

INFLUENCE OF THE PRODUCTION AND UTILIZATION OF INSTRUCTIONAL MATERIALS ON TECHNICAL COLLEGE STUDENTS' ATTITUDE TO BASIC ELECTRICITY

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Abstract

This study explored the production and utilization of instructional materials (IM) by Basic Electricity teachers for determining the impact which such use has on students' attitude toward Basic Electricity it also sought to ascertain the degree of competencies by Basic Electricity teachers for the production and utilization of IM. The study was conducted in Enugu State with Basic Electricity students and teachers constituting the population. 700 Basic Electricity students and 140 Basic Electricity teachers participated in the study. A researcher-designed questionnaire was used to elicit information related to the research questions. Data were analysed using mean with standard deviation frequency and percentage. The results revealed, among other things, that Basic Electricity students showed positive attitude towards the production and utilization of IM. Basic Electricity teachers are ready to produce and utilize IM in the classroom. Based on the findings, the implications of the study were X-rayed and recommendation made among which is that Basic Electricity teachers should involve Basic Electricity students in the production of some IM.

Introduction

. Teaching and learning are supposed to be activity-oriented. This also accounts for the important role of the teacher in facilitating learning through appealing to the sensory stimuli of the learners. This corroborates the Chinese adage that what I hear, I forget, what I see, I remember and what I do, I understand. The National Policy on Education

(FRN,2004) devoted section 10 of the policy on Education Services which according to the document was meant to facilitate the implementation of educational planning and objectives and promote the efficacy of education. The objectives include- to enhance teaching and improve the competencies of teachers, to make learning more meaningful

for children, to reduce educational costs and to develop and promote an effective use of innovative materials in schools.

The policy specified measures in achieving the above objectives through the establishment of Teachers Resource Centres; Educational Resource Centres, Audio-Visual Centres, Science and Mathematics Centres and Workshops. There are clear indications of the Federal Government's recognition of the important role instructional materials could play in enhancing effective teaching and learning. Ifeakor (2004) stated that the objectives of any educational process determined the contents, methods and materials needed for achieving such objectives. The materials used for enhancing instructional effectiveness are aspects of media employed for achieving the instructional objectives.

Whether they are named educational media, instructional media, curriculum materials, teaching aids and the like, instructional materials (IM) represent message carriers, a sure dependable by the teacher for the noble purpose of attaining instructional objectives in teaching learning situations. Their naming therefore has no different intention outside the purpose of teaching; that is, eliciting desired behavioural change in the target audience (Cheta, 2002). Agun and Imogie (1988) described IM as information carriers designed specially to fulfil objectives in teaching-learning situations. Furthermore, Okeke (1995) noted that IM can be referred to as the wide variety of equipment and materials used for teaching and learning. They include - chalkboard, real objects, models, mock-ups, pictures, charts, television, slide projectors and other non-

projected and projected devices. They now possess high functional values in education and classroom instructions.

The indispensability of IM for teaching cannot be over-emphasized. The following claims have therefore been used to support the use of well applied educational aids:

- IM supply a concrete basis for conceptual thinking;
- They have a high degree of interest for children;
- They offer a reality of experience which stimulates self-activity on the part of the pupils;
- They develop a continuity of thought;
- They supply necessary basis for development, learning, hence make learning more permanent, and
- They provide experience not easily secured by other materials and contribute to the efficiency, depth and variety of learning (Yusuf, 1998).

To achieve this laudable objective of IM, all hands should be on deck to produce them in different subjects. Technical school Basic Electricity teachers needed to involve their students to serve as an inducement for teaching and learning to be student-centred. In the area of production of instructional science materials, apart from the specific practical techniques for producing each of the various types of materials, the following general guidelines can be of help. For instance, it is important to select specific instructional objectives, then identify characteristics of the learner, select the content, the appropriate media/instructional

materials, determine the cost, design and develop the materials, observing closely the rule of clarity, simplicity, accuracy, durability, suitability, size of the class, operating facilities and test the material for effectiveness.

The Basic Electricity teacher is to be guided by the objectives set; and at what stage the material is to be used-at the beginning of the lesson (introduction), at the presentation stage or at the end of the lesson. Furthermore, for proper utilization, the teacher must make certain preparations to ensure maximum utilization of the IM. To accomplish this, four basic steps are needed: preparation of the teacher-taking care of relevance, accuracy clarity etc; preparation of the learner i.e class management and briefing on the materials i.e its readiness; preparation for the follow-up to ascertain the extent to which learning has been achieved (Yusuf,1998;Ajelabi,2000).

Empirical studies within and outside Nigeria have established that students achieve greater learning as evidenced in cognitive and psychomotor skills, when IM are used for instructional purposes (Benedict,1994; Ifeakor, 2000 & Yusuf,1999). Studies have also established that students preferred mediated instruction to the prevalent classroom instruction (talk and chalk) in Nigeria school system (Ossana, 1990); Peterson and Webb.

It is also well-known that performance does not only rest on the intellectual skills but on the affective orientation of an individual too. No matter how resourceful a teacher may be, often times,

learners decide what and when to learn and according to their interest, needs, abilities and personalities. Students attitude to teaching-learning situation counts a lot towards effective learning.

The Oxford Advanced Learners Dictionary of Current English described attitude as a "way of feeling, thinking or behaving towards somebody/something". Stressing the importance of attitude, Gankon (1998) expressed thus:

Feeling is as real and as important and a part of our human nature as much as is knowing. How a person feels is almost important to him than what he knows. How he behaves is almost always more important to others than what he knows. (p. 358).

One's attitude towards something (a stimulus) is the person's mental disposition that will determine his/her response towards the stimulus to which the attitude is directed (Ayogu,2002). Attitude therefore can be positive or negative towards the stimulus. In the classroom setting, the production and utilization of instructional materials (IM) as earlier noted (Ajelabi 2000; Yusuf,1998) are potent factors to learning and learning outcomes. Therefore the assessment of technical school Basic Electricity students' attitude toward the production and utilization of instructional materials become a sine qua non in the efforts toward improving learning, learning habits and achievement in Basic Electricity. Furthermore, attitude had been

reported to be positively related to achievement in school subjects (Alao, 1990).

The production and utilization of IM for effective teaching and learning of Basic Electricity was the target of study presented in this paper. Specifically, the aim of the study was to ascertain the attitude of technical college Basic Electricity students towards the production and utilization of IM during Basic Electricity lessons. It should be noted that with the provisions of NPE on IM, adequate care should be taken for the implementation. Furthermore, it sought to ascertain how far Basic Electricity teachers were equipped with the competencies for the production and utilization of IM. Do technical school Basic Electricity teachers possess the skills to produce some IM like models of transformers and electric motors? How often do they involve students to do so? Are there IM available for teaching and learning of Basic Electricity. If IM are used in the classroom, how do students react to Basic Electricity learning session? These questions presented problems that necessitated this study.

Research Questions

The following research questions were answered by the study:

- 1) To what extent do technical school Basic Electricity teachers produce and utilize instructional materials (IM) in teaching?
- 2) What influence has the production

and utilization of IM on technical school students' attitude to Basic Electricity

- 3) How effective is the experience of technical school Basic Electricity teachers in the production and utilization of IM?

Research Method

The descriptive research method of the survey type was adopted. This method is considered appropriate to give adequate description of the production and utilization of IM and the degree of teachers' experience in the use and production of IM.

The study covered all the public technical colleges in Udi, Nsukka Enugu education zones of Enugu State Udi (32 schools), Nsukka (49 schools) and Enugu (64 schools).

The target population comprised all Basic Electricity teachers in 145 schools in the area of study and all the Basic Electricity students about 2,200 students in the 145 colleges.

Stratified random sampling based on location was used to select 70 schools (50%) of the schools in the three zones. Thus, 16 schools from Udi, 21 from Nsukka and 33 from Enugu zones. Simple random sampling was used, selected 10 students each from the sampled schools, thus giving a sample size of 700 students. Simple random sampling was also used to select 2 Basic Electricity teachers from the sampled schools giving a sample size of 140 Basic Electricity teachers.

The instrument used for this study

was a questionnaire prepared by the researcher. The instruction contained three sections A-C. Sections A and B were answered by the students. Section A dealt with information on the production and utilization of instructional materials (IM) by Basic Electricity teachers, while Section B dealt with the attitude of technical school Basic Electricity students on the production and use of IM. Section C dealt with the Basic Electricity teachers experience in the use and production of IM and was answered by Basic Electricity teachers. Section A and B were structured to elicit the degree of agreement and disagreement with the item statements based on a 4 point scale of strongly Agree (SA)= 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1. Section C was structured to elicit Yes/No responses.

The instrument was validated by two Basic Electricity teachers in Awgu zone and two lecturers who are measurement and evaluation experts. Based on their suggestions, the instrument was modified.

The questionnaires was administered to 50 students and 28 Basic Electricity teachers in Awgu education zone. A measure of internal consistency was determined for the three sections using cronbach Alfa method thus Section A=0.69, Section B=0.72 and Section C=0.89. This method was considered appropriate since the items are non-dichotomous.

The administration of the questionnaire was done by the researcher and research assistants who are science teachers other than Basic Electricity-4 from Udi zone, 4 from Nsukka zone and 7 from Enugu zone. The choice of research assistants was to facilitate data collection. They were asked to administer and collect back respondents' responses to questionnaire items during their visit on the spot. Through this process, all the administered questionnaire were returned thus ensuring 100% return rate.

The data obtained from sections A and B were analysed using mean with standard deviation (SD). Based on the four point scale of the instrument, a mean of 2.55 and above was an indication of positive attitude for positive statement and indication of negative attitude for negative statement. On the other hand, a mean of 2.50 and below was indication of negative attitude for a positive statement and an indication of positive attitude of a negative statement. For section C, data collected were analysed using frequency count and percentage.

Results and Discussion

Table 1: Mean and Standard Deviation (SD) on the Production and Utilization of Instructional Materials (IM) by Basic Electricity teachers. N=700

	Item	X'	SD	Remarks
1	Your Basic Electricity teacher mentions that some IM can be produced using clay, plastacine, paper-machine etc.	2.49	0.89	Negative
2	Your Basic Electricity teacher builds models of the concept/machines to be taught.	2.15	0.98	Negative
3	You have been told to build models or draw a chart in Basic Electricity	1.99	2.10	Negative
4	Most of the Basic Electricity lessons are taught with practical demonstrations of the concept	2.40	1.98	Negative
5	Available IM in the Basic Electricity laboratory are used by your Basic Electricity teacher to demonstrate the lessons.	2.05	1.03	Negative
6	On some occasions, your Basic Electricity teacher told you that there are no IM in your school laboratory	2.98	1.73	Negative
7	There is no fund to purchase standard IM in the market or materials to produce improved ones.	4.05	2.17	Negative
8	Your Basic Electricity teacher has never used any IM during his/her lesson.	3.78	2.05	Negative

Table 1 on the production and utilization of IM by Basic Electricity teacher as observed by Basic Electricity students indicated that most

Basic Electricity teachers do not produce and use IM in teaching. This result of analysis was used to answer research question 1. One may conclude from these results that most Basic

Electricity teachers still use the conventional "talk and chalk" method.

Table 2: Mean and standard deviation and Remarks on the Technical School Basic Electricity students attitude in respect to each item N=700

	Item	X'	SD	Remarks
1	Joining in the production of IM supply a concrete basis for conceptual thinking	4.32	1.53	Positive
2	Use of IM motive, hold and control attention and generate interest in students	3.61	0.85	Position
3	Encouraging students to learn through the building of models etc is time consuming.	2.41	2.21	Negative
4	Production of IM in teaching is stressful	2.09	2.57	Negative
5	Production of IM aids imagination and improves perceptual development	3.85	1.29	Positive
6	Use of IM makes learning more permanent	3.90	0.64	Positive
7	IM are too difficult to source and costly too	1.78	1.16	Negative
8	Use of IM enhances students' participation and stimulates self-activities	4.95	1.54	Position
9	Production of IM can positively influence students' cooperative learning	3.36	2.07	Positive
10	Utilization of IM can improve achievement and consequently increase enrolment in Basic Electricity.	3.50	1.67	Positive
11	The use of IM would make Basic Electricity lessons enjoyable	4.29	0.99	Positive
12	Knowledge acquired through the production and utilization of IM in Basic Electricity lessons can positively influence students' career choice	3.36	1.01	Positive

Table 2 was used to answer research question 2. The mean score of 9 out of 12 items constructed in favour of the production and utilization of IM exceeded 2.55, the base mark for positive attitude for an item. The posture indicates that Basic Electricity students have positive attitude towards the use and production of IM by Basic Electricity teachers for instructional purposes. The negative attitude demonstrated in items 3,4 and 7 simple signifies that Basic Electricity teachers do-not produce and use IM in teaching-learning processes otherwise some common IM e.g common switch, sockets and lampholders are not costly and can be sourced. Their practical use in classroom will

convince Basic Electricity teachers that they will save their time and energy. Some studies (Ayogu,1999;Mogbo,1994;Okwo,1998 and Yusuf,1999) reported of non-availability, inaccessibility and non utilization of IM in schools. The teachers, students and the school authorities can easily source some of the IM for the teaching of technical school Basic Electricity.

Table 3: Frequency and Percentage of Basic Electricity Teachers' Experience in the Production and Utilization of Instructional Materials (IM) N=140.

	Item		%		%
1	Do you consider your pre-service training in the production and utilization of IM adequate?	20	14.3	120	85.7
2	Have you attended any workshop or seminar on the production and use of IM?	18	12.9	113	80.7
3	If yes (to2) did you benefit through your attendance?	05	27.7	13	72.2
4	Do you make personal effort to develop in IM through reading, discussion or use of audio-visual materials?	105	75.0	35	25
5	Would you be ready to attend an in-service course/training on the use and production of IM	129	92.1	11	7.8
6	Given all the assistance (material resources etc) would you be ready to produce and use IM for instructional purpose?	132	94.3	08	5.7

From the results in Table 3, majority of the Basic Electricity teachers indicated that their pre-service and in-service training in production and use of IM were inadequate. Specifically, while 14.3% of the teachers considered their training to be adequate, 85.7% of them considered their experience to be inadequate. Their responses also indicated that 12.9% of them attended seminar or workshop in IM production and utilization while 80.7% never attended any. Among those who responded positively to the attendance of workshop, 27.7% of them believed they benefited by their attendance, while 72.2% believed they did not benefit. The analysis further revealed that 75.0%

of the teachers indicated that they made personal efforts to develop interest in the production and utilization of IM, while 25.0% indicated no interest development. Majority of teachers (92.1%) showed their interest in attending in-service programmes on the use and production of IM. This finding is in line with Ifeakor (2003) in which she noted that "in-service training would help science teachers to know how to use science and technical education materials in teaching science subjects to their students in a more effective manner" Finally, 94.3% of Basic Electricity teachers indicated that with the availability of all resources they would produce and utilize IM for instructional purposes.

Conclusions

This study has demonstrated that most Basic Electricity teachers do not produce and utilize instructional materials for teaching and learning. It was also revealed that Basic Electricity students showed positive attitude towards the production and utilization of IM by Basic Electricity teachers for instructional purposes. Furthermore, Basic Electricity teachers considered their pre-service training inadequate to meet the challenges related to IM production and utilization and they expressed interest in the area when fully equipped with adequate resources.

Based on these findings, the indicated positive attitude by Basic Electricity students towards the production and utilization of IM implied that:

- 1) Students were aware that production and utilization of IM would supply them with a concrete basis for conceptual thinking.
- 2) That with the use of IM, they would improve in Basic Electricity achievement and their interest would be enhanced
- 3) That with the production and utilization of IM, they would make the right career choice.
- 4) That with the use of IM by their teachers, Basic Electricity lessons would be enjoyable.
- 5) On the other hand, Basic Electricity teachers are aware that with proper in-service training and provision of adequate resources they would be able to produce and utilize IM for instructional purposes.

Recommendations

The researcher recommended that:

- 1) Basic Electricity teachers should involve Basic Electricity students in the production of some instructional materials (IM) eg. Models of transformers, electric motors, solar panel components, etc.
- 2) Basic Electricity teachers should be encouraged to break away from the nonchalant attitude of not producing and utilizing available IM in their classroom.
- 3) Production and Utilization of IM should be made prominent and integrated into Science Education Programmes in teacher training schools like College of Education and Universities.
- 4) Seminars, workshop and in-service training should be periodically organized for Basic Electricity teachers and attendance must be mandatory.
- 5) The government-federal and state-should be made to understand that it is not enough to establish resource centres, what is important is to make them functional for maximum utilization

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introduction of the 6-3-3-4 system in 1982, they presently appear lopsided. The trainings are tilted towards making the individual to acquire knowledge, skills, attitudes and techniques about trades businesses and crafts to enable the recipients become entrepreneurs or gainfully employed in their respective specialisation areas.

Okaro (2010) notes that 95% of small and medium enterprises in Nigeria do not intend to live beyond their 10 years of existence. Many reasons have been adduced for this unwholesome state of affairs. Top of this list include lack of knowledge on the following areas; cost management, record keeping (especially financial records) and internal control (including ineffective internal audit).

For those versed with the knowledge of counselling, it is clear from the above points that the application of counselling will facilitate the repositioning of technical and vocational training for national development of Nigeria.

Robert (1971) in Ekwe (2009) defined technical and vocational (training as a type of education designed for preparing the individual learner to earn a living (to be self-reliant) or increase his earnings in an occupation where technical information and an understanding of the laws of science and technology as applicable to modern design, production, distribution and services are essential for success. The National Policy on Education (2004) also defined TVT as that education which leads to the acquisition of practical and applied skills as well as basic scientific knowledge. In the same vein, Ali (2001) defined technical education as the successful acquisition through formal learning and application of scientific ideas, principles and theories for the purpose of developing techniques for and

or providing goods and services as well as for improving technology itself. Further Mkpozi (2004), viewed TVT as a form of education that provides the skills, knowledge and attitudes necessary for effective employment in specific occupation. American Vocational Association (1954) in Okwoma (2009), defined TVT as an education designed to develop skills, abilities, understanding, attitudes, work habits, appreciations, encompassing knowledge and information needed by workers to enter and make progress in employment on a useful and progressive basis. Counselling will provide information needed by workers to enter and make progress in employment.

Ipaye (1990) defines counseling as a learning process whereby both counselor and the client learn by means of encounter and relationship so as to help the client to learn not only to maximize the benefits of his living but also to expose him to use his affective being to maximize the gains of his cognitive and psychomotor domain. He stresses that in counselling, for example, the individual learns new ways of communicating, new ways of obtaining information, new ways of making decisions, new ways of responding to the environment and new ways of interacting. Egbo (2008) notes that the job of counselling is to give the individual an opportunity to define, explore, discover and adopt ways of living more satisfying and resourcesfull life within the social, educational and vocational groupings with which he or she identifies. Living satisfyingly and resourcefully within the vocational group with which one identifies could involve the following ; - developing awareness about the word of work, acquiring usable information and social skills that could pay off in getting