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Need Analysis of 7E Instructional Model for Teaching Entrepreneurship Skills: A Case of Technical Colleges in Nigeria

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Abstract--- *The advent of constructionism as a teaching approach in technical colleges curricula brought about the introduction of various teaching models in the colleges. For example, 5E and 7E begin to serve the application of constructivist approach. However, technical teachers are important factor in the teaching-learning process in Nigeria because selection of methodology of teaching largely depends on the teachers, based on the course content/material. The purpose of conducting this study is to explore the opinions of technical education specialists and teachers on the need for adopting the 7E instructional model in teaching entrepreneurship skills in technical colleges of Nigeria. Exploratory sequential mixed method design was employed in the study. 4 automobile teachers, 6 building teachers, 5 electrical installation and maintenance work teachers, and 5 metal work teachers participated in the qualitative part of the study. A total of 20 participants were involved in the first phase of the study. In addition, the opinions of the trade teachers were obtained using semi-structured interview and Atlas.ti was used to transcribe information, code, and generate themes in the initial study. While 30 respondents answered the structured questionnaire in the second phase of the study which is quantitative. Descriptive statistics is used for data analysis. Six technical colleges were used within the scope of the study. Based on the opinions of trade teachers, it has been concluded that 7E instructional model is needed for teaching entrepreneurship skills in technical colleges in Nigeria.*

Keywords--- *7E Instructional Model, Entrepreneurship Skills, Nigerian Technical Colleges*

I. INTRODUCTION

Qualitative and functional technical education is supposed to go beyond graduation requirement and extend to producing skilled and efficient labour force for useful living in a given society. No effective labour force can be produced without training and training is imparted through instructional/teaching methods. This implies that the quality of instructional method greatly influenced the nature of training and level of skills acquired by a labour force. Technical courses such as automobile trade, building trade, electrical installation and maintenance work trade, radio and television trade and metal work trade can be taught effectively by employing an instructional model having 7E learning cycle. This is because acquisition of technical skills is no longer sufficient in the modern world except when blended with another soft skill such as entrepreneurship skill. This calls for curricula developers to

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exert some effort towards embedding technical skills with entrepreneurship skills in our technical colleges in order to create competitive work force.

Researchers such as [1], [2], and [3] opined that learning cycle is a constructivism learning model which consists of three phases (3E: exploration phase, concept introduction, and concept application), developed to five phases (5E: engagement, exploration, explanation, elaboration, and evaluation), and later improved to seven phases (7E: eliciting, engaging, exploring, explaining, elaborating, evaluating, and extending).

Technical skills refer to the kind of manual dexterity skills obtainable from technical colleges. Technical skills are acquired through instruction and experience usually imparted by trade teachers through five developmental stages of learning, namely: novice, advanced beginner, competent, proficient, and expert [4]. Technical skills also refer to the specialized tasks that enable workers to use their knowledge of tools, techniques, and procedures that are specific to their particular fields. These skills are usually trainable and can be taught to others. This is because technicians are mostly engaged in overt actions, which involve a lot of manipulation of materials and machines to create an effect. The skills acquired from technology are however not exclusive of the skills from science. Some scientific skills are seen in the area of technology because science and technology are different sides of the same coin. Technical skills as listed by [5] include: Inspecting, Selecting, Drawing, Testing, Analyzing, Assembling, Servicing, Installing, Identifying, Handling, Measuring, Diagnosing, Designing, Dismantling, and Repairing.

However, blending entrepreneurship skills alongside technical skills will help learners to properly fit into the world of work. Countries like Tanzania, Finland, and Germany have incorporated the practice of blending technical courses with entrepreneurship skills in order to reduce numerous subjects of study from the curricula and to promote self-reliance as well as economic development. The essence of teaching entrepreneurship in schools are different in various countries, starting from the narrow understanding of entrepreneurship rooted in acquiring skills for setting up and running businesses to the broader understanding hinged on entrepreneurial thinking: creativity and innovation, improving information skills, developing autonomy to attain personal goals, and taking responsibility for common goods.

Previous studies carried out by researchers like [6], [7] pointed out that 7E instructional model is applicable to the field of science and technical education. The studies also indicated that learning is grasp and retain by students more effectively, especially in science and technical education: educational areas dealing with skills formation and acquisition. Hence, entrepreneurship skills in automobile trade, building trade, electrical installation and maintenance work trade, and metal work trade can be taught by adapting the 7E instructional model in Nigerian technical colleges.

Background of the Study

Researchers have advocated various methods for improving students' acquisition of skills at science and technical colleges. For example, [8] listed demonstration method of teaching, field trip technique of instruction, and project method of teaching technical education as effective in teaching practical oriented subjects like automobile, building, electrical installation, and metal work. In addition, [9] opined that teaching relevant and functional technical skills require the provision of modern workshop equipment, qualified and experienced teachers, and

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effective instructional methods. [9] also pointed out that due to insufficient facilities and teaching materials technical teachers have to resort to demonstration and lecture methods alone in both theoretical and practical classes.

This indicated that the problems existing in technical education and training today can be aligned to poor instructional paradigms being used in technical colleges by relegating contemporary instructional models to the background. Contemporary instructional models help learners to concretize knowledge through fast interpretation and retention when used to teach science and technical subjects [10]. In addition, other empirical evidences advanced by [11]; [12]; [13]; [14]; and [15] pointed out that it is paramount to develop improved methods of teaching science and technical subjects devoid of the passive role of teachers in the classrooms.

However, many models were created to enhance classroom and laboratory strategies in schools and colleges and one such model is 7E instructional model that originated from Eisenkraft in 2003 [16]. Similarly, teaching entrepreneurship skills in automobile trade, building trade, electrical installation and maintenance work trade, and metal work trade need to be taught by using the 21st century instructional strategies. Therefore, focus should be geared towards constructivist framework in the context of learning skills because individuals can connect previous knowledge acquired with current learning to construct new knowledge for self-reliance and wealth creation.

Statement of Problem

Youths in Nigeria are degenerating in terms of socio-economic living regardless of technical secondary education which is supposed to prepare them for suitable and valuable life. This calls for a re-look at the technical secondary education curriculum and ways of its implementation. [10] reported that the traditional instructional model is deficient in the traditional learning environment especially if it is compared with alert learning environment because learners grasp and retain knowledge mainly provided by the teacher. Whilst learning should be a process of rapid development based upon individualistic approach to imbue broader understanding and experiences in learners. In addition, instructional paradigms constitute influential elements in teaching and learning which if not carefully selected may result in ineffective learning. However, alert learning environment refers to learner centred approach to instruction where majority of tasks or activities are performed by the learner with little or no facilitation from the teacher. For instance, Scaffolding and 7E instructional methods. Therefore, the rational for carry out this research is to investigate the desirability of adopting 7E instructional model for teaching entrepreneurship skills in technical colleges in Nigeria.

Objective of the Study

The main objective for conducting this research is to find out the perception of technical college teachers on methods of instruction for teaching entrepreneurship skills in Nigerian technical colleges; and expose the importance of using 7E instructional model for inclusion in technical college curriculum.

Research Question

What are the methods of instruction needed to be used for teaching entrepreneurship skills in technical colleges in Nigeria?

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II. LITERATURE REVIEW

Conceptual Framework

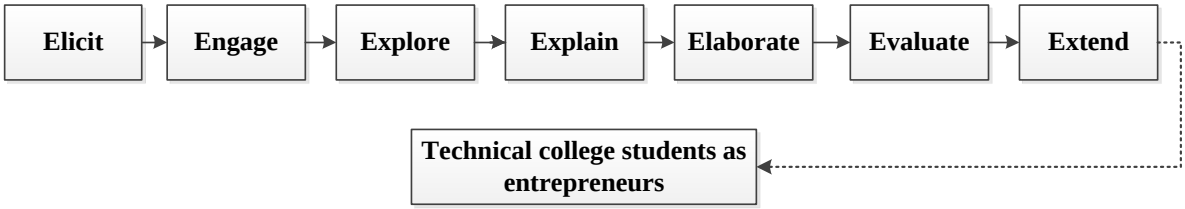

Figure 1: Conceptual Framework

2.1 7E Instructional Model

[10] listed seven stages of 7E instructional model as adopted from Eisenkraft. The stages included the following:

1. Elicit: Tasks in elicitation stage evoke learners to remember past experiences during new learning situation.
2. Engage: Teacher present stimulating situations in order to ignite the interest of learners and increase their attention in getting ready to learn. Here, logical organization of concepts formation is actualized.
3. Explore: Teacher facilitates students' learning by providing conducive learning environment to promote scientific processes; observation, developing hypotheses, identifying variables, record data, organize and produce graphical representation of experiments.
4. Explain: Teacher provides guidelines to students on content and context and express the comprehension of relevant concepts which make learners interpret and conduct exercises or experiments.
5. Elaborate: This assists learners to apply knowledge obtained in current situations to other contexts.
6. Evaluate: assessment of students' learning at the beginning and end of lesson presentation to determine their strengths and weaknesses for improvement in the future.
7. Extend: Transforming content, contexts, and skills learnt by students into practice in real-life situation successfully.

Despite the existence of other methods of teaching technical courses such as demonstration, apprenticeship, and scaffolding, development of improved method of instruction for teaching technical subjects is needed so as to turn-out competent college graduates. This study has explored 7E instructional model for teaching entrepreneurship skills in technical colleges in north-western Nigeria.

2.2 Entrepreneurship Skills

[17] defined entrepreneurship skill as person's ability to identify a business idea and actualize it in practice. This clearly shows creativity and innovation as the main processes of entrepreneurship which can increase productivity or provide new products and methods of service [18].

However, [19], in the National Policy of Education, stated that the philosophy of entrepreneurship education is to equip every technical college graduate with functional trade and entrepreneurship skills, and relevant attitudes such as ethical, civic, and moral values needed for job creation, poverty eradication and wealth generation. Moreover, among the objectives of entrepreneurship education is developing students' competencies, know-how, experience, attitudes, resourcefulness, and network required to pursue different entrepreneurial opportunities. Therefore, issues

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for consideration arose as follows: What entrepreneurship contents are to be integrated into the trade curriculum? How to integrate entrepreneurship contents into the trade curriculum? How much time or period can be allocated to cover the content?

Entrepreneurship skill areas to be considered for integration into the trade curriculum include: Entrepreneurial awareness, qualities of an entrepreneur, self and paid employment, ethics in life and business, business ideas and opportunities, business plan, starting and operating a business, and business report [20]; [21]; [22]; [23]. Despite the provision of [19] cited above, the National Board for Technical Education is yet to include entrepreneurship skills in technical college curriculum because the last curriculum review took place in 2007 [24]. However, [21] reported that conventional secondary schools in Nigeria have started embracing trade entrepreneurship subject prepared by Nigerian Educational Research and Development Council in 2014. Each secondary school is to teach at least one trade entrepreneurship subject to students as preparation towards self-employment.

2.3 Summary

This study discovered that recently entrepreneurship education has started to cover the scope of general education in Nigeria but technical colleges' curricula do not contain clear information about entrepreneurship skills in terms of contents and contexts. More so, there is no consensus on the way it should be integrated into the curricula, what entrepreneurial characteristics to include, or how to teach the contents in technical colleges. However, teachers need to be re-trained on entrepreneurship education and its importance before implementation in technical colleges. This idea is supported by scholars like [25], and [26] who advocated that teachers must have entrepreneurial characteristics before they can inculcate them to students at any level of education. The researchers consider these factors as reasons for conducting this study.

III. METHODOLOGY

The following methods and strategies were used in the conduct of the study.

A. Research Design

The study was designed to investigate the need for integrating 7E instructional model for teaching entrepreneurship skills in technical colleges of Nigeria. The researchers employed sequential exploratory mixed-method research design to carry out the study. The first stage of the study involved the use of semi-structured interview whilst the second stage involved the use of questionnaire.

B. Area of the Study

Six technical colleges in the north-western Nigerian were involved in the study. They are: Government Technical College Amadu-Asungblu, Government Girls' Technical College Tambuwal, Government Girls' Technical Commercial College Charanchi, Government Technical College Kano, Government Technical College Hadejia, and Tafawa Balewa Memorial Technical Commercial College Samaru-Kataf. The colleges were selected because they have concentration on automobile trade, building trade, electrical installation and maintenance work trade, metal work trade as well as entrepreneurship education from the business studies stream of commercial colleges.

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C. Sample and Sampling Technique

Purposive sampling is used in choosing participants for the qualitative study where 4 automobile teachers, 6 building teachers, 5 electrical installation and maintenance work teachers, and 5 metal work teachers participated. The criterion for intentionally selecting them to participate is that they have been teaching in the respective trade subjects for more than a decade. A total of 20 participants were involved in the qualitative study. While simple random sampling was employed in the quantitative study where 30 respondents (trade teachers) were randomly chosen to answer the questionnaire items for the quantitative study. Simple random sampling was used because the respondents come from the same group with common characteristics.

D. Instrumentation

Semi-structured interview and questionnaire were used as the instruments for data collection.

i. Qualitative Study

Semi-structured interview was used as an instrument for data collection in the study. 3 specialists were requested to validate the interview protocol for construct validity. They were: 1entrepreneurship teacher, 1 metal work trade teacher and 1 building trade teacher. The reliability of the interview protocol was determined through member checking and peer debriefing. The saturation point for the interview was attained at question number 4 and the data obtained from the participants were transcribed, coded, thematically categorized and analyzed by using Atlas ti. Excerpts from the interview are briefly listed in table 1. Participating teachers in the interview were coded as P_A, P_B, P_E, & P_M for automobile, building, electrical, and metal work trades respectively.

ii. Quantitative Study

The researchers adopted a structured questionnaire named questionnaire for methods of teaching basic technology in Nigerian secondary schools developed by [27], after obtaining approval from the author. The reason for adoption is that initial inquiry from the qualitative study has provided instrument fidelity so instead of creating new instrument, the researchers adopted an existing instrument to collect reference point data. Therefore, validation and reliability test of the questionnaire are less significant when adopted from another study [28]. Percentage and statistical mean were used to analyse the data (acceptability of each method of teaching as presented in table 2). In addition, four-point scale was used for the questionnaire and the decision point of 2.50 and above was considered as acceptable. More so, line graphs displayed the percentages and statistical means based on the questionnaire scale (refer to figures 2 and 3).

E. Scope of the Study

The study mainly investigated the perspective of teachers on the need to incorporate 7E instructional model for teaching entrepreneurship skills in technical colleges of north-western Nigeria. The research is delimited to six technical colleges that specialized in automobile trade, building trade, electrical installation and maintenance work trade, and metal work trade.

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IV. FINDINGS

i. Qualitative Study

a. Semi-Structured Interview

Table 1: Excerpts from the Semi-Structured Interview

QUESTIONS	RESPONSES	Coding	THEMES GENERATED
1. Are you aware of teaching entrepreneurship skills in technical colleges in Nigeria?	No I am not informed about this issue (P_A). We are yet to receive implementation policy on entrepreneurship skills (P_B). The NBTE does not include entrepreneurship skills in technical college curriculum (P_E). I learnt that new secondary school curriculum covered entrepreneurship skills but technical colleges are yet to embrace it (P_M).	Unaware, aware but not implemented, aware but not practiced.	Elicit, explore, Engage.
2. What method (s) will be suitable for teaching and learning entrepreneurship skills in technical colleges?	Teacher's explanation and engaging students in performing assignments (P_A). Allowing students to do business experiments/projects and come up with their own results (P_B). Teachers to demonstrate skills in given topics for students to observe (P_E). Grouping learners to discuss ideas and concepts from a particular topic (P_M).	Explanation, performing assignment, doing projects, drawing results, observation, group chat	Explain, Engage, Evaluate, and Extend.
3. How can teachers conduct lessons if trade subjects are embedded with entrepreneurship skills?	By explanation of ideas and concepts in the classroom (P_A). By lecture and assignment method (P_B). Introducing multi-media approach where students view video and carry out tasks in classrooms or laboratory (P_E). By introducing relevant business owners to share their experiences with students (P_M).	Explanation, lecture, assignment, observation, performing tasks, guest speaking.	Elicit, Engage, Explore, Explain, Elaborate, and Extend.
4. Do you think students will improve in their trades by gaining entrepreneurship skills?	Yes, they will imbue the capacity to fit into similar business cycles after school period and become competitive (P_A). Students will be more effective in their trades by possessing a sense of entrepreneurship (P_B). Students can create their own businesses and become financially independent (P_E). Yes, student after graduation will have better customer relationship (P_M).	Adaptation, taking, creation,	Elicit, Engage, Explore, Explain, Elaborate, Evaluate, and Extend.

Table 1 showed that three categories were generated from question 1; Elicit, explore, and engage. Five categories were obtained from question 2; Explain, engage, evaluate, and extend. Six categories were gotten from question 3; Elicit, engage, explore, explain, elaborate, and extend. Finally, seven categories were drawn from question 4; Elicit,

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engage, explore, explain, elaborate, evaluate, and extend. This indicated that the model is desired for instruction in technical colleges.

ii. Quantitative Study

b. Structured Questionnaire

Table 2: Questionnaire on Methods of Teaching Entrepreneurship Skills in Technical Colleges of Nigeria

S/NO	ITEMS	HIGHLY NEEDED (%)	MODERATELY NEEDED (%)	NEEDED (%)	NOT NEEDED (%)	MEAN SCORE ($\bar{X}$)	DECISION
1	7E Instructional Model	16 (53%)	9 (30%)	4 (13%)	1 (3%)	3.47	Acceptable
2	Demonstration Method	14 (46%)	8 (27%)	7(2%)	1 (2%)	3.17	Acceptable
3	Discussion Method	14 (46%)	7 (24%)	9 (30%)	0 (0%)	3.17	Acceptable
4	Lecture Method	11 (37%)	9 (30%)	6 (20%)	4 (13%)	2.90	Acceptable
5	Project Method	11 (38%)	10 (32%)	9 (30%)	0 (0%)	3.07	Acceptable
6	Field Trip Method	12 (41%)	12 (40%)	5 (15%)	1 (4%)	3.17	Acceptable

Table 2 indicated that 16 responses out of 30 were obtained for item 1 (7E instructional model). This is the highest number found among the items. This signified the need of 7E instructional model in technical colleges.

V. DISCUSSION

Initial inquiry provided the researchers opportunity to generate the following themes: Elicit, engage, explore, explain, elaborate, evaluate, and extend as listed by Shahen & Kayani (2015). Therefore, the findings from the preliminary study are in tandem with the categorization of Shahen & Kayani (2015).

In the second phase of this study, a mean score of 3.47 was found for item 1 of the questionnaire (7E instructional model of teaching). This finding indicates the acceptability of 7E instructional model to be used in technical colleges for teaching entrepreneurship skills as recommended by [6], [10], and [7]. While mean scores of 3.17 were obtained for items 2, 3, and 6 (demonstration, discussion, and field trip methods of teaching) respectively. The decision point here is also acceptable and the methods were advocated by [8] as effective for teaching technical courses, hence it could be extended to teach entrepreneurship skills. In addition, lecture and project methods which have mean scores of 2.90 and 3.07 were also accepted as enhanced methods of instruction in teaching entrepreneurship skills.

By and large, all the instructional methods were found to be acceptable, in this study, to some degree. But considering the order of acceptability, the 7E instructional model emerged as the method with the highest mean response. Therefore, it is suggested by the researchers as an improved method of learning that can enhance learning of entrepreneurship skills. For example, in an integrated curriculum (like entrepreneurship skill embedded with technical skills) to produce effective middle-level manpower.

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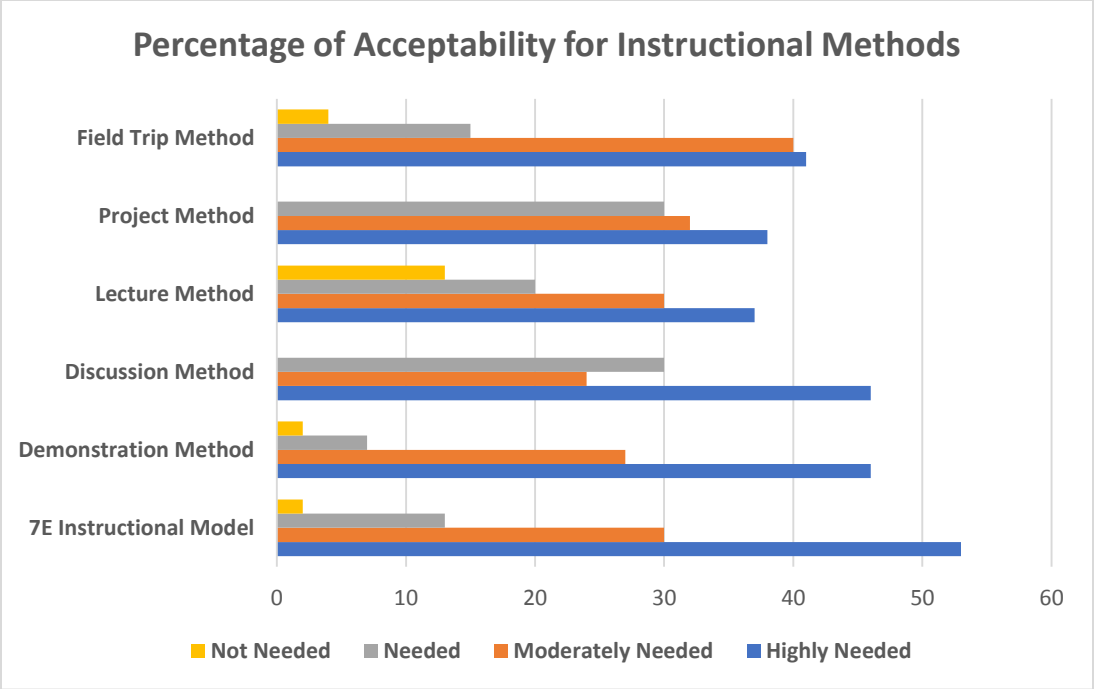

Figure 2: Percentages of Instructional Methods

In figure 2 colours are used to show the highest percentage (Blue) for each method. While other colours follow in descending order for the remaining methods. For example, first row from the origin shows 7E instructional model indicated by Blue colour (Highly Needed), Orange (Moderately Needed), Grey (Needed), and Gold (Not Needed).

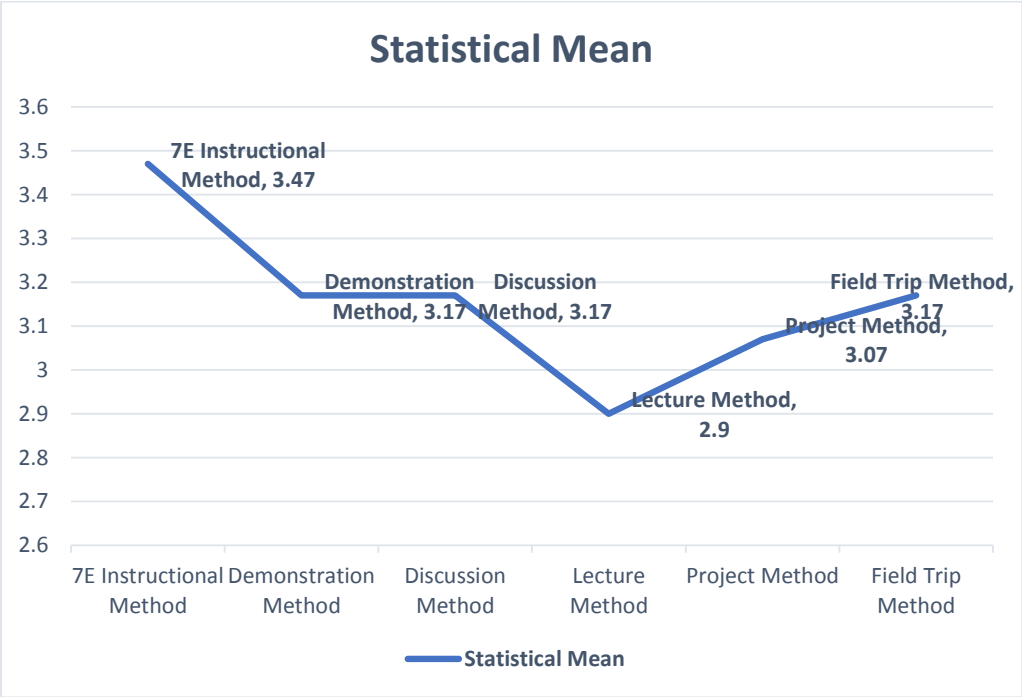

Figure 3: Statistical Mean for the Instructional Methods

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This study is hinged on constructivist theory which was propounded by Brunner in 1973. Constructivism learning theory advocates that learners construct knowledge and meaning from their capabilities. Constructivist theory is applicable to technical education because it has broad influence on diverse teaching methods and constitutes underlying theme of educational reforms. This theory is related to this research because it emphasised upon hands on activities in teaching-learning situations, allowing learners to choose, alter, decide, unite and extend ideas for learning to stay permanent in the memory of the learners. These principles are encapsulated in the 7E instructional model proposed in this study.

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