JER

JOURNAL OF EDUCATIONAL REVIEW
VOL. 14. N0 1, January- June 2022

IMPACT OF TEACHERS' PEDAGOGICAL SKILLS ON TEACHING AND LEARNING OF PRACTICAL AGRICULTURE IN SENIOR HIGH SCHOOLS IN THE SAGNERIGU DISTRICT OF NORTHERN GHANA

Afishata Mohammed Abujaja 1, Ernest Abdulai Annadumba 2, Hudu Zakaria 3
1,2 Department of Agricultural and Consumer Sciences Education, Faculty of Education, University for Development Studies, Tamale, Ghana Box TL 1882
3 Department of Agricultural Innovation Communication, Faculty of Agriculture, Food and Consumer Sciences, University for Development Studies, Tamale, Ghana Box 1882

Abstract
This paper examined the effects of teachers' pedagogical skills on the teaching and learning of practical agriculture in Senior High Schools (SHSs) in the Sagnerigu Municipality of the Northern region of Ghana. Through a multi-stage sampling technique 120 students, 15 teachers and 3 heads of departments of agriculture were sampled and interviewed with semi-structure questionnaire. From the analysis of data collected from the sampled respondents, five teaching methods namely demonstrations (78.5%), discussion (78.6%), questions and answers (71.4%), project work (50.0%) and experiments (50.0%) were the main methods used in teaching practical agriculture. The analysis of the surveyed data also reveals significant relationship between students' interest in agriculture and the attitudes of teachers during lessons (μ= 69.21, SD = 9.65). Inadequate funds, insufficient tools/equipment, short duration of practical lessons in addition to poor community-school relationship were the problems encountered in organizing agricultural science practical in schools. It is recommended for teachers to adopt positive attitude and use varying methods in teaching practical lessons in order to arouse students' interest and skills competency. It is also recommended to the Ghana Education Service to help in equipping SHSs running agriculture science programmes with needed tools and equipment for effective teaching and learning of agricultural practices.

Keywords: *Pedagogical Skills; Practical Agriculture; Teaching and Learning;*

Introduction

Notwithstanding the fact that agricultural sector's contribution to Ghana's Gross Domestic Production (GDP) has been in decline over the last decade the sector continues to provide employment for majority of Ghanaian labour force (GOG, 2020; MOFA, 2019). The sector by way of definition comprises of a wide array of existing and potential activities including; crop production, livestock rearing, fisheries, food processing, plantation development, horticulture and many more.

The teaching of a course is guided by pedagogy. However, there is a gap in knowledge on how pedagogy influences teaching which will serve as a benchmark for assessing learning of agriculture science. According to Anna and Neil (2005) a teacher needs to reflect on the practice, knowledge and theories relating to the subject matter being taught. And this should inform the selection of methods, techniques and teaching and learning materials required to achieve effective teaching and learning.

The structure of the SHS's curriculum for agriculture science was designed to prepare students adequately to either continue to the tertiary level or terminate into a career in agriculture (GES, 2010). As such it is both continuation and terminal curriculum as students after SHS could choose not to continue to the tertiary level but go into a career in any of the areas of agriculture. However, it has been earlier established in Akinmade (2002) and later Asiamah (2012) in that interest in agriculture as a career has consistently been low among the young generation and even among students pursuing agricultural science in SHSs. This paints a gloomy picture for the practice of agriculture in future. Asiamah, (2012) posited that, the drifting away of young people from agricultural knowledge and rural

life skills at basic level will rob agriculture and the prospect of the country making gains in its agricultural revolution. Akinmade (2002) attributed the low interest in agricultural career among young people to the use of traditional approaches to teaching (i.e., talk and chalk method). Martin (2012) also bemoaned the agricultural science is being taught in school. He observed that agriculture is a practical subject which is no longer attractive enough to influence the interest of students to practically applying it and building career out of it. However, the exist curricular, modules, theories and practical guides that serve as references for subject teachers.

However, Anna and Neil (2005) identified several factors as being responsible for the low skill competence and interest of young graduates in agricultural career as including workload of teachers in formal schools, lack of reform efforts in teacher education programmes, the socio-demographic characteristics of the teacher in the education faculty, the research productivity of the education faculty. A study on the subject of youth in agriculture showed limited participation of the youth as the factor associated with movement of the youth from agriculture (Beyuo and Bagson, 2013). However, there is little or no information on teachers' pedagogical approaches and their impact on teaching and learning especially in the Northern Region of Ghana. Therefore, the issue of teachers' pedagogical approach to the practical teaching of agriculture is not adequately been addressed in available literature. As the primary objective of this study is emphasized on the contribution of current teaching and learning styles being used in the teaching and learning of agricultural science in SHSs.

The Pedagogy Theories and the Practical Agriculture Teaching

Pedagogy means that teachers assist students continuously through interaction and activity in the ongoing social events of the classroom including all exchanges that teachers have with their students, not only in lessons but also learn about their students' homes and communities to understand how to draw on local forms of knowledge for academic learning (Konig et al., 2011; Shavelson & Stern, 1981; Shulman, 1987). Pedagogy had long been applied to the concepts and findings of research that show promises for all students' achievement, such as; communities of learners, language development, guided participation, emergent literacy, forms of knowledge, cultural compatibility and instructional conversation (Brown and Campione, 1996; Cobb, 1994; González et al., 1993; McLaughlin and Talbert, 2006; Purcell-Gates, 1995; Rogoff et al., 1996; Tharp and Gallimore, 1988; Vogt, Jordan, and Tharp, 1992). These pedagogical approaches, like other innovations are effective or ineffective depending on the following factors such as presence of resources and supports for teachers' and the capacity of schools for such activity (Darling-Hammond, 1997).

This pedagogical movement as it was demonstrated in many classrooms, complements the efforts of standards-based reforms. The standards for pedagogy to be discussed here are drawn from educational research and current practice in the classroom. The promise of new pedagogy is academic success for all students because the school undertakes to teach all that its students need to know. For a long time, there have been emphases on collaboration, communication, and community for teaching and learning focused on the role of social and cultural factors in student achievement (Brown and Campione, 1994, 1996; Cobb, 1994; Rogoff, Matusov, and White, 1996; Tharp and Gallimore, 1988; Vygotsky, 1978). In addition, sociocultural theory and activity theory have expanded definitions of teaching and learning to emphasize their social, cultural, language, and political contexts (Leont'ev, 1981; Moll, 1990; Rogoff et al., 1996; Tharp and Gallimore, 1988; Vygotsky, 1978). In these theories, learning is an active, collaborative process of knowledge construction located in the interactions of teacher and students, in the social structures of classrooms, and in the larger institution of the school. International food policy research institute (IFPRI) in (2001) stressed why investment in human resources as a means of revamping agricultural sector and achieving sustainable food security as one of the major challenges facing the third world nations.

According Bonwell & Eison, 1991, student's learning outcome (performance, skills, or student interest in subject) is an integral function of both teaching and learning. The teaching methods adopted in agriculture learning are as follows; lecture, demonstration, discussion, problem-solving, field trips, role play or dramatization, project-based, workshop and activity methods. Each of these influences student's performances by how they impart on learning (Thompson, Soyibo, 2002; Abujaja, & Nyarko, 2016).

Lecture Method: The lecture method is mostly applied in tertiary institutions where students are abreast with course content beforehand. It involves the passive process by which a teacher presents fact, figures, principles, or subject content with students making notes on their own. However, when applicable risk taking and problem solving are left

out of learning, students soon forget (Scott, 2005). The method suppresses creativity and participation. Students resort to memorization of content that are not properly espoused. Rogue memorization is often the focus as in the lecture method. This results in loss in learning and this type of knowledge is too soon discarded (Hoque, 2018; Sonmez, 2018).

Demonstration Method: In the demonstration method the teacher Shows, tell or do something for students to observe. Here too, the teacher is the principal performer (Abujaja and Nyarko, 2016). This approach is used to teach a skill or when time and equipment are insufficient. This is not suitable for large classes and evaluating student's learning because they are mostly passive recipients.

Experiential Learning: Experiential learning captures all student-based activity methods like projects, role play or drama, supervised practice or workshops etc. In using these methods, students learn through reflection on experiences and develop reasoning and problem-solving skills (Hoque, 2018; Sonmez, 2018). The focus of experimental learning is to provide students with primary experiences through hands-on activities (Scott, 2005). Experiences come as a result of interacting with something (Schmidt, 2010; Hohr, 2012; Pacho, 2015). This is the same when Problem Based Learning (PBL) approaches are used. Now one controversy is whether to teach theory before practical or the vice versa. On that note (Scott, 2005) states that theory before practical indirectly tells the student what to do thus, aspects such as problem solving, meaning and interest are lost. An ounce of experience is better than tons of theory because experience verifies theory (Schmidt, 2010; Hohr, 2012; Pacho, 2015).

Modular Approach: The modular approach uses a series of small steps designed to lead a learner through self-instruction (as is the case of modules and blocks). This is best adopted when multi-disciplinary subjects are to be learnt. Eventually this can lead to complex knowledge and sustainable skills (Sadiq, 2014). This is usually used with the problem-solving approach (Problem Based Learning, PBL) to ensure effective learning by students.

However, another body of knowledge is encouraging transformational pedagogy amidst the other teaching and learning approaches (Obanya, 2008). This approach over-steps the objective of optimum student learning or interest to encompass a scenario where student's capacity is built in course of teaching to be able to handle real-world tasks and problems.

Conceptual Framework on Teachers' Pedagogical Practice

The adopted Cruikshank's Model of Inquiry in pre-service teacher education in conceptualizing the issues, concepts and variables being studied. As such Cruikshank's Model is used in this study as a conceptual framework since it covers both student and teacher related contributions to learning. This model portrays five (5) concepts: teachers/educators related features, teacher educating students' issues, contexts where teacher preparation takes place, content of the teacher preparation or curriculum, and instruction process. These five concepts are visualized to interact in ultimately influence the sixth concept which is student outcomes or in our instance student's interest in Agriculture.

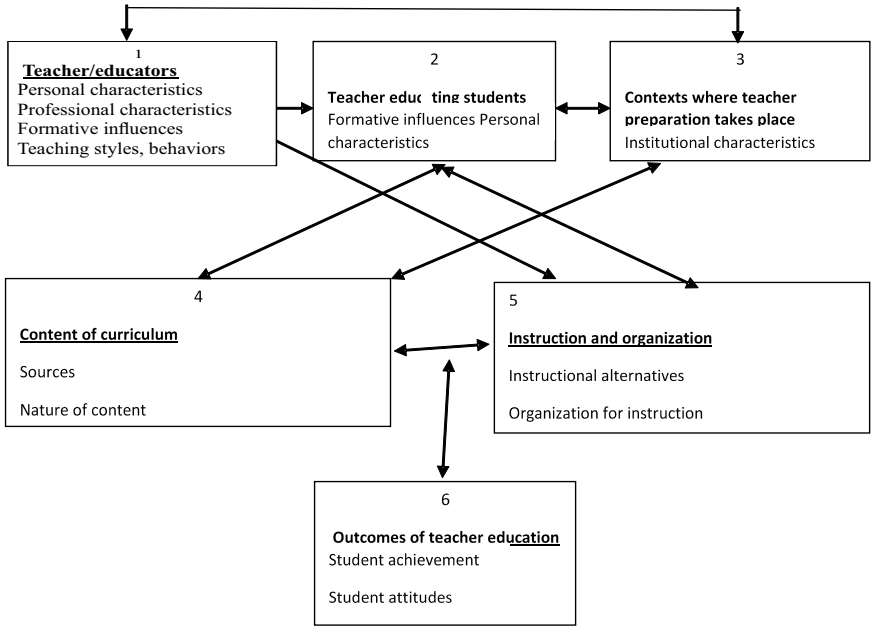

Figure 1. Cruikshank' Model to Guide Inquiry in Pı service Teacher Education

Source: Anna and Neil (2005)

The immediate determinants of student achievement/interest/performance are the curriculum related factors and the mode of teaching. These two immediate factors are also dependent on the following underlining factors; teachers' practices during lessons, the teacher in class influences and the context of teacher preparation. The first variable is teachers' practices during lessons; this entails personal and professional characteristics of the teacher. This part can be coined as teacher quality to deliver suitable output for the benefits of students in the field of agriculture. An essential component of a quality teacher is knowledge in pedagogy and pedagogical content (Anna and Neil, 2005). The textbooks, curriculum, and practical guides (pedagogical knowledge) used in an agriculture education program is an important contributing factor in the knowledge, and ultimately the quality of teachers in educating students.

Teachers draw upon pedagogical knowledge to create learning environments and teach students. Teachers need to have knowledge of the teacher's role as the mediator in student learning, instructional strategies to promote active cognitive processing of the content, classroom environments that foster learning and assessment methods that monitor students' thinking (Borko and Putnam, 1996). The concept of teacher knowledge plays a critical role in how one views teaching and learning and how teaching performances are enacted (Munby, Russell, and Martin, 2001).

According to Anna and Neil, (2005), there are seven conceptualized models that summarize the pedagogies used by teachers and other stakeholders in agricultural education:

1. Develop lesson/practical plans, organize content and its delivery (Hedges, 2000; National Council for Agricultural Education [NCAE], 2000)
2. Use innovative approaches that create and maintain student interests
3. Motivate students by emphasizing usefulness of knowledge and skills in meeting student needs
4. While teaching use problem solving approaches, give clear explanations, use effective questioning and promote critical thinking in the learners and use a variety of teaching methods
5. Involve students in activities; encourage students to apply knowledge and practical skills to solving real world agricultural problems
6. Develop a closer relationship with students, modify student behaviors in the classroom, and guide students' interpersonal relationships.
7. Monitor and evaluate learning

Teacher qualification according to (Modebelu et al., 2013), matter a lot in achieving quality teaching and learning of agriculture science. Currently, teaching of the course is more theoretical than practical. One factor that accounts for this is insufficient facilities and poor means of updating knowledge for teachers in institutions.

Methodology

This section presents description of the study area, the study design, sampling procedure and data collection methods. The study was conducted in SHSs from the Sagnarigu Municipality of the northern region. The Sagnarigu municipal which is part of the Tamale cosmopolitan area has many educational institutions including second cycle and tertiary institutions. As such it was considered appropriate for this study. The study employed a cross-sectional survey design in which data was collected from a sampled of the population. This study design provides an avenue for the exploration of both determinant-factors and effect-factors within the same study period with no need for periodic follow up (Olsen and Diane, 2004).

The major dependent variable was student interest in agriculture as a programme and a career. This was measured by assessing students' performance in the past term, their intent to pursue a career in agriculture and having an outright passion or interest in the field. Other factors that had an influence on students' interest were thus referred to as predictor variables and will be discussed as independent variables. The independent variables were socio-cultural background of students, personal characteristics of teachers, existing teaching tools and methods and the institutional capacity of schools to run practical agriculture. were compared with the interest of students in agriculture to establish linkages and associations. The study was open to other emerging factors not considered in the design of the research data collection tools.

Senior High Schools students pursuing agriculture were the primary respondents in this research. Specifically, second year students were the main target population. At that level, students were settled for the study of the real course in general agriculture, horticulture, crop husbandry or animal husbandry after the first-year preliminary study of the core subjects. Beside this, cohort of students was suspected to have learned materials up to the middle

of the third year SHS curriculum. So, it was expected that second year students would have had working knowledge of general agriculture as a whole and practical agriculture too. These considerations would ensure accuracy of responses during the data collection process. Other respondents that were included in the study were Agriculture Science teachers and the heads of the respective Agriculture Science departments in the selected schools.

Purposive sampling technique was used to select three (3) Senior High Schools in the district. These schools offered General Agriculture or Horticulture as programmes of study. Convenience sampling was then used to select forty (40) students from each of the schools. In addition to students selected, ten (10) Agriculture Science teachers and three (3) head of Agriculture Science departments were engaged per school. The targeted schools were Tamale Senior High, Islamic Senior High and Kalpohin Senior High School.

One hundred and fifty-three (153) students were sampled for this research. Out of this number forty (40) SHS two agriculture science students I each school, ten (10) were agricultural science teachers and one (1) head of department per school. Given that there are three selected SHSs in the district with each yielding fifty-one (51) respondents, the total study population was calculated to be one hundred and fifty-three (153). However, using Synecdor and Cochran's formular of sample size determination with the current pass rate in the subject as a proxy for student interest, the estimated sample size was deduced as follows;

$$N = \frac{z2 * p (1-p)}{m2}$$

Where:

N = Population size

p = proportion of students that passed in the subject of agriculture in 2014 (used as a proxy for student interest in the subject). p = 99%

z = the confidence level adopted in the study z=1.96 (95% confidence level)

m= acceptable level of error in the study (also known as the margin of error) m = 0.05 meaning 5% acceptable error level in study findings.

However, all Agriculture Science departments in the various schools had less than 10 agriculture-based teachers. Thus, the actual number of study respondents was reduced to 120 students, 15 teachers and 3 HODs.

Interviews were the method used to collect data with interview guides and semi structured questionnaires as tools. Triangulation was also adopted to ensure consistency of responses. This was so because data was taken from three different sources on the same recurring themes. Students provided responses for the assessment of their interest in agriculture, the practice of practical agriculture, ratings of their instructor's attributes during lesson sessions among others. Agricultural science teachers reported on the teaching methods they used versus the ones they preferred, challenges and coping measures in organizing practical agriculture and the approaches adopted to encourage students.

The Head of the Agriculture Science departments in each school answered questions that defined the capacity of their schools to run practical agriculture. Some of those questions included areas practical were organized, what is done about the remaining areas, sources of funds for the department, accessibility of these funds to organize practical and the community's support for practical agriculture.

The questionnaire provided a medium for the collection of both closed ended responses (Yes or No type, multi-option type and 5-Likert –type scales) and open-ended responses (these elicited reasons, explanations, perceptions, opinions, and other in-depth qualitative findings). Three questionnaire types were designed. Separate questionnaires were designed for each of the categories (i.e., students, teachers, and heads of department).

lso, there was an assessment of students' performance in Agriculture by taking their most recent scores in the subject. The most recent scores on other subjects were also collected for comparative purposes. These scores were taken with the assumption that scores in the subject Agriculture is a valid indication of the student's personal interests in the field of Agriculture. The same assumption applies to the collection of scores of mathematics, integrated science, social studies, economics, business management to mention but a few.

The questionnaires were pre-tested before the actual data collection. The purpose was to identify questions that were poorly understood, ambiguous, or evoked hostile or other undesirable responses. A pre-test was carried out using the same procedures that were finally used in administering the questionnaires. The respondents were asked to provide feedback and the items were then revised in the light of their comments. Pre- testing was carried out in Business Senior High School and St. Charles Minor Seminary/ Senior High Schools on second

year students to ascertain the understanding level of the students to the items/questions. It was also to determine the approximate time that students would use to complete the questionnaire.

Content validity of the research questionnaire was ensured through seeking a second opinion from friends and supervisor of the study. Opinions from the supervisor were sought so as to ascertain if all themes in objectives were captured in order not to leave any objective poorly measured.

The split-half technique was used to determine the reliability of the study questionnaire. The same questionnaire was administered to five randomly selected students each in two different SHSs. Thereafter, Pearson's product moment of correlation co-efficient was used to compare the correlation between the mean responses in both sets. The Pearson's co-efficient was found to be 0.84 which indicated a strong positive linear relationship between the findings of the two schools.

The data collected was analyzed using Predictive Analysis Software for Social Sciences (PASW v.20) and Microsoft Excel. The data was cleaned, coded, entered into PASW, and analyzed. Information obtained was presented using figures, simple charts, tables and proportions.

Specifically, a paired sample t-testing was used to assess whether there was a significant difference in the mean score of general agriculture compared to other electives. It was expected that this test would provide useful information on the level of interests in Agriculture in the wake of other courses in Ghana (using the Senior High School level as a proxy for assessment).

The relationship between personal interests in the subject of Agriculture, pedagogy and other factors were done using cross-tabulations with the "odds ratio" as a measure of association. This was possible given that all these variables are binary. Odds ratio (OR) value of less than 1 indicates a protective relationship by the given independent variable compared to personal interest of students in agriculture. OR value of 1 indicated no relationship between variables. However, if OR is greater than one shows a relationship. It implied that a student's interest in agriculture and the odds of exposure to such a predetermining factor was high (Michael, 2008). The measure of odds would be used to assess the level of risk factors posed on the dependent variables ceteris paribus.

Two Independent Sample Test/ Mann-Whitney U-test was carried out to determine if a significant relationship existed between students' satisfaction with attitudes of their teachers during lessons and whatever that led to their becoming interested in course materials. Students' satisfaction with their teachers' attributes is the independent variable. It is a continuous variable with its values being the mean ratings of agriculture science teachers. On the other hand, the dependent variable is binary, and its values answer the question "Have you become interested in the course material". The Mann-U Whitney statistic was used to interpret the result.

Results and Discussion

Teaching and Learning of Practical Agriculture

From the findings of the study as shown in Table 1, overwhelming majority (94.2%) of respondents liked their agriculture periods compared to the few (5.8%) who do not. Follow up questions to elicit the reason, revealed that most students (89.2%) liked the way their Agricultural Science teachers taught as against 10.8% who did not.

On the practices or attribute of the instructors during classroom interaction, students rated the instructors on several grounds with the 5-Likert-type scale. Table 1 below presents the individual ratings and the mean response per variable.

Table 1: Teachers Attitudes and Students Outcome During Lessons

Assessment variables	Totally satisfied N [%]	Satisfied	Not sure N [%]	Dis-satisfied N [%]	Totally dis-satisfied N [%]	μ
1. Student-Instructor interaction						
Instructor encouraged student to express opinion	69 [58.5]	38 [32.2]	10 [8.5]	0 [0.0]	1 [0.8]	2
Students had an opportunity to ask questions	82 [68.9]	29 [24.4]	7 [5.9]	0 [0.0]	1 [0.8]	1

Instructor generally stimulated class discussion	38 [33.3]	42 [36.8]	24 [21.1]	0 [0.0]	2 [1.8]	2
2. Instructor's Responsiveness						
Always be eager to provide assistance	48 [41.0]	40 [34.3]	17 [14.5]	4 [3.4]	3 [2.6]	2
3. Organization of course						
The course was well organized	56 [47.9]	37 [31.6]	15 [13.2]	12 [10.5]	6 [5.3]	2
The material was presented in a clear and orderly manner	41 [34.2]	40 [35.1]	15 [13.2]	12 [10.2]	6 [5.3]	2
4. Likeability/concern						
I like the instructor as a person.	55 [48.7]	38 [33.6]	9 [8.0]	7 [6.2]	4 [3.5]	2
The instructor seems to have equal concern for all students.	56 [47.9]	37 [31.6]	16 [13.7]	5 [4.3]	3 [2.6]	2
The instructor was actively helpful when students had difficulty.	67 [57.8]	27 [23.3]	15 [12.9]	6 [5.2]	1 [0.9]	2
5. Pedagogical affect						
Methods of instruction were effective	46 [40.0]	47 [40.9]	18 [15.7]	3 [2.6]	1 [0.9]	2
Methods of instruction were useful	43 [37.1]	53 [45.7]	15 [12.9]	3 [2.6]	2 [1.7]	2
6. Student interest						
You were interested in learning course material.	69 [58.5]	35 [29.7]	8 [6.8]	2 [1.7]	4 [3.4]	2
You have become more knowledgeable in this area.	72 [61.0]	39 [33.1]	3 [2.5]	4 [3.4]	0 [0.0]	1
You have gained skills in this area	75 [64.7]	33 [28.4]	6 [5.2]	1 [0.8]	1 [0.8]	1

Mean ratings: totally satisfied=1: Satisfied=2: Not sure=3: Dissatisfied=4: Totally Dissatisfied=5

Mean of means is 2

In Table 1, respondents were generally satisfied (MR= 2) about their teachers' attitude during lesson delivery sessions. On the individual variables relating to their instructors, respondents were totally satisfied to having the opportunity to ask questions in class (MR= 1). They were also satisfied (MR= 2) on the following terms about their agriculture instructors: He/she encouraged students to express their opinion, stimulated class discussion, eager to provide assistance, well organized course material, well presented course material, effective methods of instruction, useful methods of instruction, actively helpful in difficult times and liking the teacher as a person. As a testimonial to the above, all respondents totally agreed to becoming more knowledgeable and skilled in agricultural science (MR= 1). However, none of the practices of teachers during lessons received a mean rating of doubt (MR= 3) or Disapproval (MR= 4 and 5).

Two Independent Sample Test/ Mann-U Whitney Non-Parametric Test

Also, a 2-independent sample test was conducted to compare satisfaction with teachers' attitudes during lessons among students who had gained an interest in the course material and those who had not. The dependent variable values answered the question "were interested in the course material". The responses were 1 for 'Yes' and 2 for 'No'. The independent factor was students' satisfaction with their teachers' attitude during lessons where mean rating of 1 to 5 denotes increasing satisfaction.

The results showed that the Mann-Whitney test was statistically significant (Mann-Whitney U= 476.5, p

= 0.015). There was a difference in mean ranking of students' satisfaction with their teachers' attitudes between students that became interested in the course materials (μ = 61.9, SD = 0.5) and those who did not (μ= 41.5, SD = 6.6). It was observed that the more satisfied a student is with his/her teacher, the more interested they were in the course material.

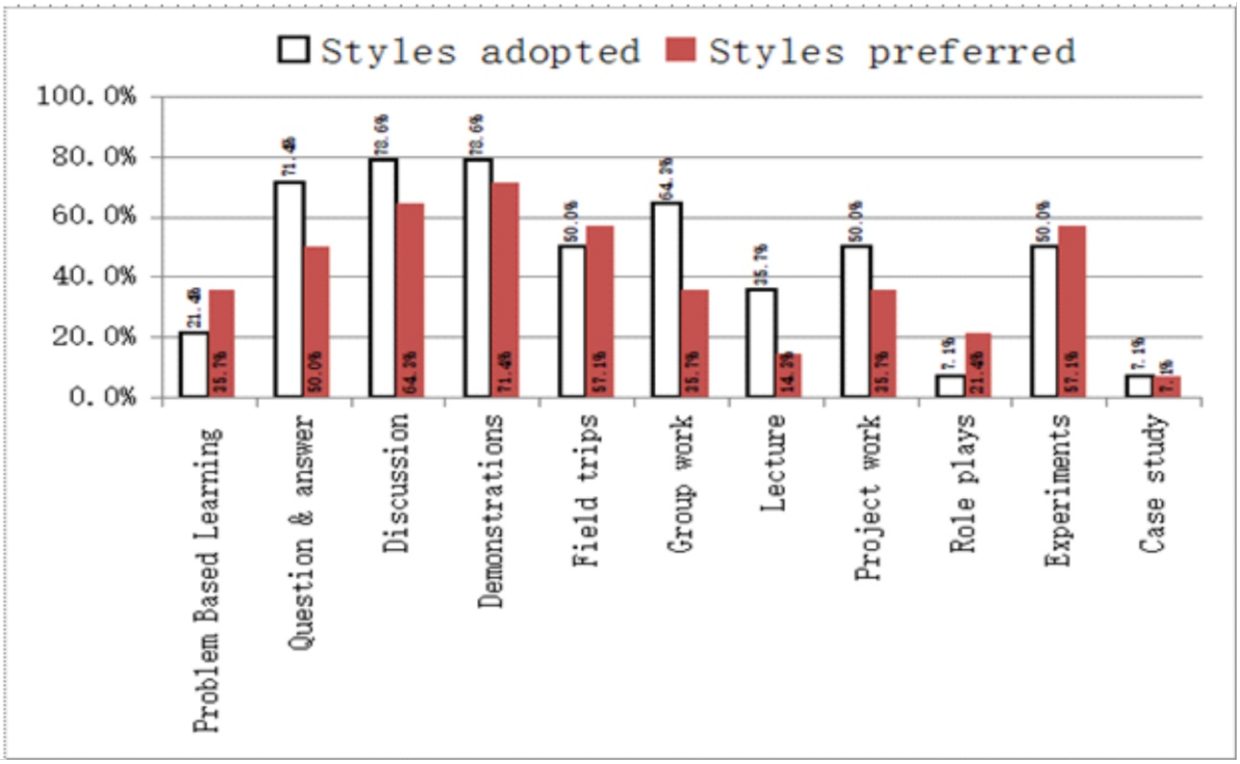

Fig 2: Distribution of Teaching Styles Adopted and Preferred in Schools

From figure 2 the bars show similar patterns in both teaching styles adopted and teaching styles preferred. This showed that the methods mostly adopted by teachers were essentially the methods most preferred in teaching practical agriculture. These methods in order of most response were demonstrations, Discussions, Field trips and experiments. Questions and answer approach and group works.

Relationship among Variables

A logistic regression was conducted to determine the impact some variables had on the possibility that a respondent report having an interest in a future career in agriculture. The independent variables were sex, religion, growing up in a farming household, parental approval of a student's choice to read agriculture, students' intention to return to farming after school, study of practical agriculture, liking agriculture lesson times and liking how Agriculture Science teachers teach. Sex was coded as 1 for male and 2 for female. The rest were dichotomous variables where 1= yes and 2=no. the dependent variable, students' interest in a future career in agriculture was also dichotomous and coded.

The null hypothesis for this analysis states that sex, religion, growing up in a farming household, parental approval of a student's choice to read agriculture, students' intention to return to farming after school, study of practical agriculture, liking agriculture lesson times and liking the way your agriculture teacher teaches were not significant predictors of student interest in agriculture. Conversely, the alternative hypothesis states that at least one of the above-mentioned variables is a significant predictor of whether a student had an interest in agriculture.

The results as shown in Table 2, indicate that only four (4) of the independent variables made a statistically significant contribution to the model. These variables were students' intention to return to farming after school, growing up in a farming household, parental approval of a student's choice to read agriculture and study of practical agriculture. The strongest predictor of students' interest in

agriculture was students' intention to return to farming after school (OR= 8.2, 95% CI: 1.57-42.87, p = 0.004). This indicated that respondents who had an intention to return to farming after school were 8.2 times more likely to report having an interest in agriculture in school compared to those who had no such intentions. Parental support of a students' choice to do agriculture had an odds ratio of 8.8 (OR=8.8, 95% CI: 1.34-58.25, p=0.008). Thus, respondents with parental approval to do agriculture were 8.8 times more likely to report having an interest in the field of agriculture. Based on the results of the logistic regression the null hypothesis is rejected.

Covariates/Independent variables	Odds Ratio OR	95% CI		P-Value	Statistical significance
		Low	High	<0.001	
Sex	2.6	0.56	11.75	0.20	Not significant
Religion	0.56	0.125	2.50	0.44	Not significant
growing up in a farming household	5.247	1.176	23.407	0.018	Significant
parental approval of a student's choice to read Agriculture	8.833	1.340	58.247	0.008	Significant
students' intention to return to farming after school	8.20	1.568	42.870	0.004	Significant
study of practical agriculture	5.684	1.094	29.534	0.022	Significant
liking Agriculture lesson times	0.929	0.883	0.978	0.470	Not significant
liking the way your agricultural teacher teaches	1.179	0.133	10.418	0.884	Not significant

Note CI=Confidence Interval OR= Odds Ratio
Null hypothesis H0: there is no statistically significant relationship between variables
Alternative hypothesis HA: there is a statistically significant relationship between variables

The Institutional Capacity of SHSs to Run Practical Agriculture

The Heads of Agriculture Science departments of the respective Senior High Schools were also interviewed on variables that depicted the capacity of SHSs to run practical agriculture. The responses are presented in Table 3.

A list of challenges SHSs face in organizing agriculture practical revealed the following responses: lack of agriculture implements for practice and demonstrations, inadequate land, inadequate funds, and absence of school bus. These challenges were similar to those stated by the agriculture science teachers except the land and school bus options. Lack of funds and lack of implements/tools were the common problems both teachers and HODs agreed on.

Source of Funds

Also, SHSs mainly relied on school's Internally Generated funds (IGFs) and central government Impress. UNESCO (1999) reported that lack of financial resources hindered the expansion of facilities which led to specific problems in vocational subjects like agriculture. Omaren (1992) also reported that school farm managers blamed the failure to improve food production on lack of funds to meet the high initial costs required to open up viable agricultural programmes for efficient training in practical skills. Table 3 reveals that one hundred percent of the SHSs had inadequate funds to do practical agriculture.

Table 3: The Institutional Capacity of SHSs to Support Practical Agriculture

Variables		[n=3]	[%]
Are funds given enough to conduct practical?	Yes	0	0.0
	No	3	100
Are funds released on time for practicals?	Yes	1	33.3
	No	2	66.7
Do you conduct practicals in all areas of agriculture?	Yes	0	0.0
	No	3	100.0

On the issue of whether funds were released on time, 66.7 % responded no and 33.3 % responded yes. When they were asked whether Senior High Schools are able to conduct agriculture practical in all areas of agriculture, all the three (3) Heads of Departments of the study schools said no. This again confirmed what Omaren (1992) said that lack of funds to acquire educational facilities hindered the practical teaching of the subject and the stimulation of food production. The commonly covered fields were crop science (66.7% of the time) and animal science, soil science, horticulture and agriculture engineering occurring (33.3% of the time). The coping measures for areas in agriculture not covered were the use of demonstrations and increasing theoretical tutorials on such topics.

Attitudes of the Community towards Teaching and Learning of Practical Agriculture

From the study descriptive responses, students were not encouraged to do agriculture because it was regarded as a course for rural minded people. According to one female student in Islamic Senior High, Tamale

"This course is for people in the village, am staying in SSNIT"

Students also seem to have this mindset since some students postulated that the school was using them as labourers in the school farm. This assertion will only make sense if only agriculture students worked on the farm. Michael in the Form Two C, Kalpohin Senior High complained bitterly as follows;

"We the Horticulture students go to the school farm very often compared to our colleagues in Science or Business. Even people in the community have begun asking our teachers to let us come and weed or harvest maize"

Maybe they mistook their labor-intensive practical assignments as literally working for the school. From another's perspective, the community members were cooperating positively with the schools.

Factors that Weaken Students' Interest in the Field of Agriculture

Heads of Department were also asked to suggest some factors that might be militating against students' interest in agriculture as a whole. According to them, students feel they were being punished when they are asked to work in a garden because they thought agriculture was for rural minded people. Another factor was the confession that inadequate practical lessons were taught students. These inadequate practical lessons in schools could be as a result of lack of funds to acquire the necessary tools and equipment including money to be able to carry out their practical.

Conclusions

Socio-demographic factors such as growing up in farming household, parental approval of course of study and the intention to return to farming or an agro-based industry had a significant relationship with respondents' interest in practical agriculture. Secondly, Senior High Schools are poorly equipped to carry out teaching and learning of practical agriculture. These schools are faced with challenges which include inadequate funds, lack of appropriate materials amongst others. In addition, the funds made available are inadequate and not released on time. As such SHSs could not conduct practicals in all areas of agriculture. The support from the PTAs, NGOs and other relevant stakeholders in agriculture was not encouraging.

The students liked their Agricultural Science lessons, the way their Agriculture Science teachers teach and were generally satisfied with their teachers' attitudes during the lesson delivery. Also, the teaching methods employed to teach had little or no negative influence on student learning outcomes. This was because there was no difference in the methods adopted by agriculture science teachers and the methods preferred for the optimum teaching and learning of practical agriculture.

Recommendations

The study therefore recommends the following:

1. The schools and communities should be sensitized enough on the prospects of agriculture and the need to have a positive attitude towards the subject.
2. School authority in collaboration with PTA should set aside funds purposely for the teaching and learning of agriculture in their schools through the establishment of agriculture and environment levy for the purposes of agriculture practical and equipment.
3. Community leaders should be made to allocate land for agriculture practical or for school farming especially those schools that do not have lands for agriculture practical.

References

Abujaja, A. M., Nyarko, G. (2016). Principles, Techniques and Methodologies in Teaching Agricultural Science: What Agricultural Science Teachers Need to Kowa out Teaching. Reformers Company limited, Accra, Ghana.

Akinmade, C. T. O. (2002). Attitude to Science as a School subject. In Akpan O. E. (ed.) Toward

Creative Science Teaching and Learning in West African schools. Catholic Press, Ghana,

Cape Coast: 75 – 87.

Anna, L. B., Neil, A. K. (2005). A Document Analysis of the Pedagogical Knowledge Espoused in Agricultural Teaching Methods Courses. Journal of Agricultural Education 46 (2): 53-57.

Asiamah, D. A. (2012). Trend and Constraints of Youth Involvement in Agriculture: The case of Ghana. Ministry of Food and Agriculture [MOFA], Ghana.

Beyuo, A. N., and Ernest, B. (2013). Youth in agriculture; prospects and challenges in the Sissala

Area of Ghana, Net Journal of agricultural Sciences. 1 (2): 160-168

Borko, H., and Putnam, R. T. (1996). Learning to teach. In Berlinger, D. C., and Calfee, R. C. (Eds.), Handbook of educational psychology. New York: Simon and Schuster Macmillan.

Brown, A. & Campione, J. (1996). Psychological theory and the design of innovative learning environments: On procedures, principles, and systems. In: Schauble, L. & Glaser, R. (Eds.) Innovations in learning: New environments for education (pp. 289–325). Lawrence Erlbaum Associates, Inc.

Cobb, P. (1994). Where is the Mind? Constructivist and Sociocultural Perspectives on Mathematical Development. Educational Researcher. 23 (7): 13-20.

Cruikshank, D. R. (1984). Toward a Model to guide inquiry in preservice teacher education. Journal of Teacher Education 35(6): 43-48.

Cruikshank, D. R. (1990). Research that informs teachers and teacher educators. Bloomington, IN: Phi Delta Kappa Educational Foundation. Ball and Knobloch a Document Analysis of the Pedagogy, Journal of Agricultural Education 57 Volume 46, Number 2, 2005.

Darling-Hammond, L. (1977). Doing what Matters Most: Investing in Quality teaching. New York. ISBN-09654535-3-7.

Gonzalez, N., Moll, L. C., Floyd-Tenery, M., Rivera, A., Rendon, P., Gonzales, R. & Amanti, C. (1993). Teacher Research on Funds of Knowledge: Learning from House-holds (Educational Practice Report 6). Santa Cruz, CA and Washington, DC: National Center for Research on Cultural Diversity and Second Language Learning. (Available from Dissemination Coordinator, CREDE, 4646 40TH Street NW, Washington DC 20016-1859).

Hedges, L. E. (2000). What being a Teacher is all About. Columbus, OH: Ohio Agricultural Education Curriculum Materials Service.

Hohr, H. (2012). The Concept of Experience by John Dewey Revisited: Concerning, Feeling and 'Enliving'. Studies in Philosophy and Education. 32(1).

Hoque, E. (2018). Memorization: A Proven Method of Learning. Journal of Applied Research. 22 (111): 142-150.

König, J., Blömeke, S., Paine, L., Schmidt, W.H., & Hsieh, F.-J. (2011). General pedagogical knowledge of future middle school teachers: On the complex ecology of teacher education in the United States, Germany, and Taiwan. Journal of Teacher Education, 62(2): 188 -201.

McLaughlin, M. W. & Talbert, J. E. (2006). Building school-based teacher learning communities: Professional strategies to improve student achievement. Teachers College Press.

Martin, L. O. (2012). Technical vocational pedagogy: working with teachers and students at the

secondary school level to enhance better learning of agriculture through project based

learning approach- action research at Nabiswa secondary school, Uganda.

Modebelu, M. N and Nwakpadolu, G. M. (2013). Effective teaching and learning of agriculture

science for food security and national sustainability, Journal of Education and Social

Research vol. 3 number 4.

National Council for Agricultural Education [NCAE] (2000). A Guide to Local Programme Success. Indianapolis; IN: National FFA Organization.

Obanya, P. A.I., & Fadoju, A.F. (2008). General pedagogy. Evans professional teacher – education services: Course 113. Ibadan: Evans Brothers Nigeria Publishers Ltd.

Olsen, C. and Diane, M. (2004). Cross-sectional study design and data analysis, College entrance

Examination Board.

Omaren, S.O. (1992). The impact of WFP on the

Establishment of Agricultural Programmes in Educational Institutions in Apac and Lira District. Makerere University.

Osborne, E. (1994). Research and practice operating in isolation, The Agricultural Education Magazine, 67(5):3.

Pacho, T. O. (2015). Unpacking John Dewey's Connection to Service Learning. Journal of Education and Social Policy. 2(3).

Purcell-Gates, V. (1995). Other People's Words: The Cycle of Low Literacy. Cambridge, MA: Harvard University Press.

Rogoff, B., Matusov, E., & White, C. (1996). Models of Teaching and Learning: Participation in a Community of Learners. In D. Olson & N. Torrence (Eds). Handbook of Education and Human Development: New Models of Learning, Teaching and School. Cambridge, MA: Basil Blackwell.

Sadiq, S. (2014). Effectiveness of Modular Approach in Teaching at University Level. Journal of education and Practice. 5 (17).

Schmidt, M. (2010). Learning from Teaching Experience: Dewey's Theory and Preservice Teachers' Learning. Sage Publications Inc. Journal of Research in Music Education. 58 (2): 131-146.

Scott, D. Morrison, M. (2005). Key Ideas in Educational Research. Continuum International publishing Group. New York.

Shavelson, R.J. & Stern, P. (1981). Research on teachers' pedagogical thoughts, judgments, decisions, and behaviour. Review of Educational Research, 51(4), 455-498.

Shulman, L.S. (1987). Knowledge and teaching: Foundations of the new reform. Harvard Educational Review, 57(1), 1-22.

Sonmez, H. (2018). A Review about the use of the Memorization Strategy During the Learning Process by Students. International Journal of Language Education 1. 6(1): 212: 230.

Thompson, J., & Soyibo, K. (2002). Effects of lecture, teacher demonstrations, discussion and practical work on 10th graders attitudes to chemistry and understanding of electrolysis. Research in Science and Technological Education, 20(1), 25-37.

Tharp, R.G., & Gallimore, R. (1988). Rousing Minds to Life: Teaching, Learning and Schooling in Social Context. New York: Cambridge University Press.

Vogt, L. A., Jordan, C., & Tharp, R. G. (1992). Explaining School Failure, Producing School Success: Two Cases. In E. Jacob & C. Jordan (Eds). Minority Education: Anthropological Perspectives (pp. 53-66). Norwood, NJ: Ablex. (Reprinted from Anthropology & Education Quarterly, 18, 276-286).