

RESOURCES FOR THE IMPLEMENTATION OF JUNIOR SECONDARY SCHOOL INTRODUCTORY TECHNOLOGY CURRICULUM FOR ENTREPRENEURSHIP AND SUSTAINABLE DEVELOPMENT

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Abstract

Education is highly significant when discussing the issue of sustainable development. Nigeria's quest for technological advancement is dependent on the extent our students in the Junior Secondary Schools are exposed to technological skills. Entrepreneurship education seeks to provide students with the knowledge, skills and motivation to encourage entrepreneurship success in a variety of settings. This paper examines the Resources for the implementation of introductory Technology curriculum in Junior Secondary School for entrepreneurship and sustainable Development. The population covers all thirty-two Junior Secondary Schools in Agbor Education zone of Delta State. Stratified proportionate random sampling technique was used to draw sixteen Junior Secondary Schools. The questionnaire was the instrument for data collection. Data was analyzed using simple percentages and mean statistics. The findings of the study revealed that introductory technology is taught by some unqualified and insufficient teachers. Most of the important instructional media were not available and they are also inadequate. In the teaching of introductory technology teachers face constraints in areas of power supply, poor funding, lack of laboratories among others. Based on the findings, it is recommended that government should recruit qualified and adequate introductory technology teachers, provision of adequate instructional materials, production of locally fabricated machines and tools is necessary through collaboration with National Education Technology Center (NETC), Laboratories should be provided in schools for effective teaching and learning and training and retraining of teachers.

Introduction

Education is an essential tool and key in the process of achieving Sustainable Development. The concept of sustainable Development is dynamic having many dimensions and interpretations Sustainable Development is seen as a process of change which should be based upon local contexts, needs and priorities of a society (UNESCO 2007). As stated by Enunemu (2008) Sustainable Development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs. Education is widely perceived as the greatest hope and most effective tool for achieving Sustainable Development. UNESCO (2006) asserted that Education for sustainable development involves integrating both formal and non-formal, public awareness and training as major processes by which human beings and societies can reach their fullest potential.

Entrepreneurship according to Kayode (2006) is the willingness and ability of an individual to seek out investment and be able to establish and run an enterprise successfully based on identifiable opportunities. Therefore entrepreneurship education seeks to provide students with knowledge, skill and motivation to encourage entrepreneurial success in a variety of settings. In this trend, Bassey (2005). Stated that variations of entrepreneurship education should be emphasized at the secondary school level. Entrepreneurship education should be regarded as a critical component of secondary school curriculum because of the obvious needs to generate alternative sources of employment. Students in secondary schools should acquire specific skills which will enable them set up their own business hence the teaching of introductory technology at the junior secondary school level.

Introductory Technology is a core subject offered at Junior secondary school education level. The objective of introductory technology include:

- I) To provide pre-vocational orientation for further training in technology
- II) To provide basic technological literacy for every day living.
- III) To stimulate creativity (Delta State Ministry of Education 2004)

The National policy on Education (FRN, 2004) approved the study of Introductory Technology at upper Basic Education level as an Integrated discipline. At this level students are exposed to study wood work metal work, building technology, electronics and general maintenance of machines, and identification of basic tools. It is assumed that the acquisition of this basic knowledge through the teaching of Introductory technology could be a process of preparing the students for entrepreneurship education.

To achieve the objective already stated adequate teaching and learning resources are required. The teaching of Introductory Technology at the Junior Secondary School level requires basic resources for practical demonstration of lessons and to make the instruction effective and meaningful.

It is necessary to state that since over twenty-five years ago, that Introductory Technology has been introduced the noble objectives have not be achieved. The products of Junior secondary schools have not acquired knowledge of how to perform simple demonstrations or diagnosis of basic machines. Also in the external examinations students record massive failure as observed in Junior Secondary School Certificate Examination. Introductory Technology ought to be taught in well equipped laboratory with the necessary instructional materials for practical demonstrations. According to Ajewola and Okebukola (1988) introductory technology is now a subject taught with style which literature have found to encourage rote learning. This subject is now taught in normal classroom instead of a well equipped laboratory. How shall the objectives be achieved which should lead to entrepreneurship and sustainable development of students and the society at large. This is why it has become necessary in this study to investigate the resources for the implementation of the teaching of introductory technology in junior secondary schools and its implications for entrepreneurship and sustainable development.

Purpose of the study

The study was carried out to determine the influence of resources in the implementation of Introductory Technology Curriculum in Junior Secondary Schools for entrepreneurship and Sustainable Development. Specially the study sought to:

- (a) Determine the quality and quantity of manpower for the implementation of Introductory Technology Curriculum at Junior Secondary School level for Entrepreneurship and Sustainable Development.
- (b) Determine the availability and adequacy of instructional resources used in the implementation of introductory technology curriculum in the junior secondary school.
- (c) Determine the constraints facing the teachers in the use of the available resources in the teaching of Introductory Technology.

Research Questions

The study was guided by the following research questions.

1. What are the qualifications possessed by teachers teaching Introductory Technology?
2. What are the available instructional media for the teaching of Introductory Technology?
3. How adequate are the available resources and to what extent are they utilized?
4. What are the major constraints to the use of the available resources in teaching Introductory Technology?

Design

The study adopted the survey research method. The area of the study was the Agbor Education zone of Delta State which comprised of Ika North East and Ika South Local Government areas of Delta State.

Population of the study.

The target population of the study comprised of all Introductory Technology teachers and JSS II students. There are thirty-two Junior Secondary Schools in the Education Zone of Ika North East and Ika South Local Government Areas according to the statistic from the Post-Primary Education Board, Asaba in 2009/2010 academic year.

Sample and Sampling Technique

Stratified proportionate random sampling technique was used to draw (7) seven schools from in Ika North East and (9) nine schools from Ika South according to the number of schools offering Introductory Technology. All teachers in the sampled (16) schools and JSS II students' population (2,130) were randomly sampled to ensure equal representation and used for study.

Instrument for Data Collection

The questionnaire titled instructional media for the implementation of Introductory Technology curriculum at Junior Secondary Schools and a checklist were the instrument for data collection. The instrument was developed by the researcher based on literature review on Introductory Technology facilities for schools. A checklist based on resources was designed to identify the availability, adequacy and level of utilization of resources. Part of the questionnaire also elicited information on the constraints of teachers in the use of the available resources.

Data Collection

The instruments were administered and collected by the assistance of Introductory Technology teachers who were trained by the researcher. The trained teachers guided the students in the completion of instrument which they collected.

Method of Data Analysis

Checklist was used to find the available instructional material

The data gathered for this study were analysed using simple percentages and the mean (X) statistic. The mean for each item was interpreted in relation to the real limits of the codes to the responses in the instrument. Items between 3.50 – 4.49 were regarded as very high extent (VHE) or very adequate (VA). Items between 2.50 and 3.49 were considered High Extent (HE) or Adequate (AD). Items between 1.50 – 2.49 were considered less Extent (LE) or less Adequate (LA) while items between 0.50 – 1.49 were considered not at all.

Results

Research question One.

What are the qualifications of teachers teaching Introductory Technology?

Table 1: Qualifications of Teachers Teaching Introductory Technology

S/No	Local Government Area	No of school	No of teachers	Qualification			Total	No/% of qualified teachers	No/% of unqualified teachers	Total
				NCE	HND	B.SC				
1	Ika North East	7	8	2	1	5	8	54	3	8
2	Ika South	9	10	7	1	2	10	4	6	10
Total		16	18	9	2	7	18	9 50%	9 50%	18

Source: Filed work

From table 1, it shown a total of eighteen teachers teaching Introductory Technology, eight (8) were in Ika North-East and ten (10) in Ika South Local Government Areas respectively. N.C.E. holders were nine (9), two (2) hold H.ND Certificate and seven (7) B.Sc degree. Also from the table nine (9) teachers which represented 50% were qualified as Introductory Technology teachers while nine (9) which represented 50% of the teachers were not qualified teachers. These were H.N.D. holders who did not posses teaching qualifications and teachers in other subject discipline.

Research Question two

What are the available instructional media for teaching introductory Technology?

Table 3: Available instructional Media.

No	Instructional Media	Decision
1	Lathe	AV
2	Shaping	AV
3	Drilling	NA
4	Milling	NA
5	Rolling	NA
6	Bending	NA
7	Scaly saw	NA
8	Band saw	NA
9	Thickness	NA
10	Surfacing	AV
11	Spindle moulder	NA
12	Lathe tools	NA
13	Hammer	AV
14	Punches	AV
15	Scraper and scraping	NA
16	Pin punch	AV
17	Chisels	AV
18	Cutters	AV
19	Hand saw	AV
20	Jack plane	AV
21	Pinchers	AV
22	Clamp	AV
23	Tri-square	NA
24	Angle file	NA
25	Oil stone	AV
26	Electric Arc welder	NA
27	DC. Arc welder	AV
28	Soldering Iron	AV
29	Spanners	AV
30	Screw Drivers	AV
31	Fire Extinguisher	AV
32	Oscilloscope	NA
33	Arc Meter	NA
34	Oxy-acetylene cylinder	NA
35	Electrodes/electrode Hove	NA
36	Smooth plane	AV
37	Rough plane	AV

Source: Field Work

KEY: AV: Available NA: Not Available

From table 2, out of the thirty-seven instructional media listed for the teaching of Introductory Technology in Junior Secondary Schools, twenty were available which represented 54% of the instructional media while seventeen were not available which represented 46%. This result showed that number of instructional media available were insufficient for the teaching of Introductory Technology since 46% were not available. Also some of the instructional media that were not available like electric are welder, DC. Are welder, are meter oscilloscope, oxy-actylene cylinder, electrodes/electrode Hove are very important in the teaching of Introductory Technology with regard to welding and electrical areas technological advancement for entrepreneurship and sustainable development.

Research Questions Three

How adequate are the available resources and to what extent are they utilized?

Table 3: Level of Adequacy and Extent of Utilization of Available Resources.

S/N	Instructional Media	Adequacy		Extent of use	
		Mean \bar{X}	Decision	Mean \bar{X}	Decision
1	Tri-square	1.20		2.75	*
2	Chisels	2.17		1.22	
3	Lathe	2.62		0.88	
4	Hammer	3.03	*	2.60	*
5	Punches	2.52	*	2.58	*
6	Pin punch	1.65		1.97	
7	Cutters	2.11		2.30	
8	Hand saw	1.67		1.89	
9	Pinchers	1.81		1.18	
10	Screw Drivers	3.00	*	2.04	
11	Jack plane	2.34		1.98	
12	Shaping	1.68		1.18	
13	Spanners	2.14		2.52	*
14	Soldering iron	1.29		2.65	*
15	Rough plane	2.00		1.83	
16	Smooth plane	2.30		1.08	
17	Drilling	1.28		1.65	
18	Clamp	2.30		0.68	
19	Surfacing	2.25		1.02	
20	Fire-Extinguisher	1.08		0.66	

Source: Field work

KEY: * indicates level of adequacy and extent of use

From table 4, it shown that only three instructional media – Hammer, punches and screw drivers were adequate resources for the implementation of Introductory Technology while five instructional media namely tri-square, hammer, punches, spanners and soldering iron were used to a high extent in the teaching of Introductory Technology. These items which were adequate and were highly utilized are observed to be items commonly used not only in the teaching of Introductory Technology but in other subjects like Mathematics and Fine Art like Tri-square. Items like hammer, punches, spanners and soldering iron are used by non academic departments in schools which has helped to preserve them

Research Question Four

What are the major constraints to the use of available resources in teaching introductory technology?

Table 4: Major constraints to the use of available resources

S/No	Constraints	Mean X	Decision
1	Lack of skills to use	2.85	HE
2	Poor funding	3.20	VHE
3	Poor power supply	3.68	VHE
4	No power supply	3.90	VHE
5	Lack of laboratories	3.36	VHE
6	Insufficient time allocation	2.70	HE
7	Obsolete tools	3.33	VHE
8	Lack of proper security	2.66	HE
9	Introduction of Newer tools	2.80	HE
10	Lack of maintenance culture	2.65	HE

Source: Filed work

Key: VHE- Very High Extent; HE-High Extent; LE – Low Extent.

Table 5, showed that poor funding, poor power supply, no power supply, lack of laboratories and obsolete tools were constraints to a very high extent in the teaching of Introductory Technology. Other constraints were lack of skills to use, insufficient time allocation, lack of proper security, introduction of newer tools and lack of maintenance culture.

Discussion

The study revealed that nine teachers out of the eighteen teachers in this study were qualified as Introductory Technology teachers which represented fifty percent. The rest nine teachers which represented fifty percent were in other subject discipline and some of them did not have basic teaching qualification. This finding agrees with Asogwu (2007) where out of nine schools in his study only one school had a qualified teacher. It necessary to state that apart from two of the schools that had two teachers, the rest fourteen schools had just one teacher.

The finding of the study also showed that most of the needed tools and machines or instructional resources were not available, and where available, they were not adequate only three of the tools were adequate namely – punches, hammer and screw drivers. Introductory technology as a practical course would only be meaningful if taught with the needed instructional tools and machines.

From the finding on table 5, only few of the tools are used to high extent. This should not be surprising since the teachers are few and this have negatively influenced their performance due to excessive work-load.

The study revealed that the challenges facing teachers in the use of available resources in the teaching of introductory technology are enormous. Top on the list has to do with no power supply at all and poor power supply. In most of the schools there is no power supply at all. Other challenges were obsolete tools, poor funding, lack of laboratories and workshops, insufficient time allocation for practicals, lack of skills to use and lack of maintenance of these tools. These are serious constraints facing teachers on the field. These challenges should be dealt with so that entrepreneurship education for sustainable development can be achieved in our society.

Implications for Entrepreneurship and Sustainable Development

The effective implementation of Introductory Technology at Junior Secondary School level for entrepreneurship requires the provision and utilization of the instructional resources.

Introductory technology is a practical oriented course which requires availability of resources and the manipulation of these tools by the students during and after lessons in order to be familiar with their functions and application.

Adequate man power is required in the teaching of Introductory Technology in Junior Secondary Schools. Teaching will not be effective and meaningful with just one teacher in a school teaching JSS one to JSS three. With this situation the acquisition of technological skills and knowledge cannot be achieved.

Entrepreneurship education for sustainable development will be a mere dream as long as Nigeria remains a country without source of power. Most rural schools do not have source of power supply. Those schools in towns are not connected to any power supply and no power is generated by any machine in these schools. Those challenges and more make implementation of the curriculum of introductory technology unrealistic and the dream of technological breakthrough of the country for entrepreneurship and sustainable development a mirage.

Recommendations

Based on the findings of this study the following recommendations are made:

- Qualified and adequate introductory technology teachers should be recruited.
- Provision of adequate instructional materials, through production of locally fabricated machines and tools is necessary through collaboration with National Education Technology centre (NETC).
- Laboratories and workshops should be provided in schools for effective teaching and learning of Introductory technology.
- Reliable source of power should be provided and extended to schools both in urban and rural areas.

Conclusion

At every level of education, the learner should be provided with adequate learning resources and manpower. Entrepreneurship education for sustainable development will be effectively managed when students are trained to be literate, have manipulative skills, trained in trades and craft and be provided with technical and other relevant skills for employment at the secondary school level.

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