magnitude of each of the independent variables so as to know how each one of them accounts for the variation in the dependent variable. From the coefficient table:

$$Y = 0.001 + 0.223X_1 + 0.129X_2 + 0.176X_3 +0.275X_4 - 0.228X_5 + 0.167X_6+ 0.158X_7 + 0.072X_8 + 0.070X_9 + 0.210X_{10}$$

Attitudes of the students along with student – teachers' relationship, skills and abilities of the teacher, roles of parents, psychological and health related factor and students' perception on Agricultural science are significant because their significant value is less than 0.05 therefore they are needed to influence effective teaching and learning of Agricultural science; however, school resources, social status, development of study skills cum teaching learning methods are not significant at 5% level of confidence interval.

Perception of Respondents on Effective Teaching and Learning

Teachers' comments were scored on a five-point scale to determine their impression of effective teaching and learning. The scores for highly agree, agree, undecided, disagree, and strongly disagree are 5, 4, 3, 2, and 1, respectively. Approximately ten different comments on education perception were identified. According to the survey, the availability of a school farm and an Agricultural Science laboratory to make Agricultural Science more engaging to teach and learn scored best (11.60%). This is closely followed by a positive attitude toward agricultural science as a subject, parental provision of educational resources to assist their children or wards, and use of the library and taking notes during class. The percentages of responders stressing these statements are 11.23%, 11.15%, and 10.83%, respectively. Furthermore, 10.57% of teachers stated that students' good attitudes toward agricultural science motivates them. Meanwhile, the least ranked perspective (6.74%) of respondents on the effective teaching and learning of agricultural science is 'students whose parents are of high social position perform better than those of low social status,' which they did not consider as impacting agricultural teaching and learning. This also supported the linear regression model of this study showing insignificance of social status in terms of effective teaching and learning.

Table 5: Respondents' Perceptions of Teaching and Learning Statements

S/N	ITEMS	SA	A	UD	D	SD	EPI	Percentage	Rank
1	The availability of school farm and Agricultural Science Laboratory make Agricultural Science more interesting to teach and learn	64	19	7	10	0	437	11.60	1
2	Students whose parents are of high social status perform better than	10	21	6	39	24	254	6.74	10

	those of low social status								
3	Students with good health status and boldness perform better than others	31	36	12	14	7	370	9.82	8
4	The teaching methods used by teachers affect the performance of students	44	28	15	4	9	394	10.46	6
5	Students that use the library and take notes during class makes teaching of Agriculture interesting	42	34	16	6	2	408	10.83	4
6	The way students perceive Agricultural Science encourages the teachers	29	50	11	10	0	398	10.57	5
7	Good attitude towards the subject influences the teaching and learning of Agricultural Science	39	48	10	3	0	423	11.23	2
8	Provision of Educational resources by the parents helps in the effective learning	44	38	13	4	1	420	11.15	3
9	Students with bad relationship with the teachers fail more than those with good relationships	34	36	19	9	2	391	10.38	7
10	Skills demonstration should not be used to determine effective instruction.	12	25	11	27	25	272	7.22	9
	Total						3767		

Note: *Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), Strongly Disagree (SD)*
Source: *Computed from field survey, 2021*

Discussion of the Findings

Students' attitudes (X1), students-teacher relationships (X3), teachers' skills and abilities (X4), parents' roles (X5), psychological and health-related factors (X7), and students' perceptions of agricultural science as a subject (X10) are all positively correlated to effective teaching and learning of agricultural science. Aside from the fact that they are all statistically significant, the increased prevalence of these elements showed that they will undoubtedly generate excellent teaching and learning in agricultural science. Effective teaching and learning of agricultural science are positively correlated with school resources (X2) and social status (X6), though they are not statistically significant, indicating that they cannot induce effective teaching and learning. Nonetheless, they have a positive impact, indicating that additional efforts made by the school to increase their educational resources and perhaps an increase in the social status of the parents in terms of their ability to financially support their children. Additionally, the growth of study abilities (X8) and teaching-learning methods (X9) with relation to classroom presentation, graphical display, dictation, and verbal explanation followed the same pattern despite not statistically being significant. This showed that while they are unable to create learning environments that are beneficial for teaching, they can nevertheless influence students' performance and teachers' ability to impart knowledge. The availability of a school farm and an Agricultural Science Laboratory, which make Agricultural Science more interesting to teach and learn, was ranked highest by teachers, indicating that for the subject to be taught effectively in the secondary schools of the study area, there must be a good laboratory and a well-located school farm for practical purposes. As a result, the students will enjoy the subject and be able to use improved methods on their own farms at home. This will invariably result in effective learning capabilities, and teachers' abilities to disseminate good agricultural instruction and practices will improve.

CONCLUSION

Based on the findings of this study, it is possible to conclude that:

a. In order to attain good academic achievements in agricultural science, students must be devoted and genuine in their studies; teachers must be approachable in attitude and execute teaching-learning processes in a positive manner.
b. The key determinants of effective teaching and learning of agricultural science are teachers' skills and tal 86 the participation of par psychological and health-related issues, the development of study skills, teaching-learning methods, and students' perceptions of agricultural science.

As a result of the findings, the following recommendations would help in determining effective teaching and learning of Agricultural Science in Secondary Schools:

i. The government should endeavour to provide facilities such as demonstration farms and equipment to help in teaching of Agricultural science.
ii. Teachers should find out about their abilities and skills to help the students when teaching.
iii. Parents should motivate their children because they play an essential role in their children's academic lives.
iv. Parents should endeavour to give educational materials, focus on their children's needs, and learn to punish them when necessary. Teachers should engage in the best teaching method(s).
v. Students should develop study s 86 and most especially the one that would help to improve performance.
vi. Students should be taught how to face their fears and be of good health status.
vii. The school should encourage students and teachers by creating time to listen to their needs.
viii. Classroom exercise should be encouraged.

If the above recommendations are being used or implemented, it will help both teachers and students in teaching and learning Agricultural science respectively.

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