Improvisation of Instructional Materials for Introductory Technology: The Delta State Experience

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ABSTRACT

The study sought to identify how the teachers of introductory technology improvise instructional materials for teaching and learning. The survey research design was adopted. 150 introductory technology teachers in Delta State Secondary Schools were sampled. The questionnaire had 22 major items which fall into five categories namely: perception of the introductory technology teachers towards improvisation; degree of awareness of improvised materials by the introductory technology teachers; extent of utilization of improvised materials; obstacles hindering improvisation of teaching materials in introductory technology and extent of improvisation of introductory materials. Data was analyzed using frequency and percentage and revealed that: introductory technology teachers have positive perceptions towards improvisation. Teachers' awareness for improvisation and the level of utilization of improved materials is very low. Also a lot of obstacles confronted teachers from improvising and teachers find it difficult to improvise instructional materials. The study therefore, recommends among others, that all technical education programmes (including introductory technology programme) should include a course on improvisation. Practicing introductory technology teachers should attend regularly conferences workshops and seminars on improvisation.

Keywords: *Introductory technology, improvisation,*

INTRODUCTION

There is a general agreement that the most appropriate function of education (technical education inclusive) in the secondary school curriculum is to provide opportunities for developing competencies in student's area of vocational choice (Okoro, 1993; Okorie and Ezeji, 1988; FRN, 2004: Osuala 1981; UNESCO, 1978). The effective implementation of this curriculum presupposes the availability of adequate instructional materials. Unfortunately, a recurring problem besieging technical education since its inception has been the absence of adequate facilities. Majorie and Brown (1969) had warned that teachers should not use inadequate facilities and equipment as an excuse to resort to poor teaching; instead they should learn to improvise. Improvisation in school has long been a subject of interest to both education and curriculum developers. Ibe (1992) sees improvisation of instructional materials as the preparation and the provision of alternatives to real materials as teaching aids. He went further to emphasize that where the materials are to be improvised, emphasis should be laid on using cheap, locally available materials. The present system of secondary education in Nigeria has emphasized the study of introductory technology at the first tier of the two tier secondary education system. The

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National Policy on Education (FRN, 2004 and Okorie, 2001) have stated that the junior secondary schools will be both prevocational and academic. However, the policy document goes further to state the pre-vocational subjects as:

(i) woodwork (ii) metal work (iii) electronics (iv) basic electricity,
(ii) Elementary building construction (vi) technical drawing
(iii) Food preservation and storage and other miscellaneous topics

A closer reflection on these subjects reveals the importance of using adequate and appropriate teaching materials for their effective teaching and learning in the classroom. The development of knowledge and skills in them should need the manipulation of teaching materials for their effective study. Callahan and Clark (2977) emphasizing the importance applying improvised materials in teaching, state that, we use new tool, to spice up the teaching-learning process and to make it possible for pupils to teach themselves. It is impossible to teach without tools. Introductory technology emphasizes the development of psychomotor skills. In essence, it requires more of seeing and touching of the tools and materials of instruction than mere theorization.

Onwuka (1981) states that there is a continual explosion of technology and as such it becomes necessary that people must continue to acquire new skills and methods of doing things. For the fact that introductory technology forms a base for the technological and industrial growth of Nigeria, it then becomes very necessary to improvise the necessary instructional materials for effective teaching and learning of the subject. Furthermore, improvisation of instructional materials increases the resourcefulness of the introductory technology teacher. The teacher, as he improvises forms the habit of converting what would have been regarded as useless materials into useful forms. It also creates room for the involvement of the teacher in more reading and other academic findings. By so doing, the teacher increases his knowledge in the introductory technology subjects as enunciated in the National Policy on Education (FRN, 2004).

There is dearth in improvisation of teaching and learning materials in technology education (Akpan, 1994). This may be responsible for the lop-sided handling of the issue by various organizations in the country. The Federal Science Equipment Centre at Yaba and Product Development Institute at Enugu, have been established for the production, maintenance and repair of science equipment for the schools. Also the Nigerian Educational Research Council has been organizing workshops to improve the effectiveness of science teachers towards improvisation. Technical education is yet to benefit from any of these projects particularly in introductory technology. The need to improvise instructional materials that could be made from locally available materials at lower costs becomes imperative as introductory technology equipment are scarce and expensive in the fast declining value of the Naira in the world market. This study, therefore sought answers to the following research questions.

1. What is the perception on the introductory technology teachers towards improvisation of teaching facilities?
2. To what extent are the introductory technology teachers aware of the specific instructional materials that could be improvised locally?

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3. To what extent do the introductory technology teachers utilize improvised materials in the teaching of the subject?
4. What are the obstacles that hinder introductory technology teachers from improvising teaching materials?
5. To what extent do the introductory technology teachers improvise specific teaching materials?

PARTICIPANTS AND PROCEDURE

A survey design was adopted for this study because it solicited the opinion of the respondents. The population is made up of 150 technical teachers teaching introductory technology in the secondary schools in Delta State. All the technical teachers were utilized for this study considering their fewness. Relevant data were sought from these participants through the administrations of copies of a researcher developed questionnaire on them. A 27 item questionnaire which covered perception of introductory teachers towards improvisation of teaching facilities, extent of awareness of introductory technology teachers about improvisation, extent of utilization of improvised materials, obstacles hindering improvisation of teaching technology materials. The instrument was validated by two lecturers from the department of technical and business education, Delta State University, Abraka. They scrutinized the questionnaire. Their comments were assembled and based on their corrections, two items were dropped and finally leaving the questionnaire with 27 items. A reliability coefficient of 0.65 was obtained using Cronbach Alpha. A total of 150 copies of the questionnaire were administered. The participants were requested to complete the questionnaire and return same to the investigator. All copies of the questionnaire were duly completed and return for analysis. Data collected were analyzed by means of frequency count and the percentage.

RESULTS AND DISCUSSION

Items on table 1 sought to ascertain the perception of introductory technology teachers towards improvisation of teaching materials. The average percent in favour of improvisation of instructional materials is 66.71% while 33.29% of the cases show the unfavourable disposition of teachers towards improvisation. Items considered on table 2 were used to verify the extent to which the introductory technology teachers were aware of specific teaching materials that could be improvised. The average percentage level of awareness in favour of improvisation is 23.52% while 76.48% of the teachers claimed ignorance about materials that could be improvised. The level of awareness is very low or non-existent. Table 3 indicates the extent of utilization of improvised materials in teaching introductory technology by the teachers. The average response in favour of utilization of improvised materials is 33.20% while the response for non-utilization of improvised materials stands at 66.80%. This shows that the level of utilization of improvised teaching materials in introductory technology is low. Table 4 shows that the introductory technology teachers encountered problems in 64.01% of the cases. The results on table 5 show that averages of 18% of the various instructional materials in introductory technology were locally

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improvised by the technical teachers for their school workshops. This study has revealed the following findings regarding improvisation of instructional materials by teachers of introductory technology:

1. Teachers have positive perceptions towards improvisation of teaching facilities
2. Introductory technology teachers' awareness for improvisation of instructional materials is very low or non-existent.
3. The level of utilization of improvised instructional materials by teachers of introductory technology is very low.
4. Introductory technology teachers are faced with obstacles that hinder them from improvisation such as insufficient time, non-availability of fund, lack of motivation, creativity, skills, basic materials and poor salary.
5. Teachers deemed it difficult to improvise instructional materials.

The findings of the study indicate that introductory technology teachers have positive perceptions towards improvisation of teaching facilities. Teacher's awareness for improvisation of instructional materials and their level of utilization of improvised materials is very low. A lot of obstacles confront teachers from improvising and teachers find it difficult to improvise instructional materials. The perception of the teachers towards improvisation is not matched with corresponding enthusiasm to actually carry out improvisation. Research has proved that effective use of instructional materials arouse student's interest (Agwagah, 1999: Uzoegwu, 2001). It is therefore, expected that in the absence of the commercially made instructional materials for the teaching and learning of introductory technology, teachers can improvise.

The high ignorance level of 76.48% is disgusting and may be responsible for the teachers not being able to direct students to take part in improvising materials for the workshop. Opinions of some researchers (Balogun, 1982: Osuala, 1990) indicate that teachers usually avoid practical because they do not possess the confidence to try what they have not done before. The few that are willing to carry out practical lessons only accept to do so when imported and ready-made instructional materials and equipment are available. The crux of the matter is that most technical teacher's programme do not expose the students to appropriate courses on instructional materials stand equipment construction, maintenance repair and improvisation for introductory technology teachers lack the basic ingenuity needed for improvisation and hardly ever attend workshop on improvisation. Lacks of fund, motivation, creativity, time, skills, basic materials and poor salary have been identified by introductory technology, teachers as obstacles they contend with in improvisation. Ibe (1992) has emphasized that lack of fund; motivation, creativity, time, skills, basic materials and poor salary have hindered the teachers from preparing instructional materials. The fact that introductory technology teachers find it hard in improvising instructional materials negates the principles of effective teaching of the subjects since commercial instructional materials are scarce. The assertion seems to be in line with the call made by Majorie and Brown (1969) for teachers to improvise in teaching practical lessons. But it is only in 18.80% of instructional materials in table 5 that the introductory technology teachers actually made local improvisation.

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Table 1: Perception of the Introductory Technology Teachers towards Improvisation

S/N	Items	Agreed	%	Disagreed	%
1	It is simpler to conduct theory lesson in introductory technology than to improvise for practical lesson	88	58.67	62	41.33
2	Hand tools for introductory technology can be made locally	120	80	30	20
3	Equipment for introductory technology can be improvised	110	73	40	27
4	Instructional materials for introductory technology can easily be improvised	108	72	42	28
5	Improvisation of introductory technology equipment can easily be improvised	135	90	15	10
6	Introductory technology teachers have positive felling towards improvisation	80	53.33	70	46.67
7	Teachers of introductory technology are aware of improvisation in school but do not have interest on improvisation	60	40	90	60

Average percent 66.71(+) 33.29(-)

Source: Survey, 2012

Table 2: Degree of Awareness of Improvised Materials by the Introductory Technology Teachers

S/N	Items	Agreed	%	Disagreed	%
1	Are you aware of the quality of resource materials to be used for improvisation in introductory technology?	30	20	120	80
2	Are you aware of the existence of resource materials for construction of introductory technology equipment in the workshop?	40	26.66	110	73.34
3	Are you aware that improvisation of introductory equipment can be made as an alternative for factory made ones?	50	33.33	100	66.69
4	Are you aware that using local materials in improvising introductory technology teaching materials promotes students learning by doing?	36	24	114	76
5	Are your aware that student population explosion in schools justifies the need for improvising introductory technology equipment?	22	14.66	128	85.34
6	Are you aware that government is in support of improvisation of introductory technology equipment?	27	18	123	82
7	Are you aware that improvisation of teaching resources in introductory technology motivates students learning?	42	28	108	72

Average percent 23.52(+) 76.48-

Source: Survey, 2012

Table 3: Extent of Utilization of improvised Materials

S/N	Items	Agreed	%	Disagreed	%
1	Do you often use improvised materials for the teaching of introductory technology?	30	20	120	80
2	Do you have a well equipped introductory workshop that is utilized for the improvisation of teaching materials?	42	28	108	72
3	Do your introductory technology students use improvised materials for a group practical project?	38	25.33	112	74.67
4	Do students have interest in utilizing improvised materials in the learning of introductory technology?	104	69.33	46	30.67
5	Do you accept the fact that improvised teaching materials should be used in teaching 60% of introductory technology practical?	35	23.33	115	76.67

Average percent 33.20(+) 66.80(-)

Source: Survey, 2012

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Table 4: Obstacles Hindering Improvisation of Teaching Materials in Introductory Technology

S/N	Items	Agreed	%	Disagreed	%
1	Is there any fund earmarked for improvisation?	10	6.67	140	93.33
2	Do you teachers lack motivation in improvisation of teaching materials?	45	30	105	70
3	Do you teachers lack creativity making you not to engage in improvisation?	49	32.67	101	67.33
4	Does improvisation waste so much time?	98	65.33	52	34.67
5	Do you teachers have skills to improvise teaching materials?	34	22.66	116	77.34
6	Are basic materials for improvising introductory technology equipments available?	42	28	108	72
7	Does poor salary prevent you teachers from improvising teaching materials in introductory technology?	100	66.66	50	33.34

Average percent 35.99(+) 64.01(-)

Source: Survey, 2012

Table 5: Extent of Improvisation of Introductory Technology Materials

S/N	Materials	Frequency	%
	Building/woodwork tools		
1	Try square	20	13.33
2	Mallet	24	16.00
3	Hammer	08	5.33
4	Marking gauge	20	13.33
5	Sand papers	32	21.33
6	Screw drivers	26	17.33
7	t-square	62	41.33
8	Rule	54	36.00
	Electrical/Electronic tools		
1	Pliers	09	6.00
2	Gimlet	06	4.00
3	File	20	13.33
4	Hand brush	13	8.66
5	Fuse	07	4.66
6	Switch board	16	10.66
7	Current testers	10	6.66
8	Wiring board	50	33.33
	Mechanical/Metalwork Tools		
1	Spanners	12	8.00
2	Work benches	58	38.66
3	Funnels	20	13.33
4	Tool boxes	18	12.00
5	Anvil	2	1.33
6	Charts	82	54.66
7	Models for technical drawing	38	25.33
8	Drawing board	70	46.66
	Average percentage	18.80	

Source: Survey, 2012

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CONCLUSION AND RECOMMENDATIONS

It is obvious that many introductory technology teachers recognize the need for improvisation. But from the result of this study, most of them do not improvise or utilized improvised materials. Most of them were ignorant of the existence of the resource materials for introductory technology equipment. Some of the problems militating against improvisation were identified as lack of fund, motivation, creativity and time. As a result of the findings, the following recommendations were made:

1. All technical teacher education programmes should include a course on improvisation of technical education equipment.
2. Practicing introducing technology teachers should attend regular, conference, workshops and seminar in improvisation, maintenance and repair of introductory technology equipment.
3. Funds should be provided to schools for purposes of buying materials needed for improvisation.
4. The science equipment manufacturing centre at Yaba, the project Development Institute Enugu and all other similar organization established with public funds should be made to diversify their activities to meet the need of technical education programme in Junior Secondary Schools instead of concentrating on science equipment alone.
5. The National Board for Technical Education should make the list of basic requirement for technical education workshop (including introductory technology workshops) available to all secondary schools offering courses in technical education.

REFERENCES

Agwagah, N. V. (1999). Instructional Materials Deficiency in some secondary school Mathematics Topics. Challenge of Mathematics Education for Further Mathematics Education in Nigeria. *Journal of Nigeria Education Research Association* 13(1), 115-116.

Akpan, G. A. (1994). Improvisation of teaching Materials by Technical Teachers in Akwa Ibom State. *Nigeria Vocational Journal*. 7, 207-214.

Balogun, T. A. (1982). Improvisation of School Science Teaching *Equipment, STAN Journal.* 2(1) 131-137.

Callahan and Clark (1977). Teaching in the Secondary school: Planning for Competence. New York: Macmillan Publishing Co. Inc.

Ezugu, L. C. (1990). Selecting Appropriate Instructional Equipment for Vocational/Technical Programmes: *A challenge for Nigeria Vocational and Technical Education Nigeria Vocational Journal*. 4(1), 12-19.

Federal Republic of Nigeria (2004). *National Policy on Education* (4th edition), Yaba: NIRDC Press.

Ibe, B. O. (1992). *Improvisation of Instructional Materials for the Teaching of Introductory Technology in Nigerian Secondary Schools*. Paper presented at college of education, Ekiadolor, Benin City.

James, E. U. (1978). Factors militating against the teaching of Basic Electronic and Applied Electricity in Comprehensive and Trade Schools in Cross-River State. Unpublished Theses, Univeristy of Nigeria.

ISSN: 2141-6753

Okorie, J. U. (2001). *Vocational industrial education league of researchers in Nigeria*. Bauchi: LRN Publishers.

Majorie, J. and **Brown, C.** (1969). *The Evaluation Process in Health Education*. New Jersey: Prentice Hall.

Okorie, J. U. and **Ezeji, S. C. O. A.** (1988). *Elements of Guidance, Vocational and Technical Education*. Onitsha: Summer Publisher.

Okoro, O. M. (1993). Principles and methods in Vocational and Technical Education Nsukka: University Trust Publishers.

Onwuka, O. (1981). Curriculum development for Africa, Onitsha: African Educational Publishers Ltd..

Osuala, E. C. (1981). *Foundations of Vocational Education*, Calabar: Centaur Press.

Osuala, E. C. (1990). Redefining the mission of vocational education in contemporary Nigeria. *Nigerian Vocational Journal* 3(91) 63-69.

UNESCO (1978). *A practical guide to international and vocational education*. Paris: UNESCO.

Uzoegwu, P. N. (2001). Availability of instructional materials for effective teaching and learning of English in the universal basic education scheme. *The Nigerian Universal Basic Education Journal.* 1(2), 205-206.