

REVELANCE OF INSTRUCTIONAL MATERIALS TO THE SUCCESSFUL IMPLEMENTATION OF ELECTRICAL INSTALLATION AND MAINTENANCE WORKS CURRICULUM AT TECHNICAL SCHOOL LEVEL IN ENUGU STATE

BY

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Abstract

This paper examined the relevance of instructional materials to the successful implementation of Electrical Installation and Maintenance Works (EIMW) curriculum at the Technical School level in Enugu Educational Zone, Enugu State. In an attempt to establish the importance of instructional materials to the teaching and learning of EIMW the researcher employed quasi experimental research design. The study made use of two Technical Schools Year II classes from two co-educational Technical schools that offer EIMW. The investigation indicated that students in instructional materials group performed better in the post-test than their mates in the group without instructional materials. The paper also examined certain peculiar problems militating against the use of instructional materials in EIMW. The study shows that for effective realization of the benefits of instructional materials, teachers concerned should be given opportunities to attend seminars, workshops, and conferences on the teaching material improvisation techniques.

Key words: Instructional Materials, Implementation, Curriculum Technical School

Introduction

Today, the EIMW teacher is facing many criticisms with regards to the seldom use or lack of utilization of instructional materials to facilitate teaching and learning processes. The potential values of the subject are probably not being realized due to poor communication between the teacher and the students and improper or lack of use of instructional materials. Effective communication in the classroom is the river that gives life to students learning. For effective teaching and learning of EIMW, teachers should reduce “over-verbalization”. By this, the teacher is to minimize the excessive use of words to convey meanings in a skill acquisition programme like EIMW. Unfortunately, some of the teachers do love to hear the

sound of their voices, so much that they often forget to consider whether or not their students are really understanding, enjoying their teachings and acquiring the skills.

The possible result is that students find it difficult to relate facts and concepts, which the EIMW teacher teaches in every day experiences, real world or design electrical circuits to solve problems. EIMW teacher has a duty of finding how to relate his subject matter to students' interest and every day experiences. Since children at this level imagine things, their teachers need to stimulate their imagination at this level with expression works. Lesson should be presented to them in concrete, pictorial and practical forms. In general, instructional materials

- i. Awaken pupils interest by arousing their curiosity to learn more.
- ii. Provide more scientific bases on what are known about human beings.
- iii. Make instruction more powerful by stimulating reality, bringing distant and remote events to pupils.
- iv. Make concepts taught last longer in students' memories;
- v. Make learning more immediate by helping to bridge the gap between the world outside and the world inside the classroom and
- vi. Provide diversified ways through which individual learners needs are met (Oludipe, 2004:63).

Teachers are to recognize that the days are gone when textbooks and chalkboards were the only materials available for effective EIMW instruction. The current era is that of learning by doing. The child's entire senses need to be stimulated for effective total child education. The Technical School teachers of EIMW need to sit up and face the challenges of using instructional materials and resources for effective implementation of EIMW curriculum.

Statement of the Problem

It is expected that when students are taught EIMW concepts by their teachers using relevant instructional materials they will be more interested in the subject and perform well. It is in this view that the investigator looked at the relevance of instructional materials to the effective teaching and learning of EIMW.

The following hypothesis guided the study

There will be no significant difference between students in instructional materials Group (IMG) and students in the group without instructional material (WOIM) in their achievement at the post-test. The study will also determine the factors militating against effective utilization of instructional materials.

Research Method

Design of the Study

The research design for this study is quasi-experimental. This implies that the study was not a pure experimental study. A pure experimental design is not always possible for research in education because there always exist some extraneous variables beyond the researcher's control source (Aku, 2013).

Area of the Study

The study was carried out in Enugu Education Zone of Enugu State, Nigeria with two Local Government Areas Enugu North and Enugu South. The researcher used the Enugu Education Zone for the convenience. And also to ensure that all the respondents share common socio-cultural environment.

Population for the Study

The target population for the study consisted of all year II students in the 17 Technical schools in the area, with a total figure of 300.

Sample and Sampling Technique

Eighty students from two arms of Technical Schools Year II were randomly selected from two-co-educational Technical Schools in Enugu Education Zone of Enugu State. There are 40 students in each school. They were used for the two experimental groups.

In each school selected, one sample class was taught with instructional materials which included visual materials such as models, switches, electric motors, conduit fittings, sockets, blenders, generators, bulbs, cables, etc and the other was taught without instructional materials. The classes taught with instructional materials, instructional material groups are denoted by IMG, while those taught without instructional materials are represented as WOIM.

Materials Used:

The material used for the study included:

- a. A scheme of work consisting of selected EIMW topics, which were taught for a period of six weeks. The students have not been exposed to these topics before the study.
 - b. An instructional package without instructional materials.
 - c. An instructional package with instructional materials.
 - d. A set of fifty multiple-choice EIMW test items on the topics studied. The instrument was used as a pretest and post-test (rearranged) in order to evaluate students' achievement. These topics were taught to the students for a period of six weeks.
- a) Hazards in Electrical Workshops
 - b) Precautions in handling electrical tools and materials
 - c) First aid for electrical accidents
 - d) Electrical accessories
 - e) Conduit wirings
 - f) Rewinding of single phase electric motors

Procedure

The pre-test and post-test designs were used for this study. One class was designated as Instructional Materials Group (IMG) while the other class was designated as without Instructional Materials Group (WOIMG). The pre-test was administered to both groups at the beginning of the six weeks, the same test was administered to both IMG and WOIMG classes as post-test. The items of the pro-test were re-arranged to give a vague feeling that the post-test was different from the pre-test.

Results:

Tables 1,2 and 3 present the mean and standard scores on the results of the investigation.

Table 1: Comparison of the Pre-test and Post-test Results of the IMG Classes

| Topics | Pretest Mean | STD | Post Test Mean | STD |
|--|--------------|------|----------------|------|
| Hazards in Electrical Workshops | 16.53 | 0.83 | 26.53 | 2.83 |
| Precautions in handling electrical tools and materials | 2.85 | 0.83 | 5.00 | 0.23 |
| First aid for electrical accidents | 3.13 | 0.23 | 5.13 | 0.23 |
| Electrical accessories | 3.10 | 0.23 | 5.10 | 0.23 |
| Conduit wirings | 2.35 | 0.25 | 4.5 | 0.25 |
| Rewinding of single phase electric motors | 3.38 | 0.25 | 5.35 | 0.25 |

Table 1 above indicates the comparison of the pretest and post-test of the group taught with instructional materials. The table shows that the post-test mean scores of the six topics taught are greater than the pretest means. This shows that the students gained a lot after being taught using instructional aids.

Table 2: Comparison of the Pretest and Post-test results of the WOIM Classes

| Topics | Pretest Mean | STD | Post Test Mean | STD |
|--|--------------|------|----------------|------|
| Hazards in Electrical Workshops | 16.55 | 2.83 | 17.53 | 2.67 |
| Precautions in handling electrical tools and materials | 2.80 | 0.86 | 3.00 | 0.23 |
| First aid for electrical accidents | 3.10 | 0.23 | 5.10 | 0.23 |
| Electrical accessories | 3.15 | 0.23 | 5.15 | 0.23 |
| Conduit wirings | 2.18 | 0.37 | 2.38 | 0.36 |
| Rewinding of single phase electric motors | 3.15 | 0.41 | 3.45 | 0.36 |

Table 2 above indicates that the students gained significantly when they were taught first aid for Electrical accidents and Electrical accessories. That is why the post-test means (5.10, 5.15) on the two topics were higher than the pre-test means (3.10, 3.15). The table also shows that the students did not gain significantly when they were taught other four topics without instructional materials, though, little differences exist between the pretest and post-test mean scores.

Table 3: Comparison of the post-test results of the two instructional groups

| Instructional Material Group (IMG) | | | | Group without Instructional Materials (WOIM) | | | |
|--|----|----------------|------|--|----------------|------|---------|
| Topics taught | N | Post-test mean | STD | N | Post-test mean | STD | t-Value |
| Hazards in Electrical Workshops | 40 | 26.53 | 2.63 | 40 | 17.53 | 2.67 | 14.52 |
| Precautions in handling electrical tools and materials | 40 | 5.00 | 0.22 | 40 | 3.00 | 0.23 | 38.89 |
| First aid for electrical accidents | 40 | 5.13 | 0.23 | 40 | 5.10 | 0.23 | 0.6 |
| Electrical accessories | 40 | 5.10 | 0.23 | 40 | 5.15 | 0.23 | 1.00 |
| Conduit wirings | 40 | 4.5 | 0.36 | 40 | 2.38 | 0.36 | 26.5 |
| Rewinding of single phase electric motors | 40 | 5.35 | 0.25 | 40 | 3.45 | 0.12 | 49.25 |

Table 3 shows calculated t-value of 14.52, 38.89, 0.6, 1.00, 26.5, 49.25 at $P < 0.05$ for the topics mentioned. The critical value at (78+) = 1.96. This implies that the null hypothesis is accepted for first aid for electrical accidents, and Electrical accessories. This is because their calculated t-values of 0.6 and 1.00 are less than table value of 1.96. This indicates that there is no significant difference in the two groups. The mean scores of the two groups in the two topics mentioned above confirm this.

It is believed that the two topics first aid for electrical accidents and electrical accessories deal with students every day experience. Therefore, teaching them those topics without instructional materials do not really affect achievement on the two topics.

Moreover, the null hypothesis is rejected for the topics, hazards in electrical workshops, precautions in handling electrical tools and materials, Conduit wirings and rewinding of single phase electric motors. This is because their calculated t-values 14.52, 38.89, 26.5 and 49.25 are higher than the value (1.96). This means that there is significant difference in the post-test groups. Those taught without instructional materials performed lower than those taught with instructional materials.

Table 4: Qualification of EIMW Teachers

| Qualifications | Numbers | Percentage |
|------------------------------|---------|------------|
| NCE (Tech Edu) | 09 | 20 |
| BSc (Ind. Tech. Edu) - EIMW | 03 | 6.67 |
| City and Guilds (Full Techs) | 20 | 44.44 |
| | 07 | 15.56 |
| BSc (Indu. Tech Edu) | 06 | 13.33 |

Table 4 above indicates that most of the teachers teaching EIMW are not trained purposely for EIMW.

Table 5: Teachers Responses to Some Vital Questions on EIMW

| | Yes | % | No | % |
|---|-----|-------|----|-------|
| Have you EIMW workshop in your school? | 12 | 2.6 | 33 | 73.33 |
| You are aware of improvisation techniques in EIMW | 16 | 35.56 | 29 | 64.44 |
| You have enough instructional materials to teach EIMW | 0.1 | 22.22 | 35 | 77.78 |
| You have enough periods per week on the timetable to teach EIMW | 05 | 11.11 | 40 | 88.89 |

The result in the table above indicates that most of the Technical Schools do not have separate EIMW workshops. School administrators see provision of EIMW workshop as a mere waste of merge resources available. Most of the schools indicate that they lack instructional materials due to the present economic predicaments. However, most of the instructional materials needed in EIMW can be improvised. It is unfortunate that most of the teachers do not possess sense of improvisation. Once the original materials are not available, they forget about the use of the instructional materials to facilitate teaching and learning.

The same table 5 indicates that 88.89 of the teachers responded that they do not have enough periods on the school time table to teach EIMW. It occurs only twice in the school time-table a week. Consequently, most teachers have little or no time for concretizing these aspects in their teachings. Only 11.11% of the teachers said that they have enough periods on their school time-table.

Summary of Findings

- i. That teaching EIMW topics using instructional materials enhances the teaching and learning of EIMW.

- ii. That lack of trained teachers for EIMW, lack of facilities, lack of instructional materials and time factor are the reasons behind the ineffectiveness of the use of instructional materials for the teaching of EIMW.

Discussion of Findings

The result of the study as shown in tables **1**, **2**, and **3** reveal that students taught with instructional materials performed better than students taught without instructional materials in EIMW. The t-calculated is greater than the table t of 1.96. This finding is in line with Pasko (2013), Eyo (2007), Alio (2011) and Enem (2001). These scholars after their different studies concluded that the more the use of instructional materials in the classroom, the greater learning and motivation of students towards learning.

The result of the investigation also indicates that there is inadequate trained teachers of EIMW. This is supportive of earlier studies of Kalo (2014) and Ade (2009), confirmed by Femi (2009) indicated that lack of qualified teachers to teach EIMW in Technical Schools in Nigeria has compelled many states to entrust the teaching of the subject to anyone willing, but not necessarily able to do so. Aku (2013) agreed with the findings of the study that shortage of relevant instructional materials and lack of improvisation of the materials by teachers and students are among factors militating against effective implementation of EIMW curriculum in Technical Schools. Teachers emphasize verbal symbolism, engage limited sense organs in learners and encourage learning passivity in the learning processes. The resultant one way communication strategy in which inadequate creative ideals, processes and media are utilized is not appropriate for the achievement of the objectives of EIMW in Nigeria.

Recommendations

Lack of teaching instructional materials will be a thing of the past if EIMW teachers can improve in improvising instructional materials. Improvisation according to Mshe (2015) is the act of using alternative materials and resources to facilitate instruction whenever there is shortage of some specific first hand teaching aids. Teachers' lack of ability to improvise

EIMW instructional materials is indicative of the fact that they should be given adequate background trainings in the use of instructional materials particularly in the area of their improvisations.

Having known that instructional materials are beneficial in EIMW teaching, an in-service training programme on effective utilization of EIMW instructional materials should be introduced in all our tertiary institutions. This will enable EIMW teachers not only to know how to improvise it but to know how to use them effectively to enhance teaching and learning. Besides, workshops, seminars and conferences should be organized for the practicing teachers to improve instructional materials production and utilization.

Furthermore, to improve on the availability of qualified EIMW teachers, EIMW should be offered as a compulsory course by all the colleges of education and faculties of education in our Universities as electricity is used in all homes globally. Also, Technical schools administrators should allot more equal hours, as it is in English Language to EIMW on their school time-tables. This will give teachers and students sufficient time to undertake projects to concretize EIMW concepts and ideas.

Conclusion

The result of the study reveal that teaching EIMW concepts and ideas using instructional materials enhances the teaching and learning of EIMW. Since some of these instructional materials are not available and procurement of some of them not easy because of the present economic predicament of our country, there is urgent improvisation and utilization of needed instructional materials. Successful implementation of the core curriculum for EIMW at Technical Schools in Nigeria will be very much effective if all the issues on the above recommendations are put into action.

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