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EFFECTS OF DEMONSTRATION AND LECTURE METHODS OF TEACHING APICULTURE ON PERFORMANCE OF AGRIC STUDENTS IN ADAMAWA STATE UNIVERSITY, NIGERIA

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Abstract

A study was conducted using two (2) sets of 400 levels students to determine the effects of a combined demonstration and lecture methods of teaching apiculture on one hand, and lecture method on another, on performance of learners in the Faculty of Agriculture, Adamawa State University (ADSU), Mubi, Nigeria. Data were collected by observation of students' scores, and personal verification of records/files to obtain information on age, gender and qualification at admission of both sets of students, whereas cost of instructional materials were determined through the Departmental Store Invoice (DSI). Descriptive statistics, computed cost components and correlation analyses were employed in the analyses of the data. Results revealed that while majority (52.00%) of the Conventional Students (CS) fell within the age range of 20-25 years, a larger proportion of the Sasakawa Students (SS) were within 31-35 years. Gender-wise, males accounted for the bulk of the students with 68.00% and 78.26% for CS and SS, respectively. In spite of the fact that Lecture Method (LM) had lower cost implication, it was found to be more efficient as a method of instruction among the students than a combined Demonstration and Lecture Methods (DLM). The male students slightly (0.456) performed better than their female (0.246) counterparts, with both coefficients significant at $P<0.05$. Its concluded that the application of LM of instruction was slightly more efficient than a combined DLM among the agriculture students of ADSU. Also, the male students were found to perform slightly better than the females. While the DLM could be more appropriate at primary and secondary schools, the LM is being recommended at tertiary level based on the findings of this study.

Key words**:** *apiculture, demonstration, lecture, methods, Mubi, Nigeria*

INTRODUCTION

Scholars the world over have now recognized that there are better methods of learning than through the conventional ways of instruction [1]. Post-secondary institutions and specifically universities are beginning to realise the relevance of utilisation of appropriate methods through which students can learn [2]. Further, several methods of teaching have been proved to be relatively ineffective on students' ability to master and then retain important concepts. Some renowned researchers [3] noted that learning through some methods of teaching is passive rather than active. The applications of the traditional methods like lecture, memorizing, recitation, etc. do not seem to aid critical and creative thinking, and collaborative problem-solving. Two imminent authors [4] reported that the challenge in teaching therefore, is to create experiences that involve the students and support their own thinking explanations, evaluations, communications and applications of scientific models needed to make sense of these experiences.

Several studies [4, 5, 6, and 7] have indicated that science subjects are more affected in this trend of development. Agriculture, which is purely science based, is more of practically-oriented learning experiences than mere theories. For instance, it was reported [5] that in spite of the frantic efforts made by the government to enhance teaching of science/agricultural science syllabus, by employment of qualified graduate teachers,

provision of facilities and prompt payment of salaries, among others, the recent students' results at external examinations show a decline in performance.

The choices of appropriate pedagogies for application then become imperative [8]. While lecture method of instruction largely involves *telling* as teacher-centered, the demonstration method of learning entails teaching through learning by doing in addition to *telling*. To further stress the relevance of participation of learners as a facilitating factor in concretising learning experiences, an educationist [9] observed that the demonstration method has been found to be extensively used in sciences, and by extension should be applied in teaching agricultural courses.

This investigation, a study of the effects of demonstration and lecture methods of teaching apiculture on performance of agricultural students in Adamawa State University, Mubi, Nigeria, is an attempt towards finding an appropriate method of aiding effective learning not only among agriculture students but science in general. However, specifically, it focused on determining the performance of students in apiculture study using demonstration and lecture methods of instructions, assessing the costs implication and efficiency in using these two methods of teaching apiculture, and determining the effect of gender difference on application of demonstration and lecture methods of teaching apiculture in the Faculty of Agriculture of the University.

MATERIALS AND METHODS

Sampling techniques and data collection

Two sets of 400 level students were purposely selected for the study. The students were put into three groups based on their performance referred to as Cumulative Grade Point Aggregate (CGPA). The stratification is as follows: First stratum = 1.5-2.0; second stratum = 2.1-3.4 and third stratum = 3.5 & above. The total number of the two sets of students was 48, comprising 25 and 23 of 400 levels of Conventional and Sasakawa students, respectively.

The Conventional group was taught using a combination of demonstration and lecture teaching methods, whereas the second group was instructed using lecture teaching method for comparison of learning outcomes.

Data were collected by observation of students' scores, and personal verification of records/files to obtain information on age, gender and qualification at admission of both sets of students, whereas cost of instructional materials were determined through the Departmental Store Invoice (DSI).

Instructional materials for the study

The instructional materials utilised for the experiment include the following:

1. Projector/PowerPoint
2. Notebook computer
3. Green laser pointer
4. Extension cord wire
5. Kenya top-bar beehive
6. Beehive stand
7. Plastic funnels
8. Beehive tool/knife
9. Bees suit (set)
10. A pair of hand gloves
11. A pair of rain boots
12. *Binta Sudan/scent*
13. Honeycomb/honey

The data collected were analysed using descriptive statistics (percentage, mean and frequency distribution), computation of cost components, and multiple correlation analysis. The latter was implicitly specified as:

$$Y = f(X_1; X_2; X_3; X_4; X5)$$

Where:

Y = performance
X_1 = age of student
X_2 = male student
X_3 = female student
X_4 = learning method
X_5 = level of education at admission

This was used to specifically analyse how the selected variables correlated with the performance of the students using the two methodologies

RESULTS AND DISCUSSIONS

Distribution of the selected variables of the students studied

The results in Table 1 show the distribution of the two sets of the students based on age. It could be observed that majority (52.00%) of the Conventional Students (CS) fell within the age range of 20-25 years. On the other hand, a larger proportion (30.44%) of the Sasakawa Students (SS) was between 31 and 35 years of age. The implication of this result is that while most of the CS were young persons, the larger chunk (69.66%) of the SS was elderly persons.

Table 1.Distribution of the undergraduate students based on age

Item	Conventional students	Sasakawa students
Age range (years)		
20 – 25	13 (52.00)	-
26 – 30	06 (24.00)	-
31 – 35	02 (8.00)	07 (30.44)
36 – 40	04 (16.00)	04 (17.39)
41 – 45	-	05 (21.74)
46 – 50	-	04 (17.39)
51 and above	-	03 (13.04)
Total	**25 (100)**	**23 (100)**

Note: Figures in parentheses are percentage of total
Source: Computed from field data (2012)

Gender wise, males accounted for the bulk of both sets of the students with 68.00% and 78.26% for CS and SS, respectively.
Female students recorded only 21.74% for SS and 38.00% for CS, implying that males were the majority of students in the sets.
This finding agreed with the reports of a governmental organisation [10] and a scholar [11] which stated that girl child enrolment in schools in the northern parts of the country and even sub-Saharan Africa at large is minimal compared to the male child counterpart. This result is shown in Table 2.

Table 2.Distribution of the students based on Gender or sex

Item	conventional students	Sasakawa students
Sex/Gender		
Male	17 (68.00)	18 (78.26)
Female	08 (38.00)	05 (21.74)
Total	**05 (100)**	**23 (100)**

Note: Figures in parentheses show percentage of the total
Source: Computed from field data (2012).

The distribution of the students' qualification at the time of admission is indicated in Table 3. The result shows that majority (52.00%) of the CS were admitted into the University with Senior Secondary Certificate of Education (SSCE) or West African Examination Council (WAEC) certificate, implying that they got into the university system immediately after their completion of secondary education through the Joint Admission and Matriculation Board (JAMB) examination.

Table 3.Distribution of the students according to qualification at admission into ADSU

Item	Conventional students	Sasakawa students
Qualification at Admission		
HND	-	23 (100)
ND	12 (48.00)	-
SSCE?WAEC	13 (52.00)	-
Total	**25 (100)**	**23 (100)**

Note: Figures in parentheses show percentage of the total
Source: Computed from field data (2012)

However, for the SS, the whole (100%) lot was admitted into the university with Higher National Diploma certificate, indicating that the students might have had experience of a tertiary level education system before getting into the present university system thereby broadening their educational horizon.
Efficiency can be said to be a function of time and resources, involved in achieving result(s). In other words, it entails how minimum these resources/inputs are utilised toward realising the stated goal(s). In this regard, the costs of instructional materials as inputs used in teaching these students are captured in Table 4.
The latter indicates that it costed about three hundred and sixty one thousand three hundred and fifty naira only (N361, 350) to procure instructional materials used in teaching the CS applying a combined demonstration and lecture method.
Also, a total amount of three hundred and forty seven thousand naira only (N347, 000) was used to acquire instructional materials in teaching the SS applying lecture method.
In an effort to properly find out whether differences in performance existed in using the two methods of instructions among the two categories of students studied, and also the efficiency, Table 5 was computed.

Table 4.Cost implication of using instructional materials on the two methodologies of teaching

Instructional materials applied	Unit cost (₦)	Qty	Total cost (₦)
1.DLM (n:25)			
Projector/PowerPoint	250,000	1	250,000
Notebook Computer	90,000	1	90,000
Green Laser Pointer	4,000	1	4,000
Extension Cord Wire	1,500	2	3,000
Kenya Top-bar Beehive	6,000	1	6,000
Beehive Stand	2,500	1	2,500
Plastic Funnel	150	4	6,000
Beehive Tool/Knife	250	1	250
Bee-suit (set)	2,000	1	2,000
Hand Gloves	300/pair	1 pair	300
Rain Boot	1,800/pair	1 pair	1,800
Binta Sudan/scent	200	2 bottles	400
Honeycomb/Honey	100/100ml	500ml	500
Total			**361,350**
2.LM (n23)			
Projector/PowerPoint	250,000	1	250,000
Notebook Computer	90,000	1	90,000
Green Laser Pointer	4,000	1	4,000
Extension Cord Wire	1,500	2	3,000
Total			**347,000**

Note: ₦160 = US$1
Source: Computed from field data (2012)

As earlier stated, the Table 5 shows that while it costed N361, 350 to teach a total of 25 CS, a sum of N347, 000 was involved in teaching 23 SS. Therefore, the use of the combined methods of demonstration and lecture in teaching the students was slightly expensive than lecture method only.

Table 5.Assessment of efficiency of the two methods in determining performance of the two sets of the students

Item	Cost implication of using a method (₦)	Number of students	Cummu-lative score of students	Averag-e score of students (%)
1.DLM	₦361,350	25	1381	55.24
Cost of training per student = 1381 x 25 = ₦6, 541.46				
	361,350	1		
2.LM	₦347,000	23	1308	56.87
Cost of training per student = 1308 x 23 = ₦6, 101.68				
	347,000	1		
Difference in cost and performance of the students in the two methods = ₦439.78 & 1.63%				

Note: ₦160 = US$1
Source: Computed from field data (2012)

Extrapolating from the available data in Table 5, it could be said that it cost a total sum of six thousand five hundred and forty one naira forty six kobo only (N6, 541.46) to instruct a student in apiculture using a combined demonstration and lecture methods, passing with a mean score of 55.24%. Similarly, it amount to a sum of six thousand one hundred and one naira sixty eight kobo only (N6, 101.68) to instruct a student in apiculture using lecture method, and at the end of assessment, having a mean score of 56.87%. While it cost higher (N439.78) to teach using a combination of demonstration and lecture methods, instruction with only lecture method yielded higher (1.63%) learning outcome among the agriculture undergraduate students of Adamawa State University, Mubi, Nigeria, contrary to apriori expectation.

The above result is similar to the findings of some authors [5] in which the educationists investigated the effects of programmed instruction and demonstration methods on students' academic performance in science in Esan West LGA of Edo State, Nigeria. The authors discovered that there was a significant difference in the academic achievement of the two groups of students Used. Those exposed to programmed instruction method achieved better than those exposed to demonstration method. Also, a famous author [12] made similar conclusion, that programmed instruction method is more effective than demonstration method in helping students gain understanding of concrete observable phenomenon.

Be that as it may, it is necessary to state that costs are incurred virtually in all facets of education ranging from acquisition of human resource, erection of buildings to procurement of instructional materials. However, the type of methodology applied in teaching determines the cost to be involved and to a greater extent the learning outcome.

The pooled correlation coefficient matrix of selected factors influencing performance among the two sets of the students is shown in Table 6. Although a factor, level of education at admission, has been added, gender as a variable is being split into male and female for the purpose of determining the effect of each sex in facilitating learning among the groups of learners.

These variables include age, male, female, learning method and level of education at admission. Of these five variables in Table 6, gender seemed to have slight influence.

Table 6.Pooled correlation coefficient matrix of selected factors influencing performance among the two categories of students

	Y	X_1	X_2	X_3	X_4
Age (X_1)	0.115				
Male (X_2)	0.456*	0.312			
Female (X_3)	0.246*	0.188	0.241		
Learning Method (X_4)	0.092	0.913**	0.257	0.325	
Level of education at admission (X_5)	-0.046	-0.973**	-0.115	-0.873	-0.576

Note: * value is significant at P<0.05
** value is significant at P<0.01
Source: Computed from field data (2012)

Pooling from the results of descriptive statistics on gender of the students in Table 2, most (72.92%) of the learners were males with minority (27.08%) as females. Also, from the findings of the pooled correlation analysis in Table 6, the male gender had slight significance (0.456) in positively influencing learning outcomes than the female gender (0.246) which were both significant at P<0.05. This finding is in line with some famous investigators' report [13] that stated that at a probability of P<0.05, no statistically significant difference existed between the adjustive performance of male and female students. The male mean GPA was 68.4% and the female's counterpart was 67.8%, indicating that the latter was slightly higher with a value of 0.6%. But for one imminent author [14], his findings revealed trends of mixed results, where for instance, the females were at par with males in completed coursework, and the former surpassed the latter in mastery of content.

However, the finding of this study disagreed with a group of authors [15] who documented the effect of gender on performance of undergraduate dental students at the University of Jordan, Amman. The imminent authors reported that the Cumulative Gross Point Aggregates (CGPA) of the female graduated students were significantly higher than those of the male students.

Based on the aforementioned, it could be stated that although generally the male gender has an insignificant positive effect in enhancing the learning outcomes of students, there are also areas where the female gender surpass the male counterpart. Therefore, further in-depth investigation is required towards documenting appropriate findings for these differences for utilisation by the education world.

CONCLUSIONS

Its concluded that the application of LM of instruction was slightly more efficient than a combined DLM among the agriculture students of ADSU. Also, the male students were found to perform slightly better than the females.

While the DLM could be more appropriate at primary and secondary schools as being cited by several studies globally, the LM is being recommended at tertiary level based on the findings of this study.

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