ISSUES AND CHALLENGES IN PROMOTING CREATIVITY IN BUILDING TECHNOLOGY EDUCATION PROGRAMME IN COLLEGES OF EDUCATION IN NIGERIA THROUGH PROBLEM ORIENTED PROJECT-BASED LEARNING

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Abstract
Self-directed learning and other lifelong learning skills are critically required for today's world of work. Building Technology Education students at Colleges of Education need to be creative, innovative, critical and analytical so as to secure and remain sustained in their employment after graduation. In view of this, Building Technology Students in Colleges of Education (COEs) can no longer continue to be taught through traditional teacher-centered techniques only. Student - centered teaching techniques such as problem oriented project-based leaning should be employed. It is widely believed that these two teaching techniques will promote and enhance competencies required by the students for lifelong learning. In the present-day practice of teaching building technology education students at colleges of education, the traditional approach in classroom such as pen-and-paper or exam-based learning are still in use, However, it is important to note that project is a core subject in Building Technology Education. Therefore, this paper discusses issues and challenges faced by lecturers, Technologists and Workshop Instructors of Building Technology Education Programme in Colleges of Education. 150 experts comprising Building Technology Education Programme (BTEP) Lectures, Instructors as well as Workshop Technologists of Building Technology Education were drawn from Colleges of Education in the North West region of Nigeria. Some suggestions were given that would promote creativity in Building Technology Education Programme in Colleges of Education through implementation of POPBL techniques as a teaching and learning method.

Keywords: Problem Oriented Project Based Learning, Building Technology, College of Education, skill, self-directed learning.

Introduction

Technical and Vocational Education and Training (TVET) exposes students to practical orientation of skills and prepares them for self-reliance. TVET is a broad term that refers to all aspects of the educational process, including general education, the study of technologies and related science, and the acquisition of real-world skills, attitudes, knowledge, and understanding pertaining to occupations in various spheres of economy and social life. It is in line with the objectives of technical education, especially at post-secondary school level that Abdullahi (2005) noted that technical education provides sufficient platforms for self-empowerment among unemployed graduates. It is expected to provide youths with knowledge, skills and training that satisfy the human resource demand of a nation. Efforts towards realizing this lofty goal at Colleges of Education level is accorded priority as captured in the NPE (2014) which states the objectives of college of education to among others, include: encouraging further the spirit of enquiry and creativity in prospective teachers; providing teachers with the intellectual and professional background adequate for their assignment and make them adaptable to changing

situations, given required technical skills and knowledge needed for the development of agricultural, industrial, commercial, economic and education of Nigeria.

One of the areas of specialization in vocational and technical education as offered at COEs level in Nigerian education system is Building Technology Programme (BTEP). The goal of building technology is to provide science and industrial development with qualified technical knowledge in order to produce young men and women who will be entrepreneurial for economic development in the building industry (Effieyen, *et al,* 2014, Igwe, *et al,* 2012). It is imperative to note that Building Technology Education programme at Colleges of Education in Nigeria is now facing a demand and challenge of producing competitive graduates who can perform work in complex situation.

Flexibility and ability to adapt and transfer the knowledge are critical in this knowledge economy (k-economy) world. In addition, critical thinking skills, effective communication and problem solving are also known as the life-long learning skills required of these graduates for them to be sustained and successful in the world of work, (Isah, *et al,* 2013; Udofia, *et al,* 2012 and Umunadi, 2014). Traditional approach in teaching where lecturers just give lecture and have the students to memorize concepts and theories are no longer relevant. A more flexible and constructive approach which enable students to innovatively and creatively transfer knowledge into real world situation like POPBL is more appropriate for BTEP students in COEs in Nigeria. Creativity is considered as a critical skill in lifelong learning, as well as a skill needed in scientific problem solving and entrepreneurship. One way of promoting creativity is through the approach of Problem Oriented Project-Based Learning (POPBL).

Statement of the Problem

Certain industrialized nations have transitioned over the past few decades to knowledge-based economies that are centered on the creation of knowledge, information, and innovation. Although it has significant implications, this economic change has received very little scholarly attention from researchers in the field of education .A country's ability to use its resources effectively and the quality of its workforce are both essential for its survival and prosperity. The dignity, significance, and position of any country, developed or developing, heavily depends on the quality of its citizens, which is reflected in its educational system (Adesogan, 2017). Nigeria has not been able to catch up with countries like Malaysia, Singapore, India, China, Brazil, and Korea that were on par with it less than three decades ago, despite possessing vast human, natural, and material resources (Saba et al., 2013). This is in accordance with the observation made by Oloyede et al. (2017) that the future of any nation depends not only on its abundant natural resources but also on the knowledge and ability of its people to access and utilize those resources. This explains why, almost sixty-three years after gaining its independence, Nigeria continues to be a developing country.

The nation's educational system, particularly in science and technology, is in risk, as seen by the poor calibre of Nigerian postsecondary institutions' technology and engineering graduates (from universities, colleges of education, and polytechnics (Adesogan, 2017). In addition, the quality of BTEP graduates from COEs has been a major source of concern among most employers in the Nigerian labour market, who have expressed their dissatisfaction regarding the level of technical and essential skills possessed by these graduates (Isah, *et al,* 2013; Udofia et al.,2012). It is also reported in Nigeria that most of the BTEP graduates from COEs do not perform well in jobs interviews because they only have general and theoretical knowledge which is not enough for the tasks or skills they will encounter in their jobs (Isah, et al., 2013; Udofia et al., 2012; Umunadi, 2014). These deficiencies according to (Amesi, Akpomi and Amadi, 2014; Eke, 2011; Kennedy, 2011) is because the trend in the methods of teaching BTEP in COEs in Nigeria is still “traditional” and these are the kinds of methods which tend to hinder trainees from acquiring effective skills that will make them to be self-reliant or employable.

The few industries that are still in existence in the country choose to hire foreign labour because the

graduates of these tertiary institutions appear to be inexperienced, and retraining them would be expensive. In light of this, it is important to explore how technological innovation can be applied through teaching and learning methods like Problem Oriented Project Based Learning (POPBL) in BTEP at COEs. The research question therefore, is how lecturers of Building Technology Education Programme in COEs view the components of POPBL and what are the issues and challenges faced by these lecturers .

Problem Oriented Project Based Learning (POPBL)

The problem-oriented project-based learning (POPBL) approach to teaching and learning encourages an in-depth teaching and learning by experience (Coyle, 1999; Fergus et al., 2008). According to studies, POPBL implementation exposes students to experiential learning, allowing them to practice and experience the abilities that need to be improved. A number of researches have been conducted to show that POPBL prove to be an effective teaching-learning strategy including communication (Garcia, Ferré, and Medinilla, 2009), teamwork (Ahmad and Jabbar, 2007) and problem solving (Du, deGraaff and Kalmos, 2009). According to Oslem and Pedersen, (2005), POPBL aims to foster students' creativity as well as provide solutions to pressing social concerns. Students that had this experience will benefit from the new knowledge they learned. It is a more student-centered method where students are expected to think more critically and creatively by analyzing the information acquired to solve problems, rather than memorizing theory or formula.

Methodology

The study employed a mixed method approach, consisting qualitative and quantitative data. According to Creswell (2014), some scholars referred to it as multitrait-multimethod research. What motivates the selection of the use of mixed methods is to explore the phenomenon that are not familiar to the population of the research (Creswell, 2012). The qualitative method is an inquiry and fact finding through observation with emphasis on direct opinions of the participants. Therefore, purposive sample was used to sample participants for the qualitative part of the study. Purposive sampling involves sampling participants based on their experience and knowledge in specific field of investigation .

In this study, 10 participants were purposively selected from COEs in the North West geopolitical region of Nigeria based on their years of working experience in the institutions. Quantitative research on the other hand, is essentially about collecting numerical data to explain a particular phenomenon and analyzing the data using mathematically based methods. This is a kind of procedure in which investigators administer survey questionnaires to a sample or to entire population of people to describe the attitude, perception, opinion, and behaviours or characteristics of the population . This study was therefore, conducted at Colleges of Education in North West, Nigeria offering Building Technology Education Programme.

The population for the quantitative aspect of the study was 150 participants comprising 70 BTEP Lecturers, 60 Technologists and 20 Workshop Instructors. In this study, 10 participants were used for the qualitative aspect while 130 respondents took part in the quantitative aspect of the study. Simple random sampling technique was used in this study to select 130 participants from a population of 150 using table of sample size determination to sample 59 participants from 70 BTEP Lecturers, 52 participants from 60 BTEP Technologists and 19 participants from 20 BTEP Workshop Instructors. The reason for using Krejcie and Morgan's (1970) equation is because the population is discrete since it has a finite range and it is known.

The qualitative part was open ended questions regarding problems and challenges faced by the lecturers in their teaching and learning, while the quantitative part was a survey questionnaire which sought the opinions of the respondents on two components of POPBL. The components are: (a) self-regulated learning, and (b) continuous assessment. Out of 110 respondents, 109 (99.5%) answered the survey questionnaire. Data was analyzed using descriptive statistics (percentage, mean and standard deviation) for the quantitative data and thematic analysis was used to analyze the qualitative data .

Area of the Study

This study was conducted in COEs in North-West (NW) Nigeria. The NW is made up of seven states: Kano, Kaduna, Jigawa, Katsina, Sokoto, Kebbi and Zamfara. Moreover, Nigeria is a big country both in land and population, however, time and financial constraints are the reasons why this research was restricted to three colleges only. The COEs include Federal College of Education (Technical), Bichi, Kano State, Kaduna State College of Education, Gidan-Waya and Katsina State College of Education, Dutsin-Ma.

Results

Qualitative Aspect

The first part of the study which was qualitative had an open-ended question that dealt with student's characteristics, Lecturers competence as well as knowledge and facilities. in this regard, the table 1 below shows the demographic features of the participants, their years of working experience and educational qualifications. Among these participants, 2 were Ph.D. holders, 6 were Master's degree holders, and 2 were holders of Bachelor's degree and they are presently lecturers of building technology at Colleges of Education in North West, Nigeria. They all possess at least 12 years of working experience as Lecturers of BTP.

Table 1. Demographic Features of the participants for qualitative part of the study

SN	Participants	Job Classification	Work Experiment	Qualification
1	POPBL1	Lecturer	24	Bachelor
2	POPBL2	Lecturer	14	Masters
3	POPBL3	Lecturer	25	Ph.D.
4	POPBL4	Lecturer	23	Masters
5	POPBL5	Lecturer	18	Masters
6	POPBL6	Lecturer	11	Bachelor
7	POPBL7	Lecturer	20	Ph.D.
8	POPBL8	Lecturer	17	Masters
9	POPBL9	Lecturer	12	Masters
10	POPBL10	Lecturer	12	Masters

Lecturers views on Problems and Challenges

As presented in table 2 below, the answers by the lecturers on aspects of students' characteristics, Lecturers competence as well as knowledge and facilities. Most of the lecturers believed that they are having a large number of students to handle. Besides that, they are having problem with students' ability to immediately understand the subject matter. Also, lack of creativity, inactiveness and dependence on lecturers are also considered to be the problems faced by the lecturers. As far as facilities are concerned, the lecturers opined that classrooms are not spacious enough for the large number of students to handle. This lack of space contributes to non-conducive nature of the classroom environment.

In addition, ICT facilities like computer and internet were neither enough nor up to date. In order to implement POPBL content and also to increase lecturer's knowledge and skill the lecturers see these as challenges which should be addressed. To promote creativity of the students, creative teachers are needed as well. The elements discussed above according to the lecturers can be achieved through professional development as well as exposure to industrial skills which are also deficient. To handle students with low ability and; lack of motivation and focus, the lecturers should be more patient and must try to improve on lecturer student's relationship.

Table 2. Qualitative response of Lecturers views on Problems and Challenges

Students	Lecturers	Facilities
❖ Large number of Students ❖ Inability to comprehend immediately ❖ Lack of Creativity ❖ Inactiveness ❖ Dependence on Lecturers	❖ Mastering of Subject Content ❖ Require to be more creative ❖ Require more skills ❖ Professional Training ❖ Patient ❖ Cordial relation with students	❖ Inconducive atmosphere ❖ Insufficient Laboratories ❖ Obsolete technology

Quantitative Aspect

The majority of the respondents for the quantitative aspect of the study have spent more than 20 years in the field of teaching and learning BTP. Table 3 shows the summary of the sample responses of the questionnaire survey. From the table, percentages of response rates were 59 (99.30%), 19 (100%), and 52 (98.07%) respectively. These were considered adequate for analysis based on the assertion by Oyedele and Tham (2007) that the result of a survey could be considered as biased and of little importance if the return rate was lower than 30% to 40%.

Table 3. Questionnaire Response Rate

Category	**Questionnaire Administered**	**Questionnaire Missed**	**Questionnaire Retrieved**	**Response Rate (%)**
BTP Lecturers	59	01	58	98.30
BTP Workshop Instructors	19	00	19	100
Building Technologists	52	01	51	98.07
Total	130	02	128	99.23

Respondents' Perception on Components of POPBL

Self-regulated learning is one of the components of POPBL that an individual should possess in order for him to be creative and innovative. The overall mean of 3.56 for self-regulated learning shows that the existing programme is not giving much space for students to explore and determine their learning. This can be seen in table 4 where the means of majority of the items maintain a moderate level.

Table 4: Mean and Level of Each Item in Self-Regulated Dimension

Self-Directed Learning	**Mean**	**Level**
a. Allows for self-directed Learning	3.67	Moderate
b. Allow students to determine their own learning	3.39	Moderate
c. Allow students to determine their learning needs	3.65	Moderate
d. Allow students to search for learning materials online	3.69	Moderate
e. The programme becomes easy allowing students to search for learning materials online	3.70	High
f. The programme is designed for online learning	3.44	Moderate
g. The programme allows students to do assignment with minimum lecturers' assistance	3.47	Moderate

Self-Directed Learning	Mean	Level
h. The programme allows students to be independent in solving problems	3.449	Moderate
i. The problem allows students to relate learning problem with personal experience	3.46	Moderate
j. The programme allows students to integrate all past learning with problem to solve in the assignment	3.63	Moderate

Table 5 below shows items on assessment dimension. Assessment dimension in POPBL should have continuous and alternative assessment like process evaluation, peer evaluation and self-evaluation. It reveals that the existing programme still have traditional approach in assessing students. The alternative approaches are not fully implemented with lecturers who are the sole assessors of the students. However, students are usually assessed continuously throughout the project implementation (mean=3.87).

Table 5: Mean and Level of Each Item in Assessment Dimension

Self-Directed Learning	Mean	Level
a. In this programme, students' assignments are assessed by programme lecturers only	3.79	High
b. In this programme, students' assignments are assessed by lecturers	3.11	Moderate
c. In this programme, students are actively involved in assessing their group members	3.45	Moderate
d. In this programme, assignments are assessed thru individual presentation	3.62	Moderate
e. In this programme, assignments are assessed through group presentation	3.92	High
f. In this programme, assignments are assessed during group presentation	3.72	High
g. In this programme, students are assessed by peer group in the process of solving problem	3.19	Moderate
h. In this programme, students are assessed continuously in project implementation	3.87	High
I. In this programme, students are assessed only through end product (project)	3.06	Moderate

In the existing programme, students are required to complete a final year project before graduating. The result in Table 5 shows that most teachers rated the nature of problems given to students in many ways especially in the student's ability to solve problems. However, the approach of exposing students to the outside and real world through community and industry involvement is still lacking.

Conclusion

To promote creativity among BTEP students in COEs, lecturers should give more freedom to students to explore their own learning and construct their own meaning. They should give more attention to the process of getting to the end in producing innovative products rather than just concentrate on knowing the fact alone. A more explicit teaching method such as POPBL need to be introduced in promoting creativity among BTEP students in COEs because creativity underpins design and problem solving especially in technology and engineering education (Lewis, 20006). It can also be concluded that lecturers need to be retrained continuously so that they are more confident to have POPBL approach in their programme.

More exposure to industrial training could also help the lecturers to be more creative in handling their programme and students. BTEP in COEs is an important type of education that is expected to provide the nation with innovative, creative and critical thinking human capital which will contribute to sustain the economy. To achieve this, a good and wholistic programme for BTEP at

Colleges of Education in Nigeria should be designed. One of the suggestions is the implementation of POPBL approach.

Recommendations

Based on the findings and conclusion, the study therefore recommended that:

1. It is hereby recommended for building construction industries to develop a POPBL framework to be used for conducting interview for job recruitment of BTEP students from colleges of education so as to pave way for graduating students with practical knowledge of building technology.
2. It is recommended that BTEP lecturers and authorities in COEs should accept the implementation of POPBL technique in teaching at colleges of education in North Central, Nigeria.
3. The Federal and State Government agencies as well as all stakeholders in the administration of COEs should devise means by which POPBL techniques would be developed and implemented for BTEP at Colleges of Education in Nigeria.

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