Journal of Educational Research and Reviews
Vol. 1(4), pp. 49-54, December 2013
ISSN: 2315-9859
Research Paper

Instructional materials utilization and students' performance in practical agriculture

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Accepted 4th November, 2013

Abstract. The study was conducted to determine the effects of instructional material utilization on the performance of Junior High School students in Practical Agriculture in Ikot Abasi Local Government Area. The study used a quasi-experimental design with a pre/post-test non-randomized control group arrangement. A sample of 200 students was used for the study. To guide the study, four specific objectives and four null hypotheses were formulated and tested at 0.05 level of significance. Students' achievement test in Practical Agriculture (SATPA) was developed to gather data for the study. The instrument was validated by research experts and the reliability coefficient of 0.80 was obtained using K-R 21. Data were analyzed and hypotheses were tested using t-test and Analysis of covariance (ANCOVA). The findings of the research indicated that there was a significant difference between the performance of students taught with instructional chart and those without and there was significant difference between the performance of students taught with instructional pictures and those taught without it among other findings. Based on the findings, it was recommended that teachers should use instructional materials in teaching practical agriculture where practical demonstration is not visible in order to enhance effective teaching and learning among other recommendations.

Keywords: Instructional Material Utilization, Pictures, Charts, Filmstrip and Students' Performance.

INTRODUCTION

The acquisition of basic vocational knowledge, skills and attitudes to facilitate occupational efficiency requires skill-oriented teaching and learning activities. Over the years, the poor performance of students in public examinations has been blamed on the wrong choice of teaching methods by teachers. Teaching and learning activities have a lot to do with other variables, such as instructional materials, school environment variables, students' factors and so on. In this study, instructional material utilization is the main focus in order to determine their effects on the performance of the students.

Instructional materials are the devices developed or acquired to assist or facilitate teachers in transmitting, organized knowledge skills and attitudes to the learners within an instructional situation (Nwachukwu, 2006). Teachers use different instructional materials to motivate learning. Teachers often make use of textbooks, charts, models, graphics, realia as well as improvised materials (Awotua-Efebo, 2001). The success in the skill and knowledge acquisition in an instructional situation depends on the suitability of the instructional material, adequacy and effective utilization of the available materials (Olaitan and Agusiobo, 1994). Also, the relevance of instructional materials to the objective of the lesson and the ease of use of the instructional materials are serious considerations in instructional materials utilization to better the learner's performance.

The performance of the students in agricultural science and practical agriculture in high schools respectively is not encouraged (Ikot, 2008). Ikot observed that the poor performance of students in agricultural examinations may not be unconnected with non-utilization of suitable

instructional materials. Many teachers go to classes to teach agricultural science and practical agriculture as liberal arts without any material to assist them or the learners. Learning is facilitated when the learners make use of at least three of the sense organs namely: seeing, hearing and touching.

Literature- in methodology of teaching or pedagogy and instructional communication have explained and illustrated the effectiveness of instructional materials as a tool for improving students' performance in the learning of difficult concepts (Ibe-Bassey, 1991; Etim, 1998; Ikot, 2008). In spite of the role of instructional materials in facilitating learning, students have failed to acquire the needed knowledge and skills in Agricultural Science.

This study was conceived to show empirically the effects of instructional materials utilization on the performance of students in secondary schools. The problems of the study are stated as follows:

(i) What are the effects of graphic instructional materials on the performance of Agricultural Science students in Secondary Schools?
(ii) What are the effects of filmstrip instructional package on student's performance in Agricultural Science in secondary schools?

Studies on learning theories and skill acquisition learning revealed that a single approach or strategy cannot adequately explain the concept of how people learn, how materials should be used, how the various interactions affect learning and how best to organize the teaching and learning process (Nsa, 2012).

The development of cognitive and psycho-productive competences in learners has a lot to do with the constructivist and the pragmatic theories. Constructivists' theory is based on the assumption that learners can learn to construct or develop knowledge as they attempt to make sense out of their experiences in the teaching-learning situation. The constructivists maintained that the goals of instruction must be stated in such a way that they will help to develop learning and thinking and to focus on learners' active construction of knowledge-base and also to encourage active enquiry.

LITERATURE REVIEW

Instructional charts and students' performance in practical agriculture

A chart is a two dimensional object. They are flat visual materials which may represent diagrams or a combination of pictorial, graphic, numerical or verbal materials prepared to give a clear visual summary of vital processes, concepts or a set of relationships (Ibe-Bassey, 2000). Charts are used to present ideas and concepts which may be difficult to understand if presented using the verbal code only. Walter (1998) noted that the use of instructional charts in teaching improves the students' reading skill and stimulates creativity in the learners. Charts present an abstract rendition of reality because what is presented is shown as effective in the cognitive domain of learning. Okechukwu (1997) studied the impact of graphic materials on students' academic achievement in history using 925 students as the population size and 120 as sample size in an experimental study adopting 2 × 2 factorial arrangements. The findings of the study showed that students taught history using graphic materials such as charts and pictures performed better than their counterparts who were taught using lecture method without graphic materials.

Instructional pictures and students' performance in practical agriculture

Pictures are photographic representations of objects, people, places, events, things or concepts. Pictures in this context are still or motionless objects. They may be illustrations in textbooks, periodicals, catalogues, magazines, study prints and so on. Pictures are used to communicate abstract ideas in a more realistic way (Ibe Bassey, 1991; Etim, 2006).

A good picture should have good composition, a clear message, good contrast and sharpness with effective colours (Etim, 1998). Learners can learn from good quality pictures with or without the help of teachers. According to Okechukwu (1997), students taught with instructional pictures performed better than their counterparts taught without pictures.

Filmstrip instructional materials and students performance in practical agriculture

A filmstrip is a roll of 35 mm transparent film containing a series of related still pictures showing one concept at a time. A filmstrip can either be of a single or double frame format (Ikot, 2008).

Filmstrip can be used to teach skills, show relationships in order to convey knowledge, to affect attitude through individual and independent study groups or other tutorial groups viewing (Ibe Bassey, 1991). In a study to determine the effects of instructional materials utilization on performance of Junior Secondary Students' in Practical Agriculture in Ikot-Abasi Local Government Area, Ikot (2008) adopted a quasi-experimental design using the population of 1995 students and the intact class sample size of 225 students. The findings showed that there was significant difference between the performance

of students taught with filmstrip and those taught without filmstrip.

Abaas et al. (2012) in a study to determine the effects of Animated Agricultural Science instructional packages on Attitude and performance of Junior Secondary school Students in South West Area, Nigeria, discovered that the animated Agricultural Science Instructional packages significantly influenced the academic performance of the selected students. Osokoya (2007) in a study to determine the effects of video-taped instruction on Secondary School students' achievement in History discovered that there was significant difference between the mean scores of students taught history with video-taped instructional packages and those taught with the conventional lecture method.

Purpose of the study

The purpose of the current study was to determine the effects of instructional material utilization on the performance of the middle school students attending practical agriculture, Junior Secondary School Students in Practical Agriculture. Specifically, the study sought to:

1. Determine the difference in the performance of students taught practical agriculture using instructional charts.
2. Determine the difference in the performance of students taught practical agriculture using instructional pictures.
3. Determine the difference in the performance of students taught practical agriculture using the instructional filmstrips.
4. Determine the joint influence in the performance of students taught practical agriculture using charts, pictures and filmstrips instructional materials and those taught without them.

Hypotheses

The following null hypotheses were tested at -0.05 level of significance:

1. There is no significant difference in the performance of students taught practical agriculture using instructional charts and those taught without it.
2. There is no significant difference in the performance of students taught practical agriculture using instructional pictures and those taught without it.
3. There is no significant difference in the performance of students taught practical agriculture using instructional filmstrips and those taught without it.
4. There is no significant joint influence of instructional materials (charts, pictures and filmstrips) on the performance of students taught practical agriculture and those taught without them.

METHODOLOGY

Design of the study

This is a quasi-experimental study. It used a non-randomized pre/post-test control group design. This design was adopted to determine the effects of instructional material utilization on students' performance. The performance of the pretest was used to compare the entry behavior or previous knowledge of the groups involved in the study. It also helped to check against sampling error inherent in random sampling method which is selection based on chance. The post-test was used to assess the knowledge gained after the lessons.

Participants of the study

All Junior Secondary School Two (JSS II) practical agriculture students in Ikot-Abasi Local Education Committee (LEC) constituted the participants for the study. 1785 students from twelve schools participated in the current study.

Sample and sampling technique

The sample size for the study was 200 students purposively selected at intact classes level in five schools that had not below 40 students per class.

Research instrument

The instrument used to collect data for the study was called 'Students Achievement test in Practical Agriculture' (SATPA). It consisted of 50 multiple choice test items. The test items were constructed by the researchers based on the topics in this study (classification and feeding of farm animals).

Validation of the instrument

Students' Achievement test in Practical Agriculture (SATPA) was validated by three experts in the Department of Vocational Education, Faculty of Education, University of Uyo, Uyo. These experts ensured both face and contents validity of the instruments. The inputs that they made were incorporated in order to update the final copy of the instrument.

Table 1. T-test analysis showing the difference between the performances of students taught using charts and those without.

Source of variance	Groups	N	x Mean	df	t-cal	t-cri	Decision at P < 0.05
Pretest	Experimental	40	32.38	78	0.98	1.99	N.S
	Control	40	32.00				
Post-test	Experimental	40	58.60	78	5.83	1.99	*
	Control	40	35.93				

* Significant at P < 0.05 level of significance. NS = Not significant at P < 0.05.

Reliability of the instrument

The SAPTA instrument was administered to 40 students in the school that was not used for the main study. Split-halfs method of reliability was used and the scores were computed using Kudar-Richardson formula 21 (KR-32). The reliability co-efficient obtained was 0.80.

Research treatment procedures

The following procedures were used in order to administer the instrument:

(i) Permission was obtained from principals of the selected schools.
(ii) Agricultural science teachers who were used as research assistants were trained.
(iii) Pretest on SATPA was administered to the five intact classes selected. The pretest examination lasted for $1^{1/2}$ hr.
(iv) The scripts were collected and scored.
(v) The trained research assistants were given the instructional packages (the lesson plans and the instructional materials) to use in teaching. The packages consisted of charts for teaching of the experimental group one; picture materials for experimental group two, filmstrips materials for teaching group three; the fourth experimental group was taught using all the instructional packages in order to determine the interactive effects, while the fifth group was the control group taught without instructional materials.
(vi) All the groups were taught for one week of three lesson periods of 40 min each.
(vii) In the second week, post-test of the SAPTA were administered to the five groups. The test lasted for 1¼ hr. (1hr.15min).
(viii) The post-test scripts were collected and marked ready for analysis.

Data analysis

A t-test and analysis of covariance were used to test the null hypotheses at -0.05 level of significance.

Data presentation and interpretations

Null hypothesis 1

There is no significant difference in the performance of students taught practical agriculture using instructional charts and those taught without it.

Table 1 shows the difference between the performance of students in both pre- and post-test in both experimental and control groups. The t-test shows t-value of 5.83 in favour of the experimental group at the P value of 1.99. This means that there is a significant difference between the performance of students taught with charts (experimental) over control group taught without charts in the post-test. Thus, the null hypothesis was rejected.

Null hypothesis 2

In the post-test examinations as shown in Table 2, the t-test analysis shows a t-value of 4.56 in favour of those taught using picture instructional materials. It reveals a significant difference; therefore the null hypothesis that states there is no significant difference in the performance of students taught practical agriculture and those taught without was rejected.

Null hypothesis 3

Table 3 shows the post-test t-value of 4.33 greater than the t-critical value of 1.99 at df of 78 and P < 0.05 level of significance. The null hypothesis that states, that there is no significant difference between the performance of students taught with filmstrips and those without was rejected.

Null hypothesis 4

There is no significant joint influence of instructional

Table 2. T-test table showing the differences between the performances of students taught using pictures and those taught without.

Source of variance	Groups	N	xMean	df	t-cal	t-cri	Decision at P < .05
Pretest	Experimental	40	37.48	78	1.04	1.99	N.S
	Control	40	32.00				
Post-test	Experimental	40	51.40	78	4.56	1.99	*
	Control	40	35.93				

NS = Pre-test is not significant at P < .05. Post-test is significant at P < 0.5 level of significance.

Table 3. T-test table showing the difference between the performances of students taught using filmstrips and those taught without.

Source of variance	Groups	N	xMean	df	t-cal	t-cri	Decision at P < .05
Pretest	Experimental	40	37.23	78	1.02	1.99	N.S
	Control	40	32.00				
Post-test	Experimental	40	52.63	78	4.33	1.99	*
	Control	40	35.93				

NS = Pre-test is not significant at P < 0.05. * Post-test is significant at P < 0.5 level of significance.

Table 4. Analysis of covariance of post-test performance of students taught using charts, pictures and filmstrips.

Source of variance	Sum of squares	df	Mean squares	F-cal	F-crit	Decision at P < .05
Covariates pre-test	1438.50	1	1438.50	2.34	3.35	N.S
Main effects	2712.74	2	1356.37	16.51	3.06	*
Explained	2787.16	3	929.05	11.31	2.67	*
Residual	16047.01		82.16			

Significant at P < 0.05

materials (charts, pictures and filmstrips) on the performance of students taught practical agriculture and those taught without them.

Table 4 shows that the main effect of use of instructional materials (charts, pictures and filmstrips) was significant at P < 0.05 level of significance, having revealed a calculated F-value of 16.51 over the critical F-value of 3.06. Thus, the null hypothesis of no significant joint influence of instructional materials on student's performance in practical agriculture was rejected.

RESULTS AND DISCUSSIONS

In testing null hypothesis one, the t-test analysis showed that there was a significant difference between the performance of the students taught with charts and those taught without charts. The finding in hypothesis one is in support of Ibe-Bassey (2000) who asserted that instructional charts appeals to the sensory organs and also enables learners to draw relationship between the various concepts taught.

In null hypothesis two, the analysis indicated a significant difference between the performance of students taught with instructional pictures and those taught without pictures. The finding in hypothesis two agrees with Etim (2006) that learners can learn more easily and retain the information longer when concepts and other subject matters are presented using instructional pictures.

Null hypothesis three showed that there was a significant difference between the performance of students taught practical agriculture using filmstrips and those taught without filmstrips. This finding is in support of Osokoya (2007) and Abass et al. (2012) that students taught history using video-taped materials and students taught practical agriculture using animated instructional materials performed better than their counterparts taught using only lecture method.

In testing null hypothesis four, the analysis indicated

that there was a significant difference between the performance of students taught practical agriculture using charts, pictures and filmstrips over their counterparts taught without instructional materials. The significant difference may be attributed to the use of materials/treatment that is the use of instructional materials which offered close representations of ideas and concepts unlike teaching without those representations but as abstract concepts. The finding in hypothesis four is in line with Ibe-Bassey (2000); Etim (2006); Osokoya (2007) and Abaas et al. (2012) who indicated that students taught using charts, pictures, filmstrips, video taped materials and animated materials performed better than their counterparts taught using conventional lecture method.

CONCLUSION

The results indicated that students taught practical agriculture using instructional charts, pictures and filmstrips performed significantly better than students taught without instructional materials.

In the process of teaching/learning, instructional materials that were used facilitated students understanding by supplementing, clarifying, revitalizing and emphasizing the teacher's verbal efforts. This finding suggests that teachers should encourage the acquisition of knowledge, ideas, skills and attitudes in each learning activity.

Policy implications

The role of instructional materials in the teaching/learning process cannot be overemphasized. They facilitate and encourage self-study or independent study in students. The finding of this study has shown that inadequate use or lack of use of instructional materials in the teaching/learning situation (lecture method) negates the objective of teaching. Teachers who do not make use of instructional materials hide in the cover of none supply of the teaching resources. Therefore, as a matter of policy implementation, the governments at all levels should supply regularly standardized instructional materials, some useful hard and soft wares for use in schools. The vocational, technology and science teachers should be trained, retrained and exposed regularly to make them to be up to date in the effective selection and utilization of instructional materials for effective teaching.

RECOMMENDATIONS

Consequent upon the conclusion of this study based on the findings, the following are recommended:

1. Science, vocational and technology teachers should be resourceful in the selection and utilization of instructional materials that are useful in the concepts that they teach in each lesson.
2. The teachers should be made to update their knowledge and skills in improvisation of instructional materials through seminars, workshops and conferences organized by governments and professional bodies.
3. Teachers should develop positive attitudes towards the selection and use of instructional materials for teaching/ learning.

REFERENCES

Abass BT, Bimbo A, Ojo AO (2012). Effects of animated agricultural Science Instructional Package on attitude and performance of Junior Secondary School Students in South-West Nigeria. Mediterr. J. Soc. Sci. 3(1):425-435.

Awotua-efebo EB (2001). Effective teaching: Principles and Practice, Port Harcourt, Para graphics.

Etim PJ (1998). Instructional Modules development for improving Agricultural Science Education in Nigerian Secondary Schools. Afr. J. Educ. Inform. Manage. 1(1)

Etim PJ (2006). Issues in Educational Technology, Uyo. Abaam Publishing Company.

Ibe-Bassey GS (1991). The Selection and use of Instructional materials. Implications for teachers' Effectiveness. J. Educ. Media and Technol. 3(1):66-86.

Ibe-Bassey GS (2000). Principles and Practice of Instructional Communication, Uyo: Dorand Publishers.

Ikot AS (2008). Effects of Instructional Materials Utilization on performance of Junior Secondary Students in Practical Agriculture in Ikot-Abasi Local Government Area. Unpublished M.Sc. (ed) Thesis. University of Uyo, Uyo.

Nsa SO (2012). Instructional Strategies and Students Skills Acquisition in vegetable production. J. Bus. Econ. Review, *3*(1).

Nwachukwu CE (2006). Designing Appropriate Methodology in Vocational and Technical Education for Nigeria, Nsukka, University, Trust Publishers.

Okechukwu AR (1997). The Impact of graphic materials on students' academic achievement in History. Unpublished M.Sc. (ed) Thesis. University of Uyo, Uyo.

Olaitan SO, Aguisiobo ON (1994). Teaching of clothing and Textile. New York John Wiley and Sons Publishers.

Osokoya IO (2007). Effects of Video taped Instruction on Secondary School Students' Achievement in History, Int. J. Afr. Am. Stud. 6(1):27-34.

Walter AU (1998). Audio Materials: Their nature and use. New York, Harper and Row Publishers.