
Factors Affecting Effective Delivery of Agricultural Science Practical Lessons In the Colleges of Education in the Central Region of Ghana

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ABSTRACT

This study examined factors affecting effective delivery of Agricultural Science practical lessons in the Colleges of Education in the Central Region of Ghana. The study, specifically, sought to identify factors affecting effective delivery of practical lessons in Agricultural Science, looked at the impact of practical lessons on the students' learning and some suggested measures to be used to improve the conduct of future practical lessons in the Colleges. Descriptive survey design was used to conduct the study. Three tutors and 145 students were sampled using purposive and simple random procedures respectively to serve as respondents. Two sets of questionnaires were self-designed and used to collect data. The data collected were analysed using SPSS software and descriptive statistics were computed to present the results. The results of the study showed that the tutors possessed the requisite practical skills and scientific knowledge to conduct practical lessons. However, the tutors' inability to conduct effective practical lessons was due to unavailable material resources and funding of practical lessons as well as poor support services from school administration. Students were also found to show negative attitude towards practical lessons. Effective teaching of the practical lessons helped students to acquire process, planning and managerial skills. It was suggested by the students and tutors that allocation of time on the time table for practical lessons coupled with provision of tools, practical materials, equipment and incentives can improve effective conduct of practical lessons. It is therefore recommended that tutors should involve students in planning effective practical lessons to dispel the negative attitude of the students towards practical lessons which they sometimes consider as drudgery and laborious.

KEYWORDS: Agriculture, equipment, lessons, practical, students, teaching,

INTRODUCTION

Agricultural Science is a component of the curriculum of Colleges of Education in Ghana. Agricultural Science needs to be viewed as an important, subject in the curriculum because Ghana is considered to be an Agricultural country with 60 – 70% of the population depending on it directly or indirectly for their livelihood (Annor-Frempong, 2006). Due to Ghana's dependence

on agriculture, the effectiveness and efficiency of facilitation of the teaching-learning of it must be such that learners will acquire knowledge, skills and right attitudes at the Colleges of Education. It is then that these Colleges of Education graduates who will serve as trainer of trainers to teach at basic and senior high schools can perform creditably using appropriate pedagogy.

The conventional chalk-and-talk method of teaching Agricultural Science in Ghanaian secondary schools and other tertiary institutions have not been effective in developing the needed technical knowledge and acquisition of the vocational skills necessary for agricultural development as stated in the National Policy on Education in the syllabus of teaching Agricultural Science in schools (Ministry of Education, 2007). It is also known that Agricultural Science is taught in the classroom theoretically in the Colleges of Education without practical work and the use of relevant instructional materials (Saah, 2007). As a result of the poor method of teaching, students see the subject as difficult, and develop a negative attitude towards it.

Egun (2007) and Annor-Frempong, Zinnah and Adam (2003) identified some of the factors militating against the effective teaching-learning of Agricultural Science as a subject. These include lack of relevant instructional materials and suitable textbooks; the wide coverage of the subject; and shortage of professionally trained teachers in agricultural science was identified. Inability of teachers to explain some concepts with local examples, poor teacher motivation, lack of Agricultural Science laboratory and land, high teaching load on teachers and lack of in-service training for older teachers were found to have contributed to students' poor performance and discouraging attitude towards agricultural studies (Apantaku, 2004; Badmus, 2007 and Egun, 2007).

The use of agricultural science teaching to increase the manpower availability, provide employment opportunities, sustain and stabilize the economy, build dynamic, strong and self reliant nation, according to Iwena (2000) could not be achieved by the ineffective traditional chalk and talk method of teaching Agricultural Science in the classroom. For old traditional classroom environment, as described by Akanbi (2008), is too dull and teacher-centered.

Adesina (2011) and Byrne, Catrambone and Stasko (1999) advised that educators should constantly seek new ways to improve instruction, so as to facilitate learning and to hold the attention of their students. Dooley, Stuessy, Magill, and Vasudevan (2000) suggested the need for educational systems to meet the challenge of a changing and increasingly technological society; teaching and assessing large class sizes; with chalk board and multiple choice examinations which made it difficult to challenge learners at higher cognitive level. Generally agricultural education facilitators have varying tools, audio-visual aids evaluation techniques, teaching methods based on the varying teaching environment and available students than teachers in any other discipline (Dooley *et al*, 2004).

Agricultural Science curriculum delivery comprises both theoretical and practical lessons but most often the subject is taught without the practical components in the Colleges of Education. Practical teaching is one of the means of making the subject real to the pupils (Mamman, 2000). Theory and practical must go hand in hand so that what is taught in theory must be applied and demonstrated practically to enable learners to acquire knowledge, skills and develop the right attitude. A study designed to examine factors affecting effective delivery of practical lessons in Agricultural Science in the Colleges of Education in the Central Region of Ghana is paramount.

This is to ensure effective delivery of the Agricultural Science curriculum to ensure the production of graduates with knowledge, skills and a right attitude to act as facilitators of the teaching and learning of Agricultural Science at the Basic and the Senior High Schools in Ghana.

There are three colleges of education in the Central Region namely Our Lady of Apostles (OLA) College of Education, Komenda College of Education and Foso College of Education. The three Colleges of Education offer elective courses and general programmes. All the students offering the general programme do Agricultural Science in the first year, first semester and do it as an elective in the second year second semester. The purpose of including Agricultural Science component was a new policy directive for the 3-year Diploma in Basic Education to train a generalist teacher who would be able to teach both in primary and junior high school levels (Institute of Education, 2005). The policy stipulated that during the process of teaching, various methods should be used but priority should be given to strategies such as problem solving, decision making, critical and reflective thinking. The policy further stressed that “special emphasis should be placed on practical during the tutorial sessions” (p. 3).

Earlier studies have proved the effectiveness of practical activities as a tool for improving students’ interest, performance and retention ability in learning difficult tasks and subjects (Dooley *et al.*, 2000; Dooley *et al.*, 2004; and McGregor, 2003). This study was therefore designed to identify the factors which limit effective teaching of practical agriculture lessons in the Colleges of Education in the Central Region of Ghana. These factors need to be identified so that a remedy is sought in order to promote effective teaching and learning of the subject in the Colleges of Education.

This study seeks to identify the factors limiting the teaching and learning of Agricultural Science practical lessons in the Colleges of Education in the Central Region of Ghana. Specifically, this study sought to: identify factors affecting effective delivery of practical Agricultural Science lessons; looked at the impact of the practical activities on the learning of the subject in the Colleges of Education in the study area; and suggested possible solutions to improve the conduct of practical lessons by both teachers and students.

METHODOLOGY

Research Design

In this study, quantitative data collection procedure was used based on survey design. Survey research uses instruments such as questionnaires and interviews to gather information from groups of subjects (Ary, Jacobs, Razavich & Sorensen, 2006). In survey research, investigators ask questions about peoples’ beliefs, opinions, characteristics, and behaviour (Creswell, 2003). Surveys may also investigate associations between respondents’ characteristics and their current attitudes or beliefs towards some issues. Importantly, survey research does not make causal inferences, but rather describes the distributions of variables for large groups (Creswell, 2003). Cohen, Manion and Morrison (2004) and Gay (1992), stated that survey research involves collecting data to answer questions concerning the phenomenon under study. It is used to describe the nature of existing conditions and standards against which existing conditions can be compared, and investigate the relationships that may exist between events.

Survey research according to Fraenkel and Wallen (2006), studies both large and small populations by drawing samples from them. Thus, descriptive survey deals with relationships among non-manipulated variables. Survey designs are an attempt to collect data from members of a population with respect to one or more variables. Survey design was used in this study because it sought the views of respondents about factors affecting effective delivery of practical agriculture lessons in the Colleges of Education in the Central Region of Ghana. The descriptive survey design was appropriate for this study because of its convenience and relevance.

Population

Population is the target group or subjects who are to be used to conduct the study. For this study, the population used is made up of Agricultural Science tutors, and first and second year students in three Colleges of Education in the Central Region of Ghana. The Colleges used for the study were Komenda, Foso and OLA Colleges of Education. The sample size distribution of the population used for the study is presented in Table 1.

Table 1: Sample size distribution of the population

Subject	Population	Sample size	Percentage (%)
Tutors			
Komenda College of Education	1	1	100.0
Foso College of Education	1	1	100.0
OLA College of Education	2	2	100.0
Total	4	4	100.0
Students			
Komenda College of Education	284	55	19.4
Foso College of Education	260	50	19.2
OLA College of Education	180	40	22.2
Total	724	145	20.3

As presented in Table 1, both students and tutors were used for the study. The total number of students used for the study was 145 which represented 20.3% of the total population of 724. The 20.3% of the total population used for the study was higher than the 1 - 5% recommended by Amedahe and Asamoah - Gyimah (2012) to be used for descriptive survey design studies.

Also, four (4) tutors were used for the study. The number of tutors used for the study represents 100.0% of the total population of Agricultural Science tutors in the three Colleges of Education used for the study. The sample size of tutors used was not so large. Amin (2005) explained that when the population size is not so large, use of all the sample size is appropriate, hence the choice of 100.0% of the tutors' population.

Sample and Sampling Techniques

The choice of the three Colleges of Education in the Central Region for the study was by convenience sampling technique because the researcher teaches in one of the Colleges of Education in the Central Region and was aware of how practical lessons are conducted in the Colleges. The choice of the Colleges of Education in the Central Region also made it possible for the researcher to have access to the respondents to collect data for the study. The choice of students from first and second year classes of the three Colleges was by stratified sampling procedure followed by random sampling. Where the population was homogenous (OLA), simple random sampling was used to select the respondents. In the mixed sex colleges, the students' population was first stratified into sex strata and simple random sampling procedure was used to select the required number of respondents from each sex stratum. This procedure was followed in order to avoid bias in the selection of the students for the study and also give equal opportunity to all students in the first and second year classes to be selected for the study.

The selection of the four tutors was by census. This is because the tutors are in charge of teaching Agricultural Science practical lessons in the Colleges of Education in the study area. They are the one who conduct the practical lessons and are aware of the factors affecting effective delivery of practical lessons in agriculture in terms of material resources, students' attitudes and their own abilities and limitations. The Agricultural Science tutors are, thus, the respondents who possessed the requisite knowledge about the factors researched into in this study and were therefore in position to provide the needed data required for the study.

Research Instrument

The study involved the use of questionnaires. Two sets of questionnaires were designed and used for the study; one for the students and the other for the Agricultural Science tutors. The use of the questionnaires were appropriate because it made it possible for opinions of both students and tutors to be sought on the factors affecting effective delivery of practical Agricultural Science lessons in the Colleges of Education in the Central Region of Ghana. Gay (1992) stated that descriptive survey studies are usually conducted by administering questionnaire.

The structure of the two questionnaires was made up of close-ended items. The use of the close-ended format offered the respondents fixed alternative responses. The close-ended items are easier and faster to be completed since it did not require any extensive writing. The students' questionnaire was made up of 37 items whilst that of the tutors consisted of 25 items. The two questionnaires were divided into sections A, B, C and D. Items in the various Sections of the two questionnaires were constructed based on multiple choice items and Likert scales. The Likert scale is a method of measuring people's opinion about an issue by combining their scores on a variety of items into single index. Scaling is achieved by ensuring that high scoring and low-scoring individual differ in their responses on each of the items selected for inclusion in the index, and the distance is assumed to be the same between categories (Kerlinger, 1993). Kerlinger (1993) posited that the Likert Scale is the most widely used method of scaling in recent researches. This is because such items are much easier to construct and tend to be more reliable.

The contents of the two questionnaires were developed along the line of the research questions formulated to guide and give direction to the study. The contents were made up of demographic characteristics of both students and tutors, types of practical activities carried out by students,

factors affecting effective conduct of Agricultural Science lessons, impact of practical lessons on students' learning and suggestions to improve practical lessons in Agricultural Science.

Pilot Testing of Instruments

A pilot study was undertaken in order to refine the items on the two questionnaires so that respondents would have no problem in answering the questions when administered during the actual study on the field. The rationale for the pre-testing of the instruments was also to evaluate the validity and reliability of the instruments when used for the main research. The instruments were administered to two Agricultural Science tutors and 15 students in Akrokerri College of Education in the Ashanti Region which shares boundary with the study region. With the help of Predictive Analytic Software (SPSS 16.0 version), the internal consistency of the items for Cronbach's alpha co-efficient was determined at 0.05 level of significance. The Cronbach's alpha value calculated was 0.77 for items on the students' questionnaire and 0.80 for the tutors. This showed that the items on the two instruments were reliable and can be used for the study. Research has shown that items with Cronbach's alpha co-efficient of 0.70 or more are considered to be reliable (Pallant, 2001).

Data Collection Procedure

An introductory letter from the Dean of Faculty of Education of University of Cape Coast was presented to the Principals of Colleges of Education in the Central Region, seeking permission to carry out the research in their Colleges. A follow up visit was then made to the Colleges to interact with the respondents and to establish rapport with them for the conduct of the study. A date was then fixed for the distribution and completion of the questionnaires. The questionnaires were administered in each of the three Colleges by the researcher on scheduled dates which were convenient to the tutors and the students of the colleges. The questionnaires were received back on the same day they were administered.

Data Analysis

After collecting the data, the responses to the items on both the tutors' questionnaire and students' questionnaire were coded. The responses were keyed into Predictive Analytic Software (SPSS Window 16.0 version) and several sets of descriptive statistics analyses were computed. The data analysed using descriptive statistics gave frequency counts, percentages, and means with their respective standard deviations. Items in sections A of both questionnaires which dealt with demographic characteristics of the respondents were analysed using frequencies and percentages. Items in sections B, C and D of the two questionnaires which were constructed using Likert type scales were analysed using mean with their respective standard deviations.

A theoretical mean of 3.0 was taken as a criterion to judge the means for the items in Sections B and C of the tutors' questionnaire and sections C and D of the students' questionnaire. Therefore, any item in these Sections on the two instruments which had a mean equal to or higher than 3.0 was regarded as adequately available/strongly agreed/very important. Items with means less than 3.0 but higher than 2.5 were regarded as available/agreed/important, while items with means less than 2.5 but between 2.4 and 2.0 indicated not adequately available/ disagreed / not important to the statements. Items with means less than 2.0 were considered as not available / strongly disagreed/not very important to the statements.

Similarly, a theoretical mean of 2.5 was taken as a criterion to judge the means for the items in Sections D of the tutors' questionnaire and section B of the students' questionnaire. Therefore, any item in these Sections on the two instruments which had a mean equal to or higher than 2.5 were regarded as very useful/always whilst means less than 2.5 but between 2.4 and 2.0 indicated useful/ sometimes. Items with means less than 2.0 were considered as not useful/never. The computed results were presented in tabular form in chapter four for discussion. The data were presented using quantitative data format.

RESULTS AND DISCUSSION

Background Characteristics of the Respondents

The background characteristics of the students and teachers which were relevant for this study were gender, ages of the students, academic qualifications as well as teaching experience of the teachers. The gender distribution of both students and teachers used for this study are shown in Table 2.

Table 2: Gender distribution of the respondents

Gender	Students		Tutors	
	Frequency	Percentage	Frequency	Percentage
Males	74	51.0	3	75.0
Females	71	49.0	1	25.0
Total	145	100.0	4	100.0

As shown in Table 2, 51.0% of the students were males whilst 49.0% others were females. This showed that the total number of male and female students represented in the sample were almost the same. On the contrary, whilst 75.0% of the tutors were males, only 25.0% of them were females. This indicated that the male tutors teaching Agricultural Science in the Colleges of Education in the study area outnumbered the female tutors. Historically agricultural science programmes at tertiary institutions has been dominated by male learners or trainees.

The study explored the age distribution of the students used as respondents to conduct the study. Table 3 presents the age distribution of the students.

Table 3: Age distribution of the students

Age (years)	Frequency	Percentage
20 years and below	9	6.2
21 – 25	128	88.3
26 – 30	7	4.8
31 – 35	1	0.7
Total	145	100.0

The result indicated that majority (88.3%) of students used for this study were between the ages of 21- 25 years. This is so because according to Ghanaian system of education by the age of 18

years, children who were enrolled into Primary Class One at the age of six years are supposed to complete Senior High Schools (Antwi, 1992). The age of the students showed that they were in tertiary institutions and are matured enough to give the correct answers to the questions asked in the questionnaire in order to collect data for the study.

The study further sought from the students if they studied Agricultural Science in the Senior High Schools they attended before being admitted to the Colleges of Education. The responses given are summarized in Table 4.

Table 4: Students who offered Agricultural Science in Senior High Schools

Variable	Frequency	Percentage
Yes	100	69.0
No	45	31.0
Total	145	100.0

This showed that more than two-thirds (69.0%), of the students used for this study have studied Agricultural Science before and therefore were in position to tell the differences between Agricultural Science curriculum delivery and assessment in the Colleges of Education and the experiences that they had in their Senior High Schools. Those students who said they have not studied Agricultural Science in their Senior High Schools might be referring to Elective Agricultural Science subjects. Any student who wrote the West African Senior School Certificate Examination (WASSCE) did write Integrated Science. The Integrated Science has Agricultural Science component and therefore might have studied some aspects of Agricultural Science. In this case, all the students might have studied Agricultural Science whilst in their Senior High Schools attended. The highest academic qualifications of the tutors and teachers used for the study were examined during the study. Table 5 shows the academic qualifications of the tutors used for the study.

Table 5: Academic qualifications of the Agricultural Science tutors

Academic qualifications	Frequency	Percentage
First Degree (B.Ed. Agric.)	1	25.0
Second Degree (M. Ed Tr. Educ/M.Phil. Agric.)	3	75.0
Total	4	100.0

The results indicated that only a quarter of the tutors hold First Degree (25.0%). The majority, (75.0%) of the tutors teaching Agricultural Science in the Colleges of Education have a minimum qualification to teach there because they have their Second Degree per National Accreditation Board (NAB) and National Council for Tertiary Education (NCTE) requirements, following the upgrade of Colleges of Education into tertiary status. The study investigated the teaching experiences of the tutors used for the study. The teaching experiences of the tutors used to conduct the study are presented in Table 6.

Table 6: Teaching experiences of Agricultural Science tutors

Duration of teaching (years)	Frequency	Percentage
1 – 5	1	25.0
6 – 10	2	50.0
11- 15	1	25.0
Total	4	100.0

The results showed that most of the tutors (75.0%), have taught Agricultural Science in their colleges for more than five years. The long duration for which most of the tutors have taught the subject showed that they might have acquired enough experiences. These experiences might have put the tutors in position to enumerate and describe factors which affect their effective teaching of practical lessons in Agricultural Science in their colleges and schools.

Main Results of the Study and their Discussions

The Second part of chapter four presents the main results of the study and their discussions. The results were presented in response to the research questions formulated to guide the study. The results were presented using quantitative data format.

Research Question One: What factors affect effective delivery of practical Agricultural Science lessons in the Colleges of Education in the Central Region of Ghana?

The study tried to identify the factors that affect effective teaching of practical lessons in Agricultural Science in the Colleges used for the study. Agricultural Science tutors were asked to indicate the availability of key resources required for practical lessons in their colleges/schools. Table 7 summarizes the responses provided by the tutors who teach Agricultural Science in the colleges.

Table 7: Factors affecting effective teaching of practical Lessons in Agricultural Science

Type of factors	Mean	Standard deviation
Teachers’ practical and science knowledge	3.35	0.99
School farm/garden	2.30	1.08
Support of the Principal/Headmaster	2.28	0.73
Supervision of practical lessons	2.26	0.87
Tools and equipment	2.25	1.02
Inadequate amount of instructional materials	2.15	0.75
Laboratory for experiment	2.10	1.21
Funds for purchase of materials/equipment	1.90	0.41
Time for practical lessons	1.80	0.83
Use of school farm for punishment	1.65	1.14
Overall mean	2.21	0.90

It could be seen from the overall mean of 2.21 with standard deviation of 0.90 presented in Table 7 that the tutors/teachers who teach Agricultural Science in the study area have indicated that the

key resources required to conduct practical Agricultural Science lessons are not adequately available in their colleges. However the tutors/teachers' responses to the individual items in the table differs. The tutors indicated that they have adequate practical and science knowledge to conduct practical lessons (mean = 3.35; std 0.99). This suggested that the tutors have got the required practical knowledge to conduct practical lessons in their educational institutions but what might be lacking is their inability to get the needed funds and resources to conduct practical lessons. The finding that the tutors possessed the adequate practical and knowledge to teach practical lessons in the study area is inconsistent with those of Osborne and Hamzab (1999). They argued that most Agricultural Science teachers lacked good practical knowledge and skills to teach the subject effectively and therefore pose serious challenges to Agricultural education. However, the above finding of the study agreed with those of Carr and Kemmis (1996). They found that teachers' knowledge and good teaching skills provide a starting point for good teaching. It could therefore be said that the tutors/teachers used for the study have the requisite professional competence to demonstrate practical activities that are conducted on the field or laboratory if given the needed materials.

The responses provided by the tutors in Table 7, revealed that the colleges lacked adequate practical resources for the teaching of the practical lessons. This can be seen from the mean scores of the key resources needed for practical lessons which ranged from 2.30 to 2.10 with school farm/garden scoring a mean of 2.30, std 1.08, tools and equipment, 2.25; std = 1.02, inadequate instructional materials, mean = 2.15, std = 0.75 and laboratory for experiments, mean = 2.10, std = 1.21). The mean score of 2.30 to 2.10 is an indication that these key resources which are required for practical lessons are not adequately available. Tools and equipment are also required to be used for practical lessons. In the absence of the above key resources in the Colleges of Education and senior high schools in the study area, no meaningful practical lessons can be effectively conducted.

The practical activities cannot be conducted in a vacuum. The lack of resources for practical lessons observed in this study agreed with those of Kwarteng and Saah (2004) that the absence of school farm eventually limited students' ability to observe, demonstrate and acquire the needed manipulation skills needed to be obtained from practical lessons. The above findings of the study are also consistent with those of Annor-Frempong *et al.* (2003). They found that absence of tools and equipment, school farm and insufficient teaching-learning materials limit teachers' ability to conduct effective practical lessons. They recommended that no matter the type of teaching skills used by tutors and mastery of the subject knowledge by trainees they have to carry out such practical activities.

The responses of the tutors in Table 7 showed that unavailability of funds and non-allocation of time on the time table for practical lessons negatively affected their effective conduct of practical lessons in Agricultural Science. This is shown by the mean score of 1.90 with a standard deviation of 0.41 for the statement "Funds for purchase of materials/equipment are not available". The statement "Time for practical lessons" scored a mean of 1.80 with a standard deviation of 0.83 meaning it is not available on the time table.

From the two statements above, it could be inferred that there are no funds and time allocated for the conduct of practical lessons in the Colleges of Education in the study area. The absence of funds will make it difficult for the practical lessons to be carried out as indicated by Lauglo and

Norman (1997) from Kenya. They reported that Agricultural Science is a practical subject which required facilities like land, equipment and laboratory. According to Lauglo and Norman, these demand a lot of funds which may be difficult for many schools to have if not subverted by the government or public in order to facilitate the practical teaching of the subject. Saah (2007) also reiterated that Agricultural Science as a vocational subject requires adequate man, material and monetary resources for efficient and effective curriculum delivery and assessment. Lack of funds prevents schools from developing their farms with faculties; acquire equipment and materials for its operation. This is supported by UNESCO (1999) which observed that lack of financial resources hindered the expansion of faculties to carry out efficient facilitation of the teaching and learning of vocational subjects like Agriculture.

No time has been allocated on the time table for practical lessons in Agricultural Science. This means that any practical lesson conducted should be done outside class hours. A careful look at the situation in the colleges of Education in the study area showed that no serious practical lessons are conducted due to lack of resources, like equipment and school farm. The little attempts to do so may be scheduled in the afternoon after classes at the expense of private time of trainer (lecturer/tutor) and (trainees)

One other factor which negatively affected effective teaching of practical lesson in Agricultural Science is the use of school farm for punishment (mean = 1.65; std 1.14). This means that any time practical activities which involved weeding is carried out in the school farm or garden, it is perceived as a form of punishment, instead of it being considered as a worthwhile educational experience as reported by Saah (2007). This observation is in line with the work of Osborne and Hamzab (1999). They reported from Zimbabwe that the use of the school farm as a means of punishing deviant behaviour poses a major challenge to effective teaching of practical lessons especially where weeding is involved. Thus, when it comes to practical activities such as seed bed preparation and weed control in crops in the school farm; it is very difficult to get students to perform the activities since they consider them as a form of punishment.

The study further sought from the students the types of practical lessons or activities they performed or observed during practical lessons in Agricultural Science. The various practical activities likely to be performed are shown in Table 8.

Table 8: Types of practical lessons performed by students

Type of Activity	Always		Sometimes		Never		Mean	Std.
	Freq.	%	Freq.	%	Freq.	%		
Castration of farm animals	0	0.0	3	2.1	142	97.9	1.02	0.14
Debeaking of birds	0	0.0	0	0.0	145	100.0	1.00	0.0
Dehorning of farm animals	0	0.0	0	0.0	145	100.0	1.00	0.0
Keeping of farm records	1	0.7	8	5.5	136	93.8	1.07	0.28
Observation of pests and Diseases of crops	1	0.7	7	4.8	137	94.5	1.06	0.27
Pricking out and thinning	0	0.0	27	18.6	118	81.4	1.19	0.39
Identification of soil profile	1	0.7	42	29.0	102	70.3	1.30	0.48
Preparation of seed bed	0	0.0	37	25.5	108	74.5	1.26	0.43

Nursing of seeds	0	0.0	30	20.7	115	79.3	1.21	0.41
Identification of common breeds of farm animals	0	0.0	8	5.5	137	94.5	1.06	0.23
Performing germination test	1	0.7	3	2.1	141	97.2	1.03	0.22
Fertilizer application	2	1.4	46	31.4	97	66.9	1.34	0.51
Pruning of tomato	1	0.7	2	1.4	142	97.9	1.03	0.20
Establishing of lawns	1	0.7	12	8.3	132	97.0	1.10	0.32
Harvesting of cereals and Legumes	1	0.7	7	4.8	137	94.5	1.06	0.27
Observation and identification of Farm equipment	1	0.7	50	34.5	94	64.8	1.36	0.49
Visit of an established Fish pond	1	0.7	25	17.2	119	82.1	1.19	0.45

As shown in Table 8, students were presented with 17 different practical activities to show their frequency of performing these activities. The results in Table 8 indicated that majority of the students stated that they never performed these activities during their practical lessons. The responses range from 64.8% for, observation and identification of farm equipment, to 100.0%, for debeaking of birds/dehorning of farm animals. There were only few instances in which students indicated that they sometimes perform the practical activities presented in Table 8. For instance, 31.7% of the students said they sometimes do fertilizer application whilst 29.0% of students indicated that they sometimes do identification of soil profiles. One student each in some instances said they always do the practical activities. Those students who said sometimes and always they do the practical activities might not be giving the right responses or they might have carried out the practical activities outside their institutions. This might be true because some of the students might have come from farming communities where some of the practical activities are carried out on their parents' farm.

Those students who provided always and sometimes responses might have took part in the practical activities during their family farm activities. For, a college or school cannot practice fertilizer application when they do not have school farm/garden. This result of the study confirmed those of Obeng (2009) who reiterated that some students come to colleges and schools with practical experiences they have gained from traditional agriculture practices they carried out at home with their parents. Thus, most of the practical activities reported by the students which they said are always and sometimes carried out might be referring to those traditional practical activities they carried out at home. Majority of the students said they never did practical activities in their colleges of Education.

Research Question Two: To what extent do the practical activities have an impact on the students' learning of Agricultural Science in the study area?

The study investigated the impact of the practical activities on the students' learning of Agricultural Science in the study area. Students were presented with seven statements on importance of practical lessons to them and asked to indicate how relevant these statements are to their learning. Table 9 summarizes the relevance of the statements to the students' learning of Agricultural Science.

Table 9: Impact of Practical Lessons to Students' Learning

Impact	Mean	Std.
Development of interest in agriculture as a vocation	3.86	0.37
Development of process skills	3.79	0.49
Understanding and retention of concepts taught in the theory	3.74	0.46
Acquisition of practical and manipulative skills	3.72	0.47
Planning skills of students	3.70	0.47
Development of sense of initiative and managerial ability	3.68	0.48
Improvement of positive attitude towards Agricultural Science	3.60	0.51
Overall mean	3.73	0.46

The results shown in Table 9 generally indicated that practical lessons are very important to their learning of Agricultural Science; with an overall mean score of 3.73 and standard deviation of 0.46. Responses to the individual statements, however, showed different degrees of importance of the practical activities to the students' learning of Agricultural Science.

The students' responses showed that all the seven statements about relevance of practical activities to students learning of Agricultural Science are very important to them. The relevance of the practical lessons to students' development of interest in agriculture as vocation scored the highest mean of 3.86 with a standard deviation of 0.37 whilst improvement of positive attitude towards Agricultural Science scored the least mean of 3.60, with a standard deviation of 0.51. From these findings of the study, the practical lessons are very important to the students' learning of Agricultural Science.

The relevance of practical lessons and its impact on students' learning of Agricultural Science as found in this study is consistent with those of Saah (2007), and Youdeowei and Akinwumi (1995). They found that the inclusion of practical work in the learning of Agricultural Science have several benefits to the students. Among the benefits they identified were: providing an opportunity for students to plan their work, develop sense of initiative and managerial ability to work on the farm, motivate students to develop interest in agriculture as a vocation and enhances retention of what students have learnt in the theory. The results are also in line with earlier reports of Clark (2002) and Saah (2007). They reiterated that there is a direct transfer from the practical activities to the students' learning of concepts and practical activities and it almost always improved students' attitude to and enjoyment of Agricultural Science. They also argued that the process skills can effectively be taught by practical activities.

The study looked at the attitudes of students towards practical lessons from the perspective of the tutors, even though students have acknowledged the numerous benefits of practical activities to their learning of Agricultural Science. The attitudes of the students towards practical lessons from the perspectives of the tutors are shown in Table 10.

Table 10: Tutor's perspective of students' attitudes towards practical lessons

Statement	Mean	Std
Students consider practical lessons as drudgery, laborious	3.20	0.70
Students look down on Agricultural Science in their Colleges	2.70	0.80
Students enjoy Agricultural Science practical lessons	1.60	0.75
Students participate actively in practical lessons in their Colleges	1.55	0.89
Students are involved in planning practical activities in their colleges	1.30	0.73
Overall mean	2.07	0.77

As shown in Table 10, the overall mean of 2.07 with a standard deviation of 0.77 indicated that the tutors disagreed to the five statements related to the attitudes of students towards practical lessons. The teachers' responses to the various statements showed different levels of agreement and disagreement to the statements about students' attitudes towards practical lessons.

The tutors strongly agreed that their students consider practical lessons as drudgery, laborious and shy away from it (mean = 3.20; std = 0.70). The tutors also agreed that students look down on Agricultural Science in their colleges (mean = 2.70; std = 0.80). From the study, the tutors need to improve the attitude of the students by clearly defining the objectives of every practical field activity carried out. This will change the perception of the students and make them get involved in all the practical field work as recommended by Saah (2007). Another way to change the negative attitude of the students towards practical lessons is to get them involved in the planning of the practical lessons. However, the tutors strongly disagreed that students should be involved in the planning of the practical activities in their colleges/schools (mean = 1.30; std = 0.73). However, students' involvement in planning every stage of the practical lessons will arouse their interest in the practical lessons in order to achieve the desired impact which they have said earlier is relevant to their learning of Agricultural Science.

Furthermore, the tutors strongly disagreed that students enjoy Agricultural Science practical lessons (mean = 1.60; std = 0.75) and participate actively in them at their colleges (mean = 1.55; std = 0.89). The poor attitudes of the students could be linked to their consideration of Agricultural Science practical lessons as drudgery and laborious. The poor perceptions of the students towards practical lessons may be due to parental influences as reported by Badmus (2007). Badmus reported that most parents waged war against their wads getting involved in manual work which is a common feature of practical lessons in agriculture.

Research Question Three: How can effective delivery of practical Agricultural Science lessons in the Colleges of Education in the study area be achieved?

The study sought from the tutors and their students some suggestions they think can be used to improve the conduct of practical lessons in their colleges in the study area. Table 11 shows the suggestions given by the students.

Table 11: Students’ suggestions to improve practical lessons

Types of suggestion	Mean	Std
Adequate time should be allocated on the time table for practical lessons	3.88	0.32
Clear and well defined objectives of practical activities should be stated	3.85	0.36
Scientific and modern practices should be introduced into practical lessons	3.79	0.42
Proper provision of simple farm tools and equipment for practical lessons	3.79	0.41
Laboratory should be involved in planning practical lessons	3.68	0.51
School farms should not be used as a means of punishing deviant students	3.50	0.86
Students should be given part of the proceeds from practical activities as incentives and motivation	3.48	0.65
Overall mean	3.73	0.48

Students strongly agreed to all the nine suggestions related to improvement of practical lessons presented to them with an overall mean of 3.73 and standard deviation of 0.48. The responses to individual statements, however, showed different levels of agreement to the statements. The students’ responses to the individual statements which scored the highest mean of 3.88 was “Adequate time should be allocated on the time table for practical lessons” with the statement “students should be given part of the proceeds from practical activities as incentives and motivation” scoring the least mean of 3.48 with standard deviation of 0.86. The mean range of 3.88 to 3.48 showed that the students strongly agreed and supported the nine suggestions. This means that if the college/school authorities including the Agricultural Science tutors/teachers should implement suggestions such as stating clearly, well defined objectives of practical activities, doing proper supervision and assessment of practical lessons, students’ negative attitude towards practical lessons will change and enhance students’ interest and active participation in the field activities. When this is achieved, effective practical lessons could be conducted in the colleges of Education in the study area. The suggestions strongly agreed to by the students are in line with those suggested by Barrack and Doerfort (1999), and Saah (2007). They suggested to Agricultural Science tutors that to reduce students’ apathy to field work, they should define the objectives of the practical activities clearly and explain it to the students what they will do during practical lessons, provide the requisite tools, materials and equipment, supervise, assess all practical activities and award marks. When these suggestions are followed,

students would consider the practical activities as worthwhile components of the subject and therefore take it seriously. The tutors' suggestions provided to improve the teaching and learning of practical lessons during Agricultural Science are presented in Table 12.

Table 12: Tutors' suggestions to improve practical lessons

Suggestions	Very useful		Useful		Not useful		Mean	Std
	Freq	%	Freq	%	Freq	%		
Tutors should develop positive attitude towards practical lessons	3	75.0	1	25.0	0	0.0	2.95	0.22
Practical and risk allowances should be given to Agricultural Science teachers to motivate them	4	100.0	0	0.0	0	0.0	2.90	0.31
Planning effective, relevant and interesting practical lessons	3	75.0	1	25.0	0	0.0	2.80	0.41
Develop and supervise practical lessons	3	75.0	1	25.0	0	0.0	2.75	0.55
Involve students in planning and execution of practical lessons	2	50.0	2	50.0	0	0.0	2.55	0.51
Teachers should use improvised materials for practical lessons	2	50.0	1	25.0	1	25.0	2.45	0.70

Table 12 indicated that majority of the tutors used for this study have agreed that all the six suggestions presented to them on improvement of practical lessons are very useful to them for effective conduct of future practical Agricultural Science lessons. 75.0% of the tutors said that the development of positive attitude towards practical lessons will be very useful to improve future practical lessons. Tutors' interest in practical lessons is very useful for effective teaching or facilitation of practical activities. This finding of the study agrees with those of Camp *et al*, (2002). They argued that some of the Agricultural Science teachers tend to pity themselves and show negative attitude towards their work. The negative attitudes exhibited by the teachers tend to affect their effective teaching of the practical lessons.

Another suggestion that the tutors found to be very useful to the improvement and effective delivery of practical lessons was provision of risk allowances. Whilst 100.0% of the tutors found provision of risk allowances to be very useful for effective teaching of practical lessons, the tutors opined that provision of risk allowance will motivate them to conduct practical lessons very effectively, no matter the challenges that may confront them. Absence of risk allowance to Agricultural Science tutors which lowers their morale has been reported by BaffourAwuah (1996), who found that there is very little, or no motivation or incentives for teachers of Agriculture, who are required to spend extra time in the garden to look after the plants and animals during weekends and holidays. The absence of motivation leads to low morale of the tutors. This makes the tutors to teach the subject anyhow especially the practical aspects.

Majority of the teachers, (75.0%) found the suggestion of “planning effective, relevant and interesting practical lessons and “involving students in the planning and execution of practical lessons” respectively to be very useful to their effective teaching of practical activities in the future. When students are involved in the planning of what they are to do, all negative perceptions and apathy are dispelled and effective execution of the programme is effectively carried out. Agricultural Science tutors need to involve their students in the planning of practical activities especially when each activity is to be carried out and how it should be carried out as suggested by Pontius et al, (2002). Five key principles that Pontius, Dilts and Bartlett (2002) stated that need to be observed when planning for field work for students studying Agricultural Science in colleges are what is relevant and meaningful is decided by the learners and must be discovered by the learners. Students are to be assisted to explore and discover the personal meaning of events from their own perspectives”. Learners are, therefore, to be involved in deciding what they are to do when it comes to practical lessons in Agricultural Science.

Furthermore, 75.0% of the tutors agreed that it was very useful for practical lessons to be supervised. The supervision will make the practical lessons to worth an educational experience. The suggestion found in the present study is in line with those of Saah (2007) who reported that “all practical activities in college curriculum should be supervised, assessed and marks awarded.

One of the issues that lead to students’ development of negative attitudes towards practical lessons in Agricultural Science is the use of the same traditional practices carried out in homes for school practical lessons. The suggestion that “tutors should use scientific and improved materials for practical lessons by 50.0% of the tutors are very useful suggestions Agricultural science is a science subject and therefore most of the practices carried out should bear scientific inclination. Thus, scientific approaches should be used for agricultural practical activities carried out in Colleges of Education in the study area.

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APPENDIX A

QUESTIONNAIRE FOR AGRICULTURAL SCIENCE TUTORS

This questionnaire has been designed to identify factors affecting effective delivery of practical Agricultural Science Lessons in the Colleges of Education in the Central Region of Ghana.

Instruction: Please, read through the following items on this questionnaire and provide the appropriate responses which are applicable to your situation. Responses provided would be treated with uttermost confidentiality.

A. Background of the Tutors

1. Name of your College?
 - a) OLA College []
 - b) Komenda College []
 - c) Foso College []
2. What is your gender?
 - a) Female []
 - b) Male []
3. What is your highest academic qualification?
 - a) First Degree []
 - b) Second Degree []
 - c) Ph.D Degree []
 - d) Any others (please state).....
4. How long have you been teaching Agricultural Science in your College?
 - a) 1 – 5 years []
 - b) 6 – 10 years []
 - c) 11 – 15 years []
 - d) 16 – 20 years []
 - e) Above 20 years []

B. Factors Affecting Effective conduct of Agricultural Science Practical lessons

State the extent to which the following factors are available for the conduct of effective practical lessons in Agricultural Science in your College of Education. Use Adequately Available (4), Available (3), Not Adequately Available (2), and Not Available (1) for your answers.

Type of factor	Very Adequate	Adequate	Very Inadequate
Adequate	(3)	Inadequate	Inadequate
	(4)	(2)	(1)

-
5. Funds for purchase of consumables and other
-

resources	[]	[]	[]	[]
6. Tools and equipment	[]	[]	[]	[]
7. School farm / garden	[]	[]	[]	[]
8. Adequate amount of instructional materials	[]	[]	[]	[]
9. Teachers' Practical and Science knowledge	[]	[]	[]	[]
10. Laboratory for experiment	[]	[]	[]	[]
11. Support of the principal	[]	[]	[]	[]
12. Time for practical lessons	[]	[]	[]	[]
13. Supervision of practical lessons	[]	[]	[]	[]
14. Use of school farm as punishment	[]	[]	[]	[]

C. Attitudes of Students towards Practical Lessons.

To what extent do you agree or disagree to the following statements which negatively influence students' attitude towards Agricultural Science Practical Lessons. Use Strongly Agreed (4), Agreed (3), Disagreed (2) and Strongly Disagreed (1) for your responses.

Statements	Strongly Agreed (4)	Agreed (3)	Disagreed (2)	Strongly Disagreed (1)
15. Students consider practical work as drudgery, laborious and shy away from it	[]	[]	[]	[]
16. Students look down on Agricultural Science in your College	[]	[]	[]	[]
17. Students enjoy Agricultural Science Practical Lessons	[]	[]	[]	[]
18. Students participate actively in practical lessons in their Colleges	[]	[]	[]	[]
19. Students are involved in planning practical activities in their colleges	[]	[]	[]	[]

D. Suggestions to Improve Practical Lessons in Agriculture

Indicate how these suggestions would be useful to your conduct of future Agricultural Science Practical Lessons. Use Very Useful (3), Useful (2) and Not Useful (1) for your answers.

Suggestions	Very useful (3)	Useful (2)	Not Useful (1)
20. Develop and Supervise practical lessons	[]	[]	[]
21. Involve students in planning and execution of practical lessons	[]	[]	[]
22. Planning effective and relevant interesting practical lessons	[]	[]	[]
23. Teachers should develop positive attitudes towards practical lessons	[]	[]	[]
24. Teachers should use improvised materials for practical lessons	[]	[]	[]
25. Practical and risk allowances should be given to Agricultural Science teachers to motivate them.	[]	[]	[]

APPENDIX B

QUESTIONNAIRE FOR STUDENTS

This questionnaire is designed to examine factors affecting effective conduct of practical lessons in Agricultural Science in the Colleges of Education in the Central Region of Ghana.

Instruction: Read the items on this questionnaire and provide your responses according to our situation. Answers provided would be treated as confidential materials. Only one response should be ticked [] for each item.

A. Demographic Characteristics of the Students

1. Name of your College
 - a) OLA College []
 - b) Komenda College []
 - c) Foso College []
2. What is your gender?
 - a) Male []
 - b) Female []
3. How old are you?
 - a) 20 years and below []
 - b) 21 – 25 years []

- c) 26 – 30 years []
 d) 31 – 35 years []
 e) Above 35 years []

4. Did you study Agricultural Science in your Senior High School which you attended?

- a) Yes []
 b) No []

B. Types of Practical lessons or Activities performed / observed.

State how often you have observed or performed the following practical activities in your College during Agricultural Science lessons. Use Always (3), Sometimes (2), and Never (1) for your responses.

Type of Practical Activity	Always (3)	Sometimes (2)	Never (1)
5. Castration of farm animals	[]	[]	[]
6. Debeaking of birds	[]	[]	[]
7. Dehorning of farm animals	[]	[]	[]
8. Keeping of farm records	[]	[]	[]
9. Observation of pests and diseases of crops	[]	[]	[]
10. Pricking out and thinning	[]	[]	[]
11. Identification of Soil profile	[]	[]	[]
12. Preparation of seed bed	[]	[]	[]
13. Nursing of seeds	[]	[]	[]
14. Identification of common breeds of farm animals	[]	[]	[]
15. Performing germination test	[]	[]	[]
16. Fertilizer application	[]	[]	[]
17. Pruning of tomato	[]	[]	[]
18. Establishing of lawns	[]	[]	[]
19. Harvesting of Cereals and legumes	[]	[]	[]
20. Observation and Identification of farm equipment	[]	[]	[]
21. Visit to an established fish pond	[]	[]	[]

C. Importance of Practical lessons to student's learning

Shows how important are the following practical lesson to you as an Agricultural Science Student. Use Very Important (4), Important (3), Not Important (2), and Not Very Important (1) for your responses.

Importance	Very Important	Important	Not Important	Not Very Important
	(4)	(3)	(2)	(1)
22. Development of process skill	[]	[]	[]	[]
23. Improvement of positive attitude towards science	[]	[]	[]	[]
24. Planning skills of students	[]	[]	[]	[]
25. Development of sense of initiative and managerial ability	[]	[]	[]	[]
26. Development of interest in Agriculture as a vocation	[]	[]	[]	[]
27. Acquisition of practical and manipulative skills	[]	[]	[]	[]
28. Understanding and retention of concepts taught in the theory	[]	[]	[]	[]

D. Suggestions to Improve/ Conduct of Effective Practical lessons

Indicate the extent to which you agreed or disagreed to how the following suggestions can help to improve effective conduct of practical lessons in Agricultural Science in your College. The following responses should be used for your answers: Strongly Agreed (4), Agreed (3) Disagreed (2) and Strongly Disagreed (1).

Suggested practices	Strongly Agreed	Agreed	Disagreed	Strongly Disagreed
	(4)	(3)	(2)	(1)
29. Clear and well defined objectives of practical activities should be stated	[]	[]	[]	[]
30. Proper provision of simple farm tools and equipment for practical lessons	[]	[]	[]	[]
31. Proper supervision and assessment of practical lesson	[]	[]	[]	[]
32. Adequate time should be allocated on the time table for practical lessons	[]	[]	[]	[]
33. Students should be involved in planning practical lessons	[]	[]	[]	[]
34. Laboratory should be provide for	[]	[]	[]	[]

-
- conduct of experiments [] [] [] []
35. Students should be given part
of the proceeds from practical
activities as incentives and motivation [] [] [] []
36. School farms should not be used
as a means of punishing
deviant students [] [] [] []
37. Scientific and Modern practices
should introduce into practical lessons. [] [] [] []

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