# Effective Strategies for Integrating Project Based Learning into Woodwork Technology Education and Understanding at Tertiary Institutes in Nigeria

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Muhammad Umar Isa (✉),Yusri Bin Kamin
University Teknologi Malaysia, Johor, Malaysia
Uisa483@gmail.com

**Abstract**—The purpose of this examination is to research viable methodologies for incorporating Project based Learning (PoBL) in instructing and learning Woodwork Technology Education (WTE) at tertiary foundations in Nigeria. A mixed method approach including both quantitative and subjective technique was utilized for the investigation. The example of the examination involved 50 in-administration postgraduate understudies from Nigerian tertiary foundations concentrating Technical Vocational Education and Training (TVET) in University Teknologi Malaysia for the quantitative perspective, and 9 in-administration post graduate understudies for the subjective part. A 16-thing organized poll was utilized for quantitative information accumulation while semi organized meeting convention was utilized for subjective information gathering. Quantitative information was investigated utilizing SPSS programming variant 24 to process the rate and intend to demonstrate the degree of understanding or difference on things of the survey. NVIVO 12 was utilized for subjective data examination. Member check and pear questioning were utilized to build up the reliability of the interview convention. The principle discoveries of the examination uncovered that PoBL has not been embraced in WTE educating and learning at tertiary establishments of Nigeria, and the conventional instructional methodology including lecture, demonstration and task have been the instructional methodologies received. It was additionally uncovered from the discoveries that rebuilding of WTE educational plan at tertiary organizations in Nigeria to concentrate on a student focused methodology, just as sorting out courses and workshops for WTE speakers to be familiar with the utilization of PoBL in WTE instructing and learning as a component of the successful techniques for incorporating PoBL in instructing and learning WTE at tertiary establishments in Nigeria. PoBL is appropriate in the instructional procedures of courses like WTE which include intellectual and psychomotor aptitude procurement. At long last, the deficiencies of studies identifying with PobL in Nigeria illuminates the need to attempt this examination in WTE at tertiary organizations.

**Keywords**—Project Based Learning; Woodwork Technology Education; Tertiary Institutes; Instructional Strategies; Instructional Approach; Education and Understanding

# 1 Introduction

Education and understanding are as old as the inception of man. Education and understanding are versatile concepts that are required at all times for correct identification of indices for developments in the society[1]. The need to pay more emphasis on learners in the education and understanding process for the progress and enhancement of their essential abilities as well as motivating them for autonomous learning makes education around the world, especially in the 21st century adopt a learner centred strategy for education and understanding in higher education [2]. One of the most important student-cantered learning approach employed in today's instructional approach at tertiary institutes is the Project-Based Learning [3].

Project-Based Learning (PoBL) is an instructional approach in which authentic, real-world ventures are used as the main source to lead the learner's understanding capability. Project based learning has been defined as an organized instructional approach that involves student's engagement knowledge and skills acquisition over a prolonged investigative procedure planned around critical, reliable (real-life) inquiries and carefully planned products and activities [4]. In this regard, PoBL is perceived as an instructional model that includes problem solving and other meaningful learning of the students, allowing the students to work alone, organise their knowledge, finalize their work, create their own product and focus on concepts and scientific principles [5]. The PoBL approach has proven to be effective in education and understanding at tertiary institutes as it encourages deep learning in learners and also develops active learning, improves critical thinking and creativity in learners [6].

However, in spite the advantages associated with PoBL, it has been observed that PoBL has not been adopted in tertiary institutes in Nigeria especially in woodwork technology education (WTE). According to Muhammad [7], the instructional methods employed in teaching at tertiary institutes in Nigeria are mostly lecture and the demonstration methods which is traditional based. Accordingly, [8] asserted that one of the outstanding constraints in the instructional processes of WTE in Nigerian higher institutes is the non-use of appropriate methodology that centres on the learner. Additionally, [9] pointed out that the dominant method of instruction in woodwork technology in tertiary institutes of Nigeria involves the lecture method. Consequently, this trend has resulted in producing WTE graduates who lacked the skills to be employable at the labour market [10] . In this regard, [11] asserted that one of the reasons that hindered students from attaining efficient skills which may lead to self-reliant or employed is the adoption of traditional teacher centred instructional technique in tertiary institutes offering Technical Vocational Education and Training (TVET) in Nigeria of which WTE is a part. Equally, [12] remarked that WTE graduates are weak in the practice of their field, partly due to the instructional technique adopted in tertiary institutes in Nigeria.

Furthermore, the learners knowledge and skill in WTE cannot be achieved through the adoption of traditional methods of instruction in tertiary institutes [11] . Therefore, there is a need to refocus the instructional approach of WTE from teacher-centred to a more learner-centred approach for efficiency in skill acquisition at tertiary institutes in Nigeria

### 1.1 Woodwork technology education at tertiary institutes

Woodwork Technology education (WTE) is a TVET course obtainable in universities, polytechnics and colleges of education in Nigeria geared towards the attainment of acquiring efficient skills and knowledge in woodworking. WTE according to [13], is a program offered in Nigeria at the craft, advance craft, technical and professional levels with the objectives of providing trained manpower in technology and applied sciences in addition to training and imparting appropriate skills to individuals for economic self-reliance.

Additionally, [14] described WTE as one of the courses offered in tertiary institutes that provides students with the necessary skills and knowledge for active involvement in the world of work. [12] stated that WTE is a course of study which enables an individual to acquire skills in theory and practice but with much emphasis on practical skill acquisition in order to provide students with skills for self-reliance. WTE in essence is designed at tertiary institutes to prepare students with the knowledge and skills in woodworking in order to be productive and gain fully employed. Further, WTE as a course of study in tertiary institutes in Nigeria is sub divided into wood machining, joinery, upholstery, carpentry, cabinet and furniture making [9]. It is important to state here that acquiring these divisions of woodworking knowledge and skills in tertiary institutes require appropriate instructional approach like the PoBL since WTE engages students with activities that involve using skills and talents.

### 1.2 Project based learning

Project-based learning is a student-centred learning approach that engages students with real world situations. PoBL is a learning approach based on project development, imagination, planning and construction [15]. PoBL is usually student-centred instruction that occurs over an extended period of time during which students select, plan investigate and produce a product, in addition to the presentation or performance that answers a real-world question or respond to an authentic challenge [16]. For this reason, PoBL is perceived as a constructivist instructional learning for both pedagogy and andragogy centred around the concept of learning by doing [17].

In PoBL, the process of knowledge acquisition shift from the teacher to the student. The student becomes an independent learner with the teacher providing scaffolding guidance for the learning experience of the student [18]. PoBL is distinct from traditional instruction, since the student is perceived as the sole owner of the knowledge with no dependence on the teacher. Building on this assertion, [19] stated that for PoBL to be effective, the following features have to be integrated in its implementation:

- PoBL direct students learning from theory to practice. That is hands on manipulation
- PoBL is learner centred. Learners become independent of the teacher for knowledge and skill acquisition
- Emphasizes on the development of student's skill

- Providing real world experience to students
- Teachers or lecturers serve as facilitators providing scaffolding guidance to students

From these features, it is very obvious that PoBL is crucial in WTE education and understanding. In this sense, adopting PoBL into WTE education and understanding according to [20] will help to improve the instructional processes of WTE at tertiary institutes in Nigeria.

## 2 Problem statement

PoBL is an indispensable approach in today's instructional delivery, it is found to be effective in diverse areas of educational fields such as medicine and engineering. PoBL has impacted positively in the learner's application of knowledge to real world situations [21]. It is expected that the appropriate strategy for impartation of knowledge and skill should be based on a learner centred approach like the PoBL which enhances critical thinking, creativity, effective collaboration and communication geared towards twenty first century skills. But from the personal interaction of the researcher with in service postgraduate students from Nigerian tertiary institutes studying (TVET) Technical Vocational Education and Training at University Teknologi Malaysia revealed that lecturers are not used to adopting PoBL in their instructional approach in tertiary institutes in Nigeria especially in WTE. The instructional approach has remained the traditional method which is teacher centred. For this reason, [22] amply observed that WTE students graduate from tertiary institutes in Nigeria without the requisite employability skills partly due to faulty instructional strategy. It is pertinent to state here that this problem will continue to ravage the educational system of Nigeria at the tertiary level unless an appropriate instructional technique like the PoBL is adopted into the education and understanding processes of WTE at tertiary institutes in Nigeria. PoBL has been discovered to be efficient in higher institutes of learning around the world. However, in spite the instructional approach challenges faced in higher institutes of Nigeria, there are inadequacies of studies relating to PoBL in tertiary institutes of Nigeria particularly in WTE. It is therefore on this basis that this study was undertaken to examine the efficient approaches for incorporating PoBL into the education and understanding of WTE at tertiary institutes in Nigeria.

### 2.1 Objective of the study

The main objective of this study is to examine efficient approaches for incorporating project-based learning in the education and learning of WTE at tertiary institutes in Nigeria

### 2.2 Research Questions

The following research questions were asked to guide the study

- What instructional strategies are adopted in education and learning WTE at tertiary institutes in Nigeria?
- What are the benefits to be derive for incorporating PoBL in education and studying WTE at tertiary institutes in Nigeria?
- What strategies could be employed for incorporating PoBL in education and studying WTE at tertiary institutes in Nigeria?

## 3 Methodology

Methodology explains the processes or methods employed in conducting this study. The methodology employed for this study is highlighted under each subheading:

### 3.1 Research design

A mixed technique that combines both quantitative and qualitative approach was used for this study. A sequential explanatory layout was utilized for this research. A sequential explanatory design consists of collecting and analysing of quantitative data in a first phase of a study, and subsequently followed up with the collection and analysis of qualitative data in a second phase that explains the results of the early quantitative data [23]. The study started with a quantitative survey questionnaire to investigate the research questions, and followed up with a qualitative semi structured interview to examine the results from the quantitative on the instructional strategies adopted in WTE education and understanding and the strategies for integrating PoBL in WTE education and understanding at tertiary institutes of Nigeria.

### 3.2 Sample and sampling technique

The sampled population in this study were in service post graduate students from Nigerian tertiary institutes analyzing Technical and Vocational Education and Training (TVET) in Universiti Teknologi Malaysia. Purposive sampling was used for selecting the participants for the study. Purposive sampling is a sampling technique where the researcher selects units to be sampled based on their knowledge or experience [24]. Fifty in service post graduate students from Nigeria tertiary institutes in the department of Technical and Engineering Education studying TVET in UTM were purposively sampled and used as respondents for the quantitative aspect of the study, while nine in-service post graduate students were used for the qualitative part of the study.

### 3.3 Instrumentation

**Quantitative:** In collecting quantitative data for the study, a structured questionnaire consisting of items relevant in answering research questions posed in this study was the instrument used. The questionnaire consists statements used to elicit responses from the opinion of respondents on the instructional strategies adopted in WTE education and understanding, benefits to be derived for integrating PoBL in WTE instruction and understanding, and the approaches for incorporating PoBL in education and understanding WTE at tertiary institutes in Nigeria. The response format of the questionnaire were based on a five-point Likert scale of Strongly Agree (SA=5), Agree (A=4), Fairly agree (FA=3), Disagree(D=2) Strongly Disagree (SD=1).Quantitative data obtained from the questionnaire were analysed using SPSS version 24 and summarised in a table and chart using mean and percentage to show the level of agreement with statements on the items of the questionnaire. Hence, any item with a mean score of 3.50 and above was considered agreed, while any item with a mean score less than 3.50 was considered disagree [25]. In order to ensure validity of the questionnaire, three experts in the field of Technical and vocational education critically examined the face and content validity of the questionnaire items. To determine the reliability of the questionnaire items Cronbach's Alpha was used to establish the extent of consistency of the items. The reliability coefficient yielded 0.89 which was considered appropriate for the questionnaire to be use.

**Qualitative:** Semi structured interview protocol was the instrument used to collect qualitative data. The interview protocol was used to obtain in depth data on the instructional strategies adopted in WTE education and understanding, and the strategies that can be employ for mixing PoBL in WTE education and learning at tertiary institutes in Nigeria. Qualitative data for the study was analysed using thematic (content analysis) with the help of NVIVO version 12. Themes generated from the interview were coded using axial coding. Both face and content validation of the interview protocol were done by experts. In order to enhance the trustworthiness and credibility of the interview, member check and peer debriefing was used to establish the reliability of the interview protocol. Respondents and colleagues peer debriefed and checked the transcripts to assess the transcription and was later given to the researcher for analysis.

## 4 Results of the study

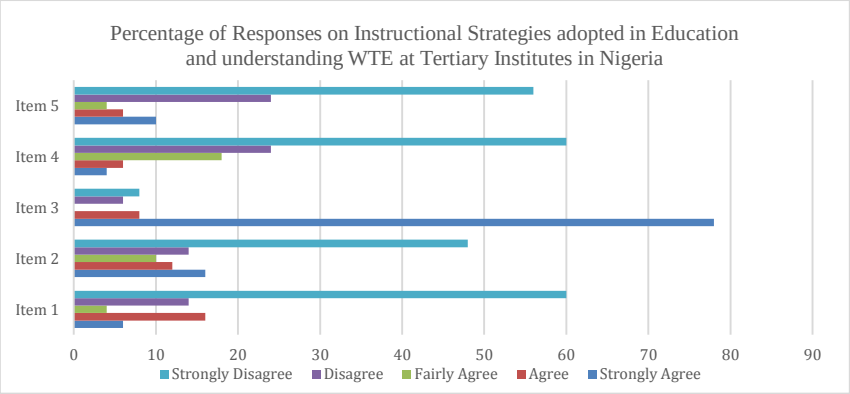
The results of the quantitative data are presented in the direction of the research questions posed in this study. This result referring to

**RQ1**: What instructional strategies are adopted in education and understanding WTE at tertiary institutes in Nigeria?

**Table 1.** Percentage, Frequency and Mean responses on the instructional strategies

| No | Item | SD f/% | D f/% | FA f/% | A f/% | SA f/% | Mean | Sd |
|---|---|---|---|---|---|---|---|---|
| 1 | Lecture method is adopted in education and understanding WTE | 3 (6) | 8 (16) | 2 (4) | 7 (14) | 30 (48) | 4.06 | 11.53 |
| 2 | Demonstration method is adopted in education and understanding WTE | 8 (16) | 6 (12) | 5 (10) | 7 (14) | 24 (48) | 3.66 | 7.90 |
| 3 | Project based learning is adopted in education and understanding WTE | 39 (78) | 4 (8) | 0 (0) | 3 (6) | 4 (8) | 1.58 | 16.29 |
| 4 | Assignment method is adopted in education and understanding WTE | 2 (4) | 3 (6) | 9 (18) | 12 (24) | 30 (60) | 4.30 | 11.44 |
| 5 | Project method is adopted in education and understanding WTE | 5 (10) | 3 (6) | 2 (4) | 12 (24) | 28 (56) | 4.10 | 12.30 |

Note: f (frequency) and % (percentage)




As shown in Table 1, the overall data distributions revealed that the respondents supported to four items on the instructional strategies adopted in WTE education and studying at tertiary institutes in Nigeria, but also revealed disagreement on one item as project-based learning being implemented in WTE education and understanding. This indicated that Nigerians were more familiar with traditional method of instruction during education and understanding at tertiary institutes.

The data presented on item 4 shows the higher mean score of 4.30 among the other items. This indicated that the agreement (agree and strongly agree) stood around 84%. It is followed by item 5, with a mean score of 4.10 which shows that 56% of the respondents strongly agreed and 24% agreed that project method is adopted in WTE education and understanding, while 10% strongly disagreed. Item 1 shows a mean value of 4.60 indicating that 60% of the respondents strongly agreed, and 14% agreed that lecture method is adopted in education and understanding WTE, while 16% disagreed. Item 2 shows a mean value of 3.66 indicating that 48% of the respondents strongly agreed and 14% agreed that demonstration method is adopted in WTE education and understanding, while 16% strongly disagreed. However, the mean score of item 3 shows 1.58 indicating that 78% of the respondents strongly disagreed that PoBL is adopted in WTE education and understanding while 8% strongly agreed.The findings in Table1 clearly shows that the traditional instructional approach involving

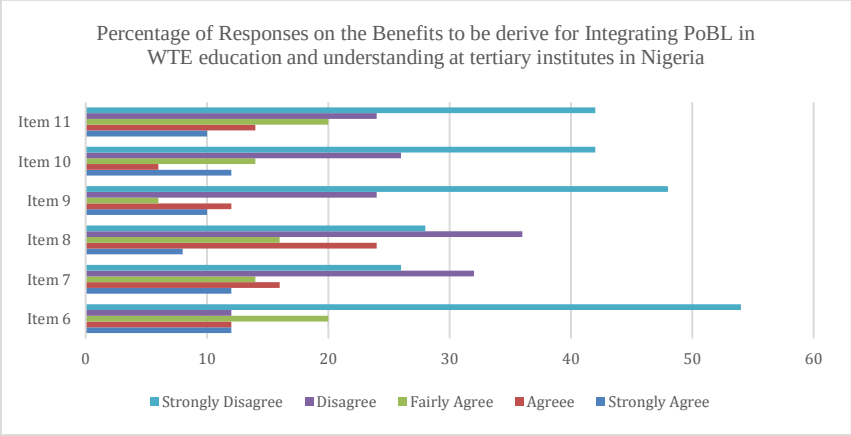
lecture, demonstration, project, and assignment methods are the dominant method of instructions in tertiary institutes in Nigeria.

**RQ 2:** What are the benefits to be derive for integrating PoBL in education and understanding WTE at tertiary institutes in Nigeria?

**Table 2.** Percentage, Frequency and Mean responses on the benefit to be derive for integrating PoBL in WTE education and understanding

| No | Item | SD f/% | D f/% | FA f/% | A f/% | SA f/% | Mean | Sd |
|---|---|---|---|---|---|---|---|---|
| 6 | Encourage student ownership of learning | 6 (12) | 6 (12) | 10 (20) | 6 (12) | 27 (54) | 4.02 | 9.17 |
| 7 | Encourage student collaboration with pears | 6 (12) | 8 (16) | 7 (14) | 16 (32) | 13 (26) | 3.50 | 4.30 |
| 8 | Encourage student's ability to work independently | 4 (8) | 6 (12) | 8 (16) | 18 (36) | 14 (28) | 3.74 | 5.83 |
| 9 | Enhances critical thinking skills of the student | 5 (10) | 6 (12) | 3 (6) | 12 (24) | 24 (48) | 3.88 | 8.51 |
| 10 | Enhances communication skills of the students | 6 (12) | 3 (6) | 7 (14) | 13 (26) | 21 42) | 3.80 | 7.14 |
| 11 | Encourage student's active participation in learning | 5 (10 | 7 (14) | 10 (20) | 12 (24) | 16 (32) | 3.50 | 4.44 |

Note: f (frequency) and % (percentage)




As shown in table 2, the overall data distributions revealed that the respondents supported to all items on the benefits to be derive for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria.

The data presented on item 6 shows the higher mean score of 4.02 among the other items. This indicated that the agreement (agree and strongly agree) stood around 66%.It is followed by item 9 with a mean score of 3.88, which shows that 48% of the respondents strongly agreed and 28% agreed that enhancement of student critical thinking skill is a benefit to be derived from integrating PoBL in WTE education and understanding, while 12% disagreed. The mean value for item 7 shows 3.50 indicating that 32% of the respondents agreed and 26% strongly agreed that collaboration is a

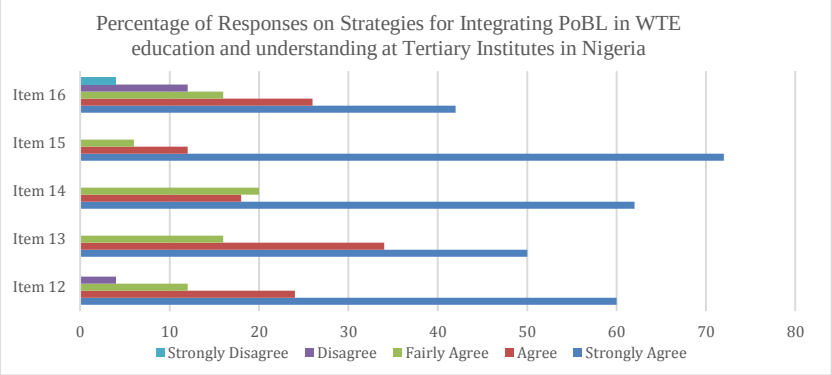
benefit to be derived from integrating PoBL in WTE education and understanding, while 16% disagreed. Item 8 shows a mean value of 3.74 indicating that 36% of the respondents agreed and 28% strongly agreed that encouragement of student work independently is a benefit to be derived from integrating PoBL in WTE education and understanding, while 12% disagreed. Item 10 shows a mean value of 3.80 indicating that 42% of the respondents strongly agreed and 26% agreed that enhancement of student communication skills is a benefit to be derived for integrating PoBL in WTE education and understanding, while 12% strongly disagreed. However, the mean score of Item 11 shows 3.50 indicating that 32% of the respondents strongly agreed, 24% agreed and 20% fairly agreed that encouragement of student active participation is a benefit to be derived from integrating PoBL in WTE education and understanding, while 14% disagreed. The findings in table 2 apparently shows that PoBL has immense positive benefits if integrated into WTE education and understanding at tertiary institutes in Nigeria.

**RQ 3:** What are the strategies could be employ for integrating PoBL in education and understanding WTE at tertiary institutes in Nigeria?

**Table 3.** Percentage, Frequency and Mean responses on the strategies for integrating PoBL in WTE education and understanding

| No | Item | SD f/% | D f/% | FA f/% | A f/% | SA f/% | Mean | Sd |
|---|---|---|---|---|---|---|---|---|
| 12 | Restructure the curriculum of WTE at tertiary institutes to focus on learner centred approach | 0 (0) | 2 (4) | 6 (12) | 12 (24) | 30 (54) | 4.40 | 12.08 |
| 13 | Sensitize WTE lecturers on the need to adopt PoBL in education and understanding at tertiary institutes | 0 (0) | 0 (0) | 8 (20) | 17 (18) | 25 (62) | 4.34 | 10.93 |
| 14 | Organise workshops and seminars for lecturers on application of PoBL in WTE at tertiary institutes | 0 (0) | 0 (0) | 10 (20) | 9 (18) | 31 (62) | 4.42 | 12.67 |
| 15 | Tertiary Institution authorities should enforce compliance on adopting PoBL in WTE education and understanding | 0 (4) | 5 (12) | 3 (16) | 6 (26) | 36 42) | 4.46 | 14.71 |
| 16 | Develop frame work for receiving feedback on the effectiveness of PoBL in WTE education and understanding at tertiary institutes | 2 | 6 | 8 | 13 | 21 | 3.90 | 7.31 |

Note: f (frequency) and % percentage




From Table 3 as shown, the overall data distributions revealed that the respondents supported to all the five items on the strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria. The data presented on item 15 showed the higher mean score of 4.46 among the other items indicating that the agreement (agree, strongly agree) stands around 84% which supported that institutes should enforce adoption of PoBL in WTE education and understanding. Item 14 followed with 4.42 as mean score, indicating that 62% of the respondents strongly agreed, 18% agreed and 20% fairly agreed that organising workshops and seminars for WTE lecturers on application of PoBL in WTE education and understanding as a strategy for integrating PoBL in WTE education and understanding. Item 12 shows a mean value of 4.40 indicating that 60% of the respondents strongly agreed and 24% agreed that restructuring of WTE curriculum to focus on a learner centred approach is a strategy for integrating PoBL in WTE education and understanding. The mean value of 4.34 as shown in item 13 indicates that 50% of the respondents strongly agreed, 34% agreed and 16% fairly agreed that sensitizing WTE lecturers on the need to adopt PoBL in WTE education and understanding is a strategy for integrating PoBL in WTE education and understanding. Item 16 shows a mean value of 3.90 indicating that 42% of the respondents agreed and 26% agreed that developing a framework for receiving feedback on the effectiveness of PoBL in WTE education and understanding is a strategy for integrating PoBL in WTE education and understanding. The findings in table 3 clearly shows that curriculum restructure, sensitization, organising workshops and seminars, institutional enforcement on PoBL adoption and developing frame work for receiving feedback are the strategies to be employed in integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria.

**Qualitative Findings:** The qualitative findings on the instructional approaches adopted in WTE education and understanding and the strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria are presented in tables 4,5 and Figure 1,2.

**Table 4.** Shows the themes generated from the interview with in-service post graduate students on the instructional strategies adopted in WTE education and understanding at tertiary institutes in Nigeria

| Question | Theme | Coding |
|---|---|---|
| What do u know about adopting PoBL in education and understanding WTE at tertiary institutes of Nigeria | 1- Never heard of PoBL until in UTM<br>2- Heard about PoBL but never adopted until in UTM | S1, S2, S3, S4, S7, S9<br>S5, S6, S8 |
| May I know the instructional approach adopted in education and understanding WTE at tertiary institutes in Nigeria | 3- Lecture method<br>4- Demonstration Method<br>5- Project Method<br>6- Assignment | S1,S2,S3,S4,S5,S6,S7,S8,S9<br>S2, S4, S6, S7, S8, S9<br>S4, S7, S8, S9<br>S1, S3, S5, S6, S8 |

Note: S = Respondents

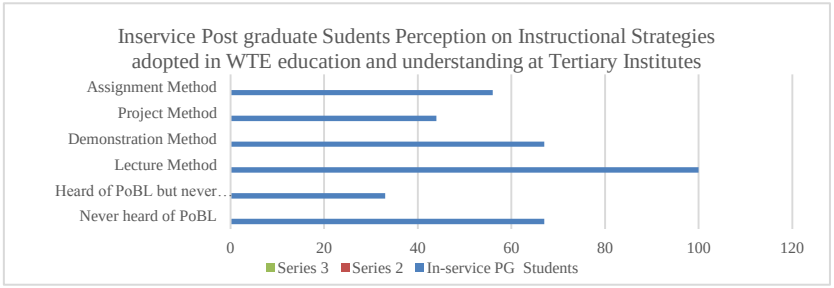



**Fig. 1.** Percentage of themes generated from interview on the instructional strategies adopted in WTE education and understanding

The themes generated from interview in table 4 on the first question that was posed to the in-service post graduate students. It was observed from figure 1 that 67 % of the in-service postgraduate students replied that they never heard of PoBL until they came to study in UTM, while 33% of the in-service post graduate students replied they heard about PoBL but never adopted it until in UTM. From the second question 100% of the in-service post graduate students replied that lecture method is the main approach adopted in WTE education and understanding, 67% replied demonstration method, 44% replied project method, and 56% replied assignment method.

**Table 5.** Shows the themes generated from the interview with in-service post graduate students on the strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria

| Question | Theme | Coding |
|---|---|---|
| What strategies do you feel could be employed in integrating PoBL in education and understanding WTE at tertiary institutes in Nigeria | 1- Restructure of WTE curriculum to focus on learner centred approach<br>2- Organise workshops and seminars for WTE lecturers on adopting PoBLin education and understanding<br>3- Institutes to enforce adoption of PoBL in WTE education and understanding<br>4- Regular feed back on the effectiveness of PoBL in WTE education and understanding | S1, S2, S4, S5, S7, S9<br>S2, S3, S5, S6, S7, S8, S9<br>S2, S3, S4, S6, S9<br>S1, S5, S6, S7, |

Note: S = Respondents

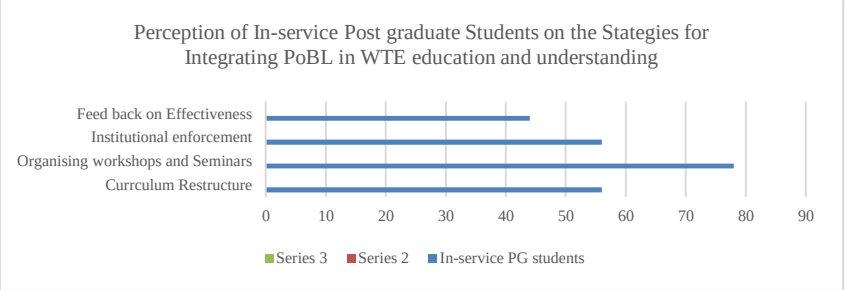



**Fig. 2.** Percentage of themes generated from interview on strategies for integrating PoBL in WTE education and understanding

Based on the themes generated from the interview as presented in table 5 on the question posed to the in-service post graduate students. It was observed from figure 5 that 56% of in-service post graduate students replied that WTE curriculum should be restructure to focus on learner centred approach, 78% replied that workshops and seminars should be organise for WTE lecturers on adopting PoBL in WTE education and understanding, 56% replied that institutes should enforce compliance on adopting PoBL in WTE education and understanding, and 44% replied that regular feedback on the effectiveness of PoBL in WTE education and understanding are the strategies for integrating PoBL in WTE education and understanding at tertiary institutes of Nigeria.

## 5 Discussions

The quantitative and qualitative data collected and analysed in this study collaboratively explains the instructional strategies adopted in WTE education and understanding and the effective strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria.

The findings from both quantitative and qualitative data revealed that lecture, demonstration, project and assignment methods analysed were found to be the instructional strategies involved in WTE education and understanding at tertiary institutes in Nigeria. This finding is in line with the opinion of [26] who stated that the traditional method involving lecture and demonstration have been the teaching approach in WTE for many years in higher education institutes in Nigeria. It was also revealed from the findings of both quantitative and qualitative data that PoBL is not adopted in WTE education and understanding at tertiary institutes of Nigeria and the traditional instructional approach has been the main instructional strategy. In line with this finding, [27] observed that in Nigeria, the predominant instructional strategy at tertiary institutes is the teacher centred approach, also called traditional approach or "chalk and talk", usually involving lecture as the instructional method.

From the quantitative analysis of research question two as shown in table 2, it revealed that encouragement of student ownership of learning, collaboration with pears, ability to work independently, enhancement of critical thinking, communication skills

as well as encourage student active participation in learning were perceived as the benefits associated with PoBL in WTE education and understanding at tertiary institutes in Nigeria. This is in line with the view of [28] that PoBL engages student autonomy in learning and enhances students higher order thinking skills. In this regard, student autonomy in learning is a feature of PoBL [29]. Equally, [30]stated that among the main benefits that we can expect to obtain after the implementation of PoBL are, building student self confidence in learning, enhance student problem solving skills, communication abilities and team work.

The findings from both quantitative and qualitative data on the strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria revealed that restructure of WTE curriculum to focus on learner centred approach, sensitizing WTE lecturers on the need to adopt PoBL in WTE education and understanding, organising workshops and seminars for WTE lecturers on the application of PoBL in WTE education and understanding, enforcing compliance on PoBL in WTE education and understanding by WTE lecturers and teachers, developing frame work for receiving feedback on the effectiveness of PoBL in WTE education and understanding were found to be the effective strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria. This finding is in line with [9] who stated that the recognition of the need for reform in WTE curriculum and instruction in Nigeria towards learner centred is crucial. Accordingly, [31] stated that, in integrating PoBL in higher institutes curriculum, adequate training of the instructor is required for its effectiveness. This implies organising seminars and workshops for WTE teachers and lecturers so as to be acquainted with the techniques involve in PoBL application in schools. On institution enforcement of PoBL in WTE education and understanding, [16] is of the view that what is needed is a realistic approach that encourages teachers to incorporate , proven elements of project-based learning into classroom practice. Figure 3 shows the effective strategies for integrating PoBL in WTE education and understanding at tertiary institutes in Nigeria

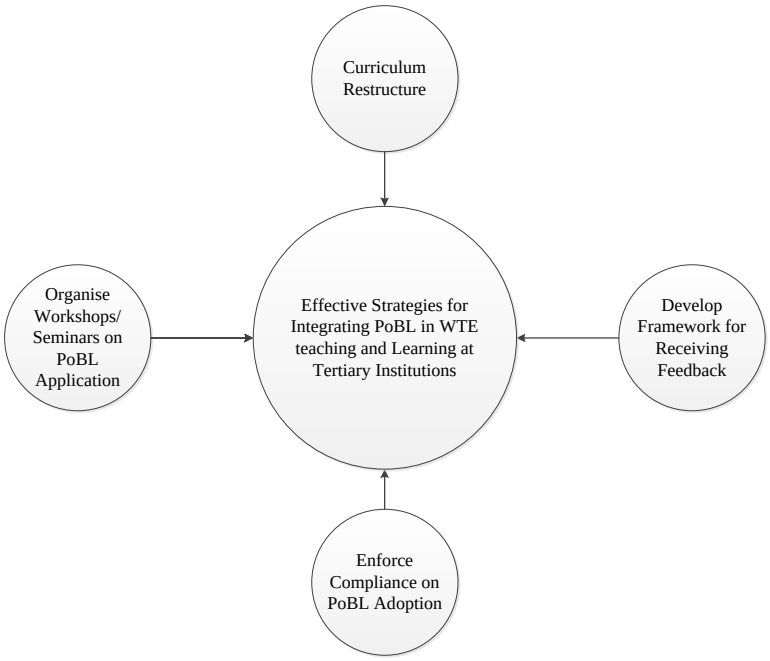



**Fig. 3.** Effective Strategies for Integrating PoBL in WTE education and understanding

## 6 Conclusion

It is through effective integration of appropriate instructional strategy like PoBL in WTE education and understanding that students skills can be effectively acquire, and Nigeria's technological development objective can best be achieve, since adopting an appropriate instructional strategy is one of the conditions that can influence effective skills and knowledge acquisition. The following conclusion were therefore made base on the results of this study. The findings from this study has shown the need to integrate PoBL in education and understanding WTE at tertiary institutes of Nigeria. From the findings it was obvious that the traditional approach is the predominant instruction strategy adopted in tertiary institutes of Nigeria, and PoBL has not been adopted in WTE education and understanding at tertiary institutes in Nigeria. As a result, students graduate without the requisite employability skills. The lack of employability skill from WTE students result from the faulty instructional approaches adopted in teaching WTE students at tertiary institutes in Nigeria. Result from the findings revealed that lecture, demonstration, project and assignment methods have been the main strategies employed in WTE education and understanding at tertiary institutes in Nigeria. Findings of the study also revealed that encouragement of student ownership of learning, collaboration with peers, independent working, active participation, and enhancement of students critical thinking skills as well as communication skills were found to be the benefits to be derived for integrating PoBL in

WTE education and understanding at tertiary institutes in Nigeria. This implies that adopting PoBL in WTE education and understanding at tertiary institutes benefit both the lecturers, teachers, instructors and the students in achieving the overall aims and objectives of WTE program. Also based on the findings of the study, reforming TVET curriculum at the tertiary level to a more student centred learning like the PoBL , sensitizing and organising seminars and workshops for lecturers on PoBL implementation in WTE education and understanding, and enforcing compliance on adoption of PoBL in WTE education and understanding are the effective strategies for integrating PoBL in WTE education and understanding. This in essence informs the need to integrate PoBL in education and understanding WTE at Universities, polytechnics and colleges of education been the main tertiary institutes in Nigeria.

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## 8 Authors

**Muhammad Umar Isa** is a native of Niger State, Nigeria. He obtained a Bachelor of Tecnology degree in Industrial and Tecnology Education (Woodwork Technology) from the Federal University of Technology Minna, Nigeria, and a Master degree in Vocational Teacher Education ( Industrial Technical Education) from the University of Nigeria Nsukka. He is a lecturer in the Department of Woodwork Technology, Federal College of Education (Technical) Bichi, Kano State, Nigeria. He is presently a PhD student in the Department of Technical and Engineering Education , School of Education, Faculty of Socoal Sciences and Humanities, Universiti Teknologi Malaysia. He has research interest in TVET and 21st century learning skills.

**Yusri Bin Kamin** obtained a bachelor of Technology with Education degree in Mechanical Engineering, and a master of education degree in vocational and Technical Education from Universiti Teknologi Malaysia. He also obtained a PhD degree in Technical and Vocational Education La Trobe University Melbourne, Aaustralia. He is presently a senior lecturer, academic manager of external programs and the head of department in the department of Technical and Engineering Education, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi, Malaysia. Email: p-yusri@utm.my

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