

AN INVESTIGATION OF AUTHENTIC LEARNING EXPERIENCE OF PRE-SERVICE TEACHERS IN A NIGERIAN COLLEGE OF EDUCATION

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ABSTRACT

The study investigated the authentic learning experiences among pre-service teachers in a College of Education. Two hundred pre-service teachers were randomly sampled for the study. 50 students each from science and technical education while 100 students were from vocational education. Data were collected using questionnaire and interview. Analysis of the data was done using frequency counts, percentage, and descriptive statistics. Findings revealed that science and technical education students had an authentic learning experience, except that the students received lecture through the traditional lecture method. Vocational education had an inadequate authentic learning experience because their learning had only five elements out of the nine authentic elements investigated. Some recommendations were suggested.

Keywords: Authentic learning, science education, technical education, vocational education.

INTRODUCTION

Education is good but a functional education. Functional education is a type of education where the recipient can transfer the classroom knowledge to solve real-world problems. Research shows in Africa today that many who received formal education fails in the area of transfer of knowledge. It is perhaps due majorly because of the type of instructions received in the schools. The old informal African education was not like that because it is education by imitation (Aina, 2013). It is a practical and education by doing, not by memorization. For the education to be functional, transfer of theory to practice must be paramount. It is imperative for a change of paradigm. In other words, what the students learn must be authentic

Irrespective of the discipline, the mode of classroom instruction must be authentic learning instruction. It will assist students as the apprentice to apply classroom experience to solve new challenges outside the class. An apprentice does not learn all the crafts at a time, but he can apply those learn to resolve the new problem at any time.

The current situations in Nigerian society where graduates of higher institutions of learning are not efficient at work after graduation calls for investigation. The situation is worst among professional teachers because these are people that mold lives. If teachers are not effective, it will affect all areas of human lives because they train all workers in the nation. The root of their poor efficiency at work is that they cannot relate theory to practice. It means they cannot connect the classroom experience to real-world problems. This negates the submission of Koenders (2006) that graduates of the modern world need to be reflective practitioners and life-long learners.

Today, it seems knowledge is inert because of the inability of school graduates to transfer knowledge acquired to practice when needed. It is a significant problem in the Nigerian teachers' education. Knowledge supposed not to be inert (Whitehead, 1932 cited in Herrington, 2006). It now raised a big question the type of learning that goes on in the classroom. What

obtains in class today is that teachers concentrate more on theory than practice. It is evidently clear from the performance of graduate of teachers' education institution as a college of education that more emphasis was in theory than practice. Aina (2014) has once observed that these categories of teachers are not performing very well after graduation. In the same vein, Herrington (2006) said it is evidently clear that theory transfers to practice in teacher education courses is not active.

Given this background, it is necessary to investigate the experience of authentic learning among pre-service teachers in a college of education in Nigeria as a case study. Authentic learning typically focuses on real-world, complex problems and their solutions, using role-playing exercises, problem-based activities, case studies, and participation in virtual communities of practice (Lombardi & Oblinger, 2007). Students are actively working, participating in discussions, hunting for information, and enjoying the entire process of authentic learning (Mims, 2003). Authentic learning activities are designed to give the students 'real-world' experiences. Authentic learning should be an inquiry in nature that enables the student to develop knowledge and skill for a successful learning (Barron & Chen, 2008). It is a learning that provides the students with the opportunity to learn for themselves in a controlled environment where the teacher can help and guide the students who are experiencing difficulty (Schoffstall & Gaddis, 2007). Authentic learning is a learning by doing. It is an active learning where students are not passive. It is an inquiry method of learning. It has been observed that this learning is crucial for developing critical thinking skills and developing scientific contents (Apedoe, Walker, & Reeves, 2006). It is a process of asking meaningful questions, finding information, drawing conclusions, and reflecting on possible solutions (Milson, 2002). In this learning, the students are allowed to direct their investigative skills to complete all scientific processes like data gathering, analysis, hypothesizing, observation and experimenting (Keselman, 2003).

Regardless of the subject matter, when the students are actively involved, they learn more and retain it longer than when they try to absorb knowledge passively (Green, 2003). It is a common practice in school to see teacher dominating the classroom activities by giving out all the information required by the students. Learning in this kind of situation is penniless and characterized by a short memory. It has been observed that students could only retain only 20% of what is learned here after a week. According to Bok (2006, p. 123), the average student retains just 42 percent of the material from a lecture by the time it ends, and only 20% one week later. Students learned by memorization, and that is why it is hard to be able to apply this learning to real-world problems.

Therefore, for learning to be authentic and be able to transfer knowledge for a solution to real-world problems certain elements are necessary. According to Herrington and Oliver (2000), there are nine elements of authentic learning which shall be the compass to navigate this study. They are:

- Learning context
- Learning activities
- Expert performance
- Multiple roles and perspectives
- Collaboration
- Reflection
- Articulation
- Coaching and scaffolding
- Authentic assessment.

Authentic learning is essential to students' academic performance aside being able to solve a real-world problem. Students would be able to recall activities where he or she has been able to participate actively. Retention in authentic learning is very high because this is a learning by doing (Aina, 2013). However, teachers' pedagogy of teaching is essential to authentic learning; pedagogy that encourages the student to be passive during learning can never be authentic. A theoretical model below is presented for the purpose of this study.

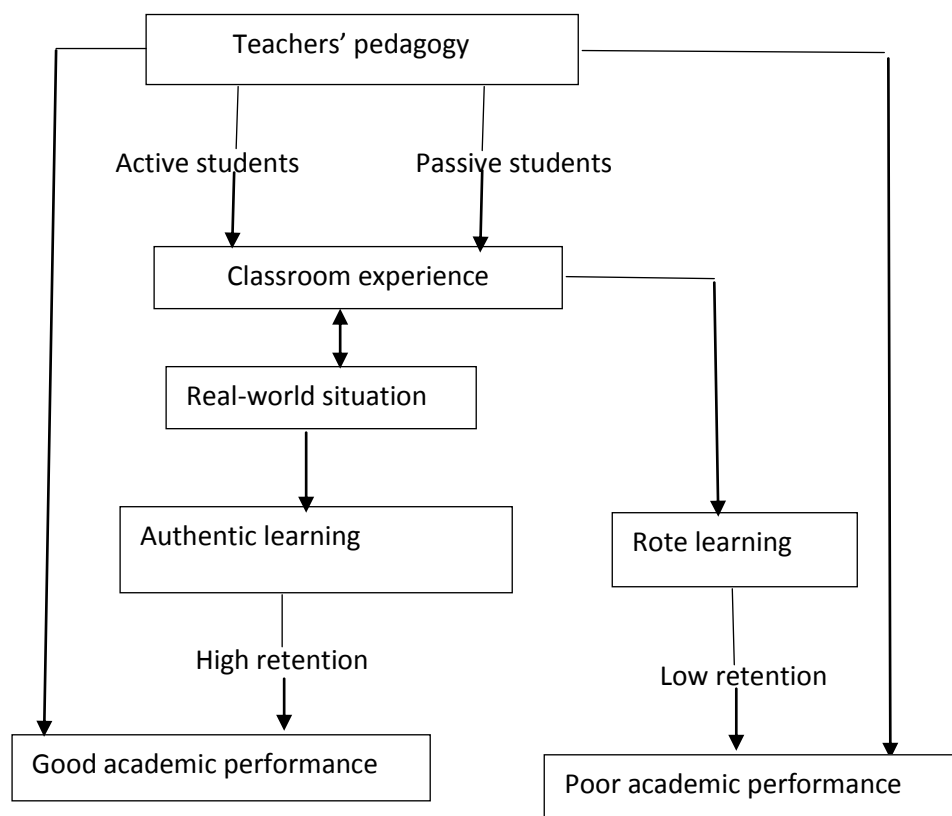


Figure 1: Conceptual framework of authentic learning and PI

THEORETICAL CONSIDERATION

The underpinning theories for this study are constructivism theory, cognitive apprenticeship theory (CAT) and constructive controversy theory (CCT) of learning. According to Brandon and All (2010), constructivism theory is founded on observation and scientific study about how people learn. The theory emphasizes that learning should be an active process in which learners construct new ideas or concepts based upon their current or past knowledge. The constructive theory model sees constructivism as a spiral with the students at the center of the spiral making students the center point of learning. Within the ring, students interact, constituting a group that interacts with the teacher. Through the process of questioning, students learn the strategies that help them become expert learners. The process of active learning gives students the ever-broadening skill of lifelong learning.

According to Brooks and Brooks (1993), a constructivist teacher should encourage student critical thinking and inquiry by asking them thoughtful, open-ended questions, and encourage them to ask questions from each other. Promote communication between the teacher and the students and also between the pupils.

Cognitive apprenticeship is based on group learning with other students in the class, having its objectives and processes based on argumentation (Bouta and Paraskeva, 2013). According to Stewart and Lagowski (2003), is a learning by doing and sequentially guided learning process with expert models and expert feedback. The goal of cognitive apprenticeship is to help students generalize the skill, to learn when the skill is applicable or not applicable, and to transfer the skill independently when faced with new challenges (Collins, Brown and Holum, 1991).

The constructive controversy involves deliberative discussions aimed at creative problem solving (Johnson, Johnson, and Tjosvold, 2000). Students must be skilled collaborators, and follow the norms of cooperation and the rules of rational argumentation. Students are strongly motivated to produce solutions, and display high-level reasoning and greater mastery and retention of new knowledge gained. They generate high quality and creative solutions.

Constructive controversy is not a debate nor is it an individualistic approach to a controversial issue. It is a procedure for cooperative learning where individuals with different incompatible views agreed on the best position based on evidence and reasoning (Johnson and Johnson, 2007). According to Daniels and Cajander (2010), constructive controversy is on the basis that discussions and controversies may create a good starting point in attempt to understand a complex problem. Students will improve their skills to constructively and innovatively think and find solutions to complex and challenging problems. When one person's ideas, information, conclusions, theories, or opinions are incompatible with those of another -- and the two seek to reach an agreement (Smith, 2013, p. 9). It is the ultimate goal of constructive controversy theory.

Though, there are numerous theories of learning in education that could be considered for this study but these theories are considered the best for this study. These theories are active learning theories that considered the students to be at the center of teaching and learning. Both theories considered students' interaction among themselves paramount, and that through argument students develops their critical thinking ability. Constructive controversy theory is much unique in classroom argumentation leading to a consensus among incompatible views and opinions.

Problem statement

Most pre-service teachers find it difficult to connect classroom theory with a practice outside classroom. It is common to see a so called brilliant student who cannot use the knowledge he or she got in the school to solve a real-world problem. The problem is because of the type of instruction they had while in school. Many of the instructions in the schools today are teacher-centred, where the teacher gives out all the learning information to the students. In these type of instructions, the teachers follow a routinely prepared class activities and make the student inactive. Authentic learning is therefore very rare, where students determine the problem of learning, collaborate, learned from the expert and the teacher only act as a facilitator. Therefore, the study is to investigate authentic learning experience among pre-service teacher in a College of Education.

Research questions

1. What authentic learning experience do students of science education possessed?
2. What authentic learning experience do students of technical education possessed?

3. What authentic learning experience do students of vocational education possessed?

METHODOLOGY

The study adopted the mixed-method approach. It is a method where both qualitative and quantitative methods are used. The reason for this is to strengthen the validity of the result of the study.

Sampling Method

Two hundred (200) pre-service teachers of the College of Education (T) Lafiagi were randomly sampled from three schools. The schools are a school of science, school of technology and school of vocation. School of Science has five departments that are; biology education, chemistry education, computer science education, integrated science education, mathematics education and physics education. School of Technology has the following department: metalwork education, electrical education, building technology education, wood work education, and automobile education. For the school of vocation, the departments are accounting education, agricultural education, and economics education.

Instrumentation

A researcher constructed questionnaire called authentic survey, and unstructured interview were used to collect data for the study. The items of the questionnaire were drafted based on the nine authentic learning elements reviewed in the literature. The questionnaire was validated by three lecturers of the college aside the triangulation already done through the mixed method. Reliability of the instrument was done by calculating the Cronbach's alpha coefficient to be 884.

Data analysis

The statistical analysis found suitable for the study is a simple percentage, frequency counts, and descriptive statistics.

RESULTS

Table 1: Science Education

s/n	Authentic learning element	Item	Mean	%	Decision
1	Context	1 & 2	25	50	Authentic
2	Activities	3 & 4	35	70	Authentic
3	Expert performance	5 & 6	15	30	Authentic
4	Multiple role and perspectives	7 & 8	42.5	85	Authentic
5	Collaboration	9 & 10	30	60	Authentic
6	Reflection	11 & 12	37.5	75	Authentic
7	Articulation	13	30	60	Authentic
8	Coaching and scaffolding	14 & 15	15	30	No
9	Authentic assessment	16	50	100	Authentic

Table 2: Technical Education

s/n	Authentic learning element	Item	Mean	%	Decision
1	Context	1 & 2	37.5	75	Authentic
2	Activities	3 & 4	32.5	65	Authentic
3	Expert performance	5 & 6	30	60	Authentic
4	Multiple role and perspectives	7 & 8	37.5	75	Authentic
5	Collaboration	9 & 10	47.5	95	Authentic
6	Reflection	11 & 12	30	60	Authentic
7	Articulation	13	45	90	Authentic
8	Coaching and scaffolding	14 & 15	7.5	15	No
9	Authentic assessment	16	25	50	Authentic

Table 3: Vocational Education.

s/n	Authentic learning element	Item	Mean	%	Decision
1	Context	1 & 2	60	60	Authentic
2	Activities	3 & 4	92.5	93	Authentic
3	Expert performance	5 & 6	45	45	Not
4	Multiple role and perspectives	7 & 8	67.5	68	Authentic
5	Collaboration	9 & 10	45	45	No
6	Reflection	11 & 12	72.5	73	Authentic
7	Articulation	13	45	45	No
8	Coaching and scaffolding	14 & 15	40	40	No
9	Authentic assessment	16	60	70	Authentic

DISCUSSION

Research Question 1: What authentic learning experience do students of science education possessed?

From the table 1 it was revealed that the teacher supplied all the information the students' needs from the start of the lecture. From this, it is clear that the traditional lecture method approach to teaching was prevalent in science education. The table reveals that aside coaching and scaffolding students of science education had other eight elements of authentic learning. From this, it could be concluded that science education in this college had an authentic learning experience.

Research Question 2: What authentic learning experience do students of technical education possessed?

From the table 2, lecturer supplies all the information required by the students in the classes. That is to say, lecturers employed traditional lecture method for teaching in technical education. Technical education students had eight of the nine elements of authentic learning except coaching and scaffolding.

The result of this study is confirming the submission of Deslauriers, Schelew, & Wieman, (2011) that lecture method dominates most of the tertiary institutions. Lecture method is frequently a one – way process unaccompanied by discussion, questioning or immediate practice that makes it a poor teaching method (Hatim, 2001, p. 99). According to Bok (2006), an average students only retains 42% of what he or she learned after the end of the lecture and 20% one week later. Berry (2008) observed that the lecture method is good at delivering a large amount of information in a short period but lack effective interactive learning approach.

Research Question 3: What authentic learning experience do students of vocational education possessed?

Table 3 reveals that vocational education student had an authentic learning experience in only five of the nine authentic elements under investigation. The table reveals that vocational education students do not have an authentic learning experience in expert performance, collaboration, articulation, coaching and scaffolding.

According to Jamison (2006), vocational education relies on the acquisition of factual knowledge and skills in an apprenticeship system. Given this submission, the vocational education under the present study is not entirely authentic in nature.

Collaboration is imperative in the authentic learning environment. Students need to work in a group and make the learning an interactive one. As earlier observed by social constructivist that learning is a social interaction. Through this, learner shares ideas and construct new knowledge through collaboration. The collaboration should not be only for students' homework assignment as the case in the present study but also during class activities.

The major problem with higher education in Nigeria today is the absence of student-centred learning. Evidence abounds that lecturers dominate the classroom activities in higher education through the lecture method. The present study has confirmed this. Teachers are to be facilitators in the authentic learning environment and only guide the students, not give them all the learning information as done in this study. From the interviews conducted, it was very interesting that all the students said they were able to use the classroom knowledge to solve real-world problems. Here are some of the students' answers to the interviews.

Student 1

“It is quite easy to apply what I have learned to solve problems outside the classroom or at home.”

Student 2

“It is easy for me to apply what I have learned to solve problems on business activities, for instance, I can manage a business with the knowledge I have acquired.”

Student 3

“It is quite easy for me to apply what I have learned based on my field of study to solve problems outside the classroom.”

Student 4

“It is easy to apply what I have learned based on my field of study to solve problems outside the classroom because my field of study deals with the study of nature and everything that is inside it”.

All the students interviewed responded that the college does not bring an expert to the school for consultation before undertaken difficult tasks. Fifteen students were interviewed, selected across the schools. However, few of the students seek expert idea on their own. These students equally said they do not work in the group during class task except when a homework assignment is given.

Interview result also indicates that the assessment in science, technical and vocational education were both carried out during class activities and also use class test format. From the interview, all the students responded that what they learned in the school were designed for them by the college management.

One of the characteristics of authentic learning is that the task must be ill-defined where students are expected to define the task themselves. Learning must be centered on the authentic tasks that are of interest to the students (Mims, 2003). The situation where what the students are learning are defined for them by the college management does not make the learning authentic because the tasks are not authentic. The present study indicates that the tasks are not ill-defined and not authentic.

FINDINGS

The findings of this study reveal some contradiction between the questionnaire results and the interview that may need further research. The questionnaire revealed that there is collaboration in science and technical education, but the interview reveals collaboration only in homework assignment not in class activities. However, findings reveal that students of science and technical education had an authentic learning experience in their various courses. The finding also reveals that the traditional lecture method is the popular instructional strategy employed by science and technical education lecturers. Though, through the interviews the students submitted that they were able to use what they learned to solve the problem outside the classroom. The extent to which this could be done is uncertain with the lecture method.

The finding also reveals that authentic experience of students of vocational education is not adequate as they possessed only five out of the nine elements of authentic learning. Students do not experience authentic learning through expert performance, collaboration, articulation, coaching and scaffolding.

CONCLUSION

The findings of this study may suffice to agree with the submission of Herrington (2006) that retention and transfer of knowledge were assumed but rarely assessed. Students claimed in the interviews that they were able to solve the world -based problem using classroom knowledge, but questionnaire surveys indicate inadequate authentic experience. Also, questionnaire survey indicates lecture method of instruction in science, technical and

vocational education. Research studies have shown that retention is low in lecture method. It is therefore concluded as follow:

Lecture method of instruction is the method of instruction in science, technical and vocational education classes. Lecture method of instruction does not support authentic learning experience because authentic learning is learning by doing to acquire the foundational skills and knowledge. Vocational education students do not possess adequate authentic learning experiences like their counterpart in science and technical education. Vocational education students lack access to expert ideas and do not collaborate during class activities.

Finally, the finding that the student used classroom knowledge to solve the problem outside the class is a conjecture that need further study.

RECOMMENDATIONS

Based on this conclusion, the following recommendations are at this moment suggested:

- Lecturers should not depend on the traditional lecture method as the only mode of instruction in their classes. Less information on learning task should be given to students and allow them seek for the information by themselves. Teachers should only act as a facilitator of learning through coaching and scaffolding.
- School should not depend on the already prepared learning tasks through textbooks but allow the learners to determine their learning tasks.
- Assessment should not be based on written test format but should be incorporated into class activities.
- Students should always be given the opportunity to interact with expert and professionals in their field of studies.
- Students should be allowed to work together in groups during class activities not only for a homework assignment.
- Resources should be made available for students to solve complex problems through different approaches.

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