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Factors Militating against Teaching of Basic Technology in Secondary Schools: An Abakaliki Study

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Abstract
The purpose of this paper was to determine the factors affecting the teaching of Basic Technology in Abakaliki. The study was a descriptive survey guided by three research questions and two hypotheses. The population of the study comprise of 120 Basic Technology teachers teaching in the selected secondary schools in Abakaliki. Questionnaire was instrument used for data collection and was validated by experts in technical and vocational education. Mean statistic was used to analyze the data for answering the research questions, while Analysis of various (ANOVA) was employed to analyze the data for testing the null hypotheses at 0.05 level of confidence. The findings of the study revealed that; the most frequently and least method of teaching used for teaching Basic Technology are demonstration and field trip respectively. Majority of the workshops in the schools were ill equipped, as a result, practical lessons were well near impossible. Funding and financing were not properly done for the schools. It was recommended that the State Government should as a matter of urgency, equip all technical workshops for the teaching of Basic Technology in all the schools in Abakaliki.

Keywords: Basic Technology, Teaching and Learning, Technical Education

Introduction
Technology is a process developed by man in order to achieve or improve upon mans need on earth so as to derive satisfaction. Uzoagulu (1995) no noted that technology is one means of not only providing the needs of the society but also ensuring the survival of individuals with respect to their basic needs of food, clothing and shelter. Similarly Awandor (1999) stated that technology to a very large extent determines the quality of the standard of living in a nation .Technology is the purposeful use's knowledge of materials, resources of energy and natural phenomena. This implies that it is more than academic study of materials but rather, it is the service provided by man (Elom 2008). Changes occasioned by technological development obviously demand a commensurate skill adjustment. Some orthodox skills have been rendered valueless by the emergence of robots and computer software (Okorie 2000). He maintained that the robots and computer should be manned by skilled personnel. To also handle them well will necessitate sophisticated training and relevant skills acquisition. He added that, if Nigeria is to benefit fully from technology, people have to train for jobs in the changing world of work. Nigeria is endowed with mineral and agricultural resources and for economical utilization; there is need for emphasis to be placed on the acquisition of skills through a well structured technology and vocational education programme (Okolie, Elom and Inyiagu, 2014).

Basic technology which is the only core subject among the per-vocational subjects of the junior secondary school Nigeria, involves the academic practical study of materials and sources of energy with the ultimate intention of applying study knowledge to provide a comfortable environment for man (Uwameiye, 1999). The basic technology was planned or designed to reduce ignorance about technology education. To attain this, the subject has three main objectives as was stated by federal republic of Nigeria (NPE 2004);

(i) To provide pre-vocational orientation for further training in technology
(ii) To provide basic technological literacy for everyday living and
(iii) To stimulate creativity.

In order to realize the objectives of technology, the curriculum content has been fully structured to accommodate the two major concepts of creativity and workmanship. Students are therefore trained to acquire the art of creativity in their basic technology lessons which will help them acquire their occupational skills (Achebe in Nwobasi 2010). It is also crucial that in the junior secondary classes, students should acquire a preliminary knowledge, skill and awareness in technology that could serve as eye opener for choosing a career

in the world of work (Uzoagulu 1995). According to Uzoagulu, Basic Technology is an exploratory and expository subject. In view of this, the organization of selected topics and contents into a teaching sequence were achieved by the technical committee on Basic Technology curriculum planning. He further stressed that the curriculum committee suggested that a periodic testing or continues assessment of students disposition to the subject be embarked upon.

The Federal Government decision that Basic Technology be taught in all junior schools as a pre-vocational subject is a strong foundation for technology education. This gives the students the basis on which they decide on the technical/vocational subjects to offer at the senior secondary schools level of education (Okolie, 2014). Basic Technology is a collection of learning experiences designed to expose students to certain occupations so that they can determine whether any of the occupations suits their interest, need and ability. These subjects are however, geared towards the provision of occupational orientation and exploration for vocational/technical careers (Osuala, 1987).

Statement of the Problem

Students at the pre-vocational level are supposed to know how to carry out minor repairs in the different aspects of Basic Technology, thereby making themselves capable of being self reliant to some extent upon graduation. However, available information has revealed that these students are lagging behind this expectation. This is evident from their inability to carry out minor repairs in different aspects of basic technology as well as poor performance in the Junior School Certificate Examination (JSCE) for the past few years. This ugly situation resulted to the need to investigate those factors affecting the teaching of this subject at the junior secondary school level in Ebonyi state.

Purpose of the Study

This study was design determine factor militating against teaching of Basic Technology in Abakaliki. Specifically, the study tends to:

- Determine the predominantly used methods of teaching Introductory Technology in Abakaliki Education Zone.
- Determine adequacy of machine tools, hand tools and consumable materials available in the schools' workshops.
- Determine level of students' involvement in laboratory and workshop activities.

Research Questions

The following three research questions guided the study:

- What are the predominantly used methods of teaching Introductory Technology in Abakaliki Education Zone?
- How adequate are the machine tools, hand tools and consumable materials available in the schools' workshops?
- What is the level of students' involvement in laboratory and workshop activities?

Hypothesis

The study also tested these two hypotheses at 0.05 confidence level.

HO_1: There is no significant difference in the mean ratings of the teachers from the schools (the Board, private and technical schools) with regards to the predominantly used teaching methods in Basic Technology.

HO_2: There is no significant difference in the rating of the teachers from the schools (the board, private and technical schools) with regards to the students' involvement in Laboratory and workshop activities in Basic Technology in the three types of schools in Abakaliki Education Zone. The board schools refer to government secondary schools, private for privately owned and technical colleges.

Methods

The study adopted Descriptive Survey Design to find out the factors affecting the teaching of Basic Technology in the Education Zone. The population of this study was made up of all the 120 Basic Technology Teachers in the educational zone. This composed of 30 from the Technical Colleges, 30 from the private schools and 60 from the Board schools. The entire population was studied; therefore, there was no sampling. A 26-item Basic Technology Teachers' Questionnaire (BTTQ) was developed by the researcher and used to collect pertinent data

from the teachers. The questionnaire adopted a four-point type scale, where the teachers were requested to select the most appropriate options. The instrument was subjected to face and content validations by three technical education experts whose suggestions were used to improve the context validity of the questionnaire. The data for this study was analyzed using frequency counts and mean to answer the research questions. One-way Analysis of Variance (ANOVA) statistical method was used to test the null hypotheses. Any mean that amounted to 2.50 was considered to be high or experienced to a great extend and any calculated mean equal to or below 2.49 was regarded to be low or affected the situation to a low extent.
X_1 represent mean from Technical Colleges.
X_2 represent mean from Private Schools.
X_3 represent mean from Board Schools.

Results:

Research Question 1: What are the predominantly used teaching methods in Basic Technology in Abakaliki Education Zone?

Table 1: Mean Ratings of the Teachers on Teaching Methods used for Basic Technology.

S/N	Items	Mean Responses			Grand Mean	Remark
		x_1	x_2	x_3		
1	Lecture method.	3.87	2.54	3.00	3.14	Highly used
2	Demonstration method.	4.07	4.14	3.93	4.05	,,
3	Project method.	3.87	3.46	2.87	3.40	,,
4	Question and Answer method.	3.13	3.61	3.67	3.47	,,
5	Simulation method.	2.73	2.43	2.40	2.52	,,
6	Problem Solving method.	3.40	2.64	3.20	3.08	,,
7.	Field trip.	1.13	1.96	2.40	1.83	Not used
8	Lecture and Question/Answer.	2.73	3.07	3.80	2.30	,,
9	Demonstration and project.	4.27	3.25	3.20	3.57	Highly used
10	Field trip and Simulation.	1.33	1.86	2.13	2.11	Not used
11	Lecture and field trip.	2.13	2.29	3.40	3.00	Highly used
12	Lecture and Demonstration.	3.00	2.61	3.40	3.00	Highly used

As shown in the table above, (the mean ratings on the teaching method), indicated that the most frequently and least methods of teaching used for teaching Basic Technology in the schools are demonstration and field trip respectively, with 4.05 and 1.83.

Research Question 2: How adequate are the machine tools, hand tools and consumable materials available in the schools' workshops?

Table 2: Mean Ratings of Teachers on the Availability of Machine Tools, Hand Tools and Materials for Practical

S/N	Availability of Machines/Tools	Mean Responses			Grand Mean	Remark
		X_1	X_2	X_3		

1	Hand tools.	3.47	2.61	1.67	2.25	Not available
2	Machine tools.	2.73	2.82	1.00	1.85	Not available
3.	Student space ratio is adequate.	2.07	2.43	2.00	2.50	Highly available
4	Work benches.	3.07	2.68	1.80	2.52	,,
5	Bench vices.	2.87	1.89	1.27	2.01	Not available
6	Hot water tap.	1.07	1.07	0.33	0.82	,,
7	Cold water tap supply.	2.27	2.00	1.07	1.78	,,
8	Electric power to machines.	2.47	1.79	0.40	1.55	,,
9	Illumination by Electricity is adequate.	2.87	1.57	0.87	1.77	,,
10	Materials for practical are always available.	2.67	1.39	1.13	1.73	,,
11	Material for practicals are always adequate.	2.53	1.57	1.47	1.86	,,
12	There is adequate ventilation in the workshops.	4.13	2.96	2.67	3.25	Highly available
13	There is a good strorage facility for hand tools.	3.20	2.61	1.53	2.44	Not available
14	Instructional area in the workshop is adequate.	3.00	2.39	1.53	2.31	,,
15	The work benches are strong enough to receive very high mechanical stress.	3.20	2.46	1.40	2.35	,,
16	There are Aprons, overalls, hand gloves and goggles for protection during practical in the workshop.	1.33	0.89	0.46	0.89	,,

The data presented in Table 2 show that items 3,4,12 are highly available while items 3, 4 and 12 are not available.

Research Question 3: What is the level of students' involvement in laboratory and workshop activities?

Table 3: Teachers' Mean Ratings of Students' Involvement in Laboratory and Workshop Activities

S/N	Availability of Machines/Tools	Mean Responses			Grand Mean	Remark
		X_1	X_2	X_3		
1	Practical lessons are included in the students' time table.	2.93	2.89	1.33	2.38	Low
2	The students show much interest in practical.	2.87	3.11	2.27	3.24	High

3.	Thee are enough instructors for students practical lessons.	2.80	2.04	1.60	2.15	Low
4	Practical lessons are lengthy enough.	2.47	1.93	2.67	2.02	,,
5	The students seem to understand practical quicker than theory.	3.53	2.64	2.40	2.86	,,
6	The students can produce pseudo jobs.	2.27	1.79	1.40	1.82	Low
7	The students can product functional jobs at fast speed.	2.13	2.00	1.40	1.84	,,
8	The students draw/design jobs before production.	1.73	2.18	1.40	1.16	,,
9	The students perform better when they all produce a similar job.	3.40	2.11	2.47	2.66	High
10	The students perform better when each of them produce a job of his/her choice.	2.60	2.57	2.60	2.59	,,

Table 3 above show that items 2, 9 and 10 were rated high because means are above the cut-off of 2.50 while items 1,3,4,6,7 and 8 were rated low.

Hypothesis 1

There is no significant difference in the mean ratings of the teachers from the schools (the Board, Private and technical colleges) with regard to the predominantly used teaching methods in Introductory Technology in Abakaliki Education Zone.

Table 4: F-test of the Teachers' Mean Ratings of Teaching Methods used in the Three Types of Schools

Source Variation	Sum of Squares (SS)	Degree of Freedom (df)	Mean Squares	F-cal	F-Crit
Total	32.5	35	0.93		
Between	0.34	2	0.17		3.32
Within	32.16	33	0.97	0.17	

Table 4 indicates that the F-calculated; 0.17 is less than F-critical which is 3.32. The null hypothesis was accepted which signifies that there is no significant difference in the three types of schools in the Education Zone.

Hypothesis 2:

There is no significant difference in the mean ratings of the teachers from the schools (the Board, Private and technical colleges) with regards to the students' involvement in laboratory and workshop activities in Introductory Technology in the three types of schools in Abakaliki Education Zone.

Table 5: F test of the Teachers' Mean Ratings of Students Activities in Laboratories and Workshops in the Three Types of Schools

Source Variation	Sum of Squares (SS)	Degree of Freedom (df)	Mean Squares	F-cal	F-Crit
Total	8.51	29	0.29		
Between	3.22	2	1.61		3.55
Within	5.29	27	0.20	8.05	

From Table 5 indicated that F-calculate is 8.05, which is greater that the critical value (F-critical) which is 3.55. This means that, the null hypothesis is rejected in favour of the alternative one; meaning that there was a

significant difference in the mean rating of the students' involvement in laboratory and workshop activities in the three types of schools.

Major Findings

The following major findings were deduced from the study;

1. The most highly and least used method of teaching Basic Technology is demonstration and Field Trip respectively.
2. Functional tools for practical are not available.
3. Practical lessons are sometimes omitted in some schools.

Discussion of Findings

Table 1 show that the most highly used method of teaching in the Demonstration method. It has the highest grand mean of 4.05. Leighbody and kidd (1966) suggested that the demonstration method of teaching which could be on individual basis, small-group basis or the entire class basis is the best method of teaching subjects that are basically concerned with acquisition of skills. Osuala (1987) said that the best teaching method for the lesson depends on what its objectives entails. He went further to state that Introductory Technology is geared towards the provision of occupational orientation and exploration for vocational/technical career.

In all the three types of schools, field trip is seldom used as a teaching method. This is because none of the schools had (at the time of data collection) a functional motor vehicle to be used for conveying the students on field trip. Worse still, the individual parents could pay the schools fees of their wards on time, talk less of paying for field trips. Table 2 shows that only work benches and ventilation were adequate in all the schools, while functional tools meant for practicals are not available. It is a well known fact that fresh air is not purchased with money, but machine and hand tools are imperative in any vocational/technical education organization. It was also found out that on the average, the three types of schools lacked electric power connection to their workshops and consequently, lacked hot water taps. The data in table 3 shows that practical lessons are sometimes omitted in some schools. This is a serious shortcoming because not all students can hope to pass or continue with schooling after the first three years, when they would have got enough practical experience with which they could be self-reliant. The school must ensure adequate information to make the students aware of educational facilities, resources, procedures and motivation to master the cognitive, affective and psychomotor skill necessary for vocational/technical adaptation and self-reliance.

Table 4 shows that none of the three types of schools is adequately funded, however, when the contributions of the fund agents are compared, the state government ranked highest with a grand mean of 2.29 and 3.04 in terms of funding and financing respectively. However, in more general sense, no school is satisfactorily funded. It was also discovered after testing the null hypothesis (H_{o1}) that the teaching methods used in teaching introductory Technology in Abakaliki Education zone do not differ significantly. This is due to the uniformity in syllabi and assessment methods as well as being under the same administration.

The outcome of the second hypothesis (H_{o2}) testing showed that there was a significant difference in laboratory and workshop activities in the three types of school. This shows that some schools have more tools than other has and therefore find it convenient to conduct practical than those that do not have as many. It further implies that the state government caters for some more than others. By this reason, they have adequate space ratio, bench vices, illumination by electricity, materials for practical and very strong workbenches in their workshops. That gives them room for more workshop activities than others.

Conclusion

There has been failure in the attempt to meet the objectives of Introductory Technology in the Nigeria Education system. The problems hindering the achievement of such objectives range from lack of technical teachers to lack of tools and materials to work with wherever workshops existed and are operational. Another problem revealed was lack of electrical power to operate the machines. It was also found out that practical lessons were seldom included in the timetable and where they were included, the periods were too short for any meaningful work to take place or there were no instructors to guide the students.

Recommendations

To avert the above listed problems, the following recommendations were made:

1. The government of Ebonyi state should as a matter of urgency provide tools and materials to schools for the enhancement of effective demonstration method of teaching.
2. The government of Ebonyi state should instruct each school to go on field trip, at least once a term.
3. All workshops should be made operational and equipment supplied, be uniform and a replica of those in industries, since all schools are assessed with the same yard stick.
4. Emphasis should be placed on local craft in the particular area a school is located for easy procurement.
5. Government should encourage more interaction between the schools, local communities and industries to afford students the chance to use things in their real settings.
6. Courses offered in the colleges should be made more practical-oriented so that those who cannot continue on the academic ladder can stand on their own.

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