RE-ENGINEERING TEACHING IN TEACHER EDUCATION: THE DIGITAL OPTION IN NIGERIA

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Abstract
Teaching has as its main goal producing learning. This paper opined that the problem of teaching in teacher education in Nigeria is the use of ineffective tools such as the lecture method, and argued that the solution lies in re-engineering teaching through integration of digital learning. In the digital method/approach, the teacher uses a wider variety of materials (text and non-text), out of class activities to complement classroom work, set the scene and engages learners in challenging activities. This approach affords learners broad-based opportunity for learning through such strategies as advanced organizer, guided design, problem-based education, Keller's tutorial systems of instruction among others. Learners contribute to classroom organization, initiate activities, take notes in an analytical manner, and challenge the teacher's opinion.
Keywords: Teaching, Teacher Education, Analog, Digital Learning.

Introduction

In the 21st century education, making students to learn is the essence of teaching. This is because it has been discovered that what really matters is not how much a teacher has taught but how much learning occurred in students. However, the term learning here is used as a gerund word, meaning it is a process and not an outcome. Learning how to learn is a critical element of the learning process. The role of the teacher is not that of providing information but as a facilitator of learning (Ely & Plomy cited in Achuonye, 2004). The challenge in teacher education in Nigeria is that it is dominated by the use of ineffective learning tools, such

as the lecture method. The word 'tool' is not necessarily referred to a physical object or material. To Oxford Dictionary it means anything that assists someone to perform a job for instance teaching method/strategies can become tools.

When the lecture method is used in learning, student participation is limited to just note taking or writing. In lecturing, the teacher is the principal actor, based on the assumption that he is the "prime source" of wisdom, that is someone who knows all about a field of study (Dike, 2006). The teacher engages in complex learning activities while students come to him to be fed with information. As a result, the lecture

method tends to promote rote memorization thereby hindering learning (Dike, 2006). This problem can be addressed by replacing approach with digital learning. This is because the digital option offers students broad-based opportunity for learning and participation in the teaching and learning. Hence, the need to examine the digital option.

The Problem of the Lecture Method

The problem of the lecture method is its ineffectiveness when used in learning (Dike, 2006, Amadi 2021). According to Dike (2006) the lecture method is ineffective as a training technique in teacher education for the following reasons;

1. It creates no room for active participation by trainees.
2. It does not allow for provision of feedback in the process of learning.
3. Trainee cannot learn it their own pace when it is the order of the day.
4. There is no guarantee that the material is useful.
5. It does not ensure that prior learning has taken place before introducing new learning.

In addition to these when the lecture method is used;

1. The student cannot use alternative approaches such as browsing the net to find solution to problems.
2. The student may not be allowed to view specimen or models provided for learning enough so as to learn.
3. The student may not be allowed to interact with others.

Concept of Teacher Education

Teacher education has been defined from different perspectives. Mkpa (2015) describes teacher education as the procedures designed to equip teachers at the pre-service and in-service levels with the knowledge, skills and competencies needed to perform their professional duties successfully. It is planned set of activities which are projected towards helping teachers to acquire appropriate knowledge, skills and attitudes so as to enable them function as creative, effective and competent teachers.

From a different perspective, Taylor (2016) viewed teacher education as any formal programmes that have been set aside for the preparation of teachers needed at every level of education. Going by the Federal Government of Nigeria Decree No. 16 of 1985, Umar cited in Wordu (2020) stated that teacher education is the professional training given to teachers entering or already in the teaching profession either as part of secondary education or higher education. That is, any deliberate and conscious effort aimed at providing training and training opportunities for those who are to carry the responsibility for driving education towards attainment of set objectives is teacher education. Teacher education encompasses any formal and informal process of helping teachers develop new insights into pedagogy and their own practice, and explore new or additional understanding of content and resources (Salvam, 2014).

Teacher Education in Nigeria

Teacher education involves both students and teachers and other staff in teacher educational institutions, including faculties of education in Nigeria universities, and National Open University of Nigeria (NOUN), National Teachers Institute (NTI) and Federal and State Colleges of Education in Nigeria. The institutions engaged in teacher education in Nigeria; as stated in Ogbonda (2021) includes:

i. Colleges of Education (Federal and State)

ii.   Faculties/Institutes of Education of universities
iii. The National Teachers Institutes (NTI)
iv. School of Education in Polytechnics
v.   National Mathematics Centre
vi. National Institutes of Nigerian Language
vii. Faculty of Education of National Open University of Nigeria (NOUN)

These offer to students courses leading to the award of Bachelor of Science in Education (B.Ed) and Nigerian Certificate in Education (NCE). Some universities run SANDWICH programme as well as Distant Learning courses just like the National Open University of Nigeria (NOUN). Most universities in Nigeria have faculty of education, and so are involved in teacher education. Ogbanda (2021) indicates that by 2017, there were 112 colleges of education in Nigeria, comprising of 22 Federal, 47 State and 43 Private Colleges of Education.

Aims of Teacher Education in Nigeria

The National Policy of Education (2004) stated that the aims of teacher education are:
a. To produce highly motivated, conscientious and efficient classroom teacher for all levels of our education system.
b. To encourage further, the spirit of enquiring and creativity in teaching.
c. To help teachers to fit into the social life of the community and society at large and to enhance their commitment to national objectives.
d. To provide teachers with the intellectual and professional background adequate for their assignment and to make them adoptable to any changing situation

not only in the life of country but in the wider world.
e. To enhance teacher's commitment to the teaching profession.

What is Teaching?

Two approaches to teaching are discernible in its literature, which are teacher-centred teaching and student-centred teaching. Teacher-centred teaching describes teaching as transmission of knowledge from a well experienced person or expert in a particular discipline to a person who knows nothing or little of what he/she is supposed to know (Blum, 2012). This perspective has been criticized for viewing teaching as a limited activity. Student-centred teaching on the other hand is the process of guiding students in acquiring the amount and quality of experience for the maximum development of their potentialities.

To Ogan and Logan in Agina-Obu (2015) teaching is a creative process which involves imagination and utilization of prior experience to provide a combination of material, methods, ideas and media that help children integrate learning and reinforce concepts. What this means is that teaching is facilitation of learning. This agrees with Jarvis (2004) that teaching is seen as an intention to bring about learning, involving active participation of both the teacher and learner, with the former serving as a facilitator by guiding the latter towards achieving the desired objectives.

Approaches to Teaching in the 21st Century

There are two main approaches to teaching; analog and digital approaches. These approaches are discussed below;

What is Analog?

The word analog is not originally an educational concept. The Oxford Dictionary of current English sees analog as electronic

information or signals represented by varying physical effect, such as voltage, the position of a printer, etc. rather than in digital form. So, when we are talking about analog teaching, we mean presentation of information to students in a manner that does not take advantage of computer. It is reminiscent of the method of teaching by telling.

Weakness of the Analog Approach

The analog method has been described as characterized by the use of prescribed textbook followed logically from A to Z, the teacher doing all the talking while pupils listen and take dictated notes and talks only when the teacher directs, frontal teaching, memorization and vote learning with emphasis on facts, figures and recitation and regurgitation and coverage of syllabus (Obanya, 2021). The main weakness of the analog approach, is that it makes the learner to be too dependent on the teacher. It also tends to make the learner to be narrow-minded, to avoid critical and innovative thinking. Learning becomes more focused on examination than on solving problems.

What is Digital Learning?

Digital learning can be defined as learning and teaching through network technologies (Zhang Amadi, 2021). In the digital approach, the teacher uses a wider variety of materials (text and non-text), out of class activities to complement classroom work, set the scene and engages learners in challenging activities. Learners contribute to classroom organization, initiate activities, take notes in an analytical manner, and challenge the teacher's opinion.

The learning process involves a wider variety of activities, flexible classroom organization, analytical and creative thinking. The outcome of learning includes;

improved love for learning, improved hand-on-experience, reward for creativity, for example discovery of new knowledge, technique, device or problem solving (Obanya, 2021). Teaching may be carried out using face to face, online or a combination of both modes.

The Realm of the Digital: Implication for Learning in Teacher Education

Digital teaching is the teaching and learning that is carried out online through network technologies. It is also referred to as E-learning or delivery of instructional materials to remote sites via the intranet/extranet audio, video, satellite, interactive broadcast, interactive television and CD-ROM (Holsapple & Lee post in Amadi, 2021). It is also viewed as teaching and learning online through network technologies (Zhang, 2004). Its implication for learning in teacher education involves certain learning strategies such as;

Advance Organizer

The aim of advance organizer is to prepare the learner ahead of time for the lesson that would be taught, Advance organizer is a body of information which may be in the form of a generalization, principle statement, picture, film, question, problem, story or demonstration related to a topic/phenomenon for discussion in a class, serving as an anchor or template between incoming information and existing knowledge in the long term memory of the learner (Dike, 2006).The aim of advance organizer according to Dike (2006:197) is:

> To assist him (the learner) to unlock the bundle of experiences in the LTM and to provide side post (pillar) which help to provide structure to learning experiences. … if a learner has the primer, it helps him to organize and assimilate any new in

information with existing one thereby providing what David Asubel (1963) calls ideational scaffolding during a learning process.

Such knowledge undergoes process of incubation in the brain before the commencement of a new lesson, and that helps to provide structure to new learning experiences the learner is meant to acquire.

Computerized Learning

Computerized learning is the uses of computer as a key component of the educational environment or learning mediated by computer (Salvam, 2014). The learner interacts with a computer in order to learn. Its lessons are developed in coded language. These developed lessons are referred to as application (Dike, 2006). The learner uses a keyboard or mouse to carry out an online dialogue with this educational software.

Computerized learning has many possibilities in its usage in learning including:
  i.   Drill and practice
  ii. Tutorials
  iii. Games and simulation
  iv. Inquiry/discovery
  v.   Problem solving

In each of these, the computer plays a distinctive role(s) which may replace some of the teacher's roles. For example, in drill and practice, the computer's roles involve asking question, assessing student performance, providing immediate feedback and recording of students' progress (Dike, 2006). In the case of tutorial, the computer role(s) involves presentation of information, asking question, monitoring response, providing feedback, summarizing lesson and keeping record. In gaming lesson, the computer acts as competitors, judge, and score recorder. In simulation design, the computer plays roles, delivers result of discussion, and maintains the model and its database. In discovery/inquiry process, the computer provides students with sources of information, store data and permits search. The computer presents problems, manipulates data, maintains database and provides feedback to students engaged in problem-solving.

Competency/Performance-based Education

Competency/Performance-based Education was adopted due to dissatisfaction with the traditional teaching approaches in teacher education. Students work at their own pace in order to achieve specified objectives. Emphasis shifts from the teacher and the teaching process to the learner and the learning process. It involves presentation by a model teacher or expert and then group presentation by students (Tomei, 2010). It relies on educational technology to create alternative media materials. It involves sharing of the meanings of objectives and agreeing on the criteria for assessment by both teacher and learner. Students are to show clearly evidence of achievement of outcomes. A student is judged according to his performance and not on the basis of completion of credit units. The means of evaluation is criterion-referenced test.

Guided Design

It is the use of a small group (4-8) to solve problems in a course so as not to present them with ordinary cold facts using the lecture method. It therefore requires generating and sequencing problems just as behavioral objectives are stated and sequenced. As the students seek solutions to the stated problems, they have to make use of alternative media materials accessible through educational technology. According to Dike (2006), problems must be open-

ended and drawn from topics not yet treated and skills areas. Students are free to tackle them based on their thinking. Each problem is broken into stages and solved in the order presented. Students need to plan first before carrying out the tasks, because certain fundamental information will be required to achieve result. The teacher acts as a facilitator and works ahead of the student to provide relevant resources needed by the student.

Problem-based Education

A problem-based instruction is the use of real-world problems as cues for creating possible or likely mental construction of events. Such problems can be posed to students at the beginning of the lesson or used as advance organizer. This is in contrast to the approach in which concepts are first presented or named or described and then, there is a presentation of a problem in the form of assignment. Problem-based instruction is inter-disciplinary and integrative in nature. This will create room for educational technology to be applied. It is also student centred as it demands active engagement of students in seeking solution to problems in a learning situation.

Keller's Personalized System Instruction (PSI)

Keller's personalized system instruction (PSI) is a programmed instructional material in which the frames are enlarged through the incorporation of personal social elements (Tomei, 2010). This instructional strategy was designed to convert the role of a teacher from a dispenser of information to an engineer or contingency manager of student's learning. According to Dike (2006) the features of PSI are:

    i.   It is individual and self-paced.

    ii. It demands unit perfection before moving to the next unit.

    iii. Lectures and demonstrations are used to motivate learners.

    iv. It stresses the written submissions by students.

    v. It advocates the use of proctors for repeated testing, remedial scoring and tutoring.

    vi. It shares with mastery learning these characteristics.

Mastery Learning

Mastery Learning is traceable to a psychologist B.F Skinner. It involves breaking of a complex behaviour into a chain of component behaviours and ensuring student mastery of each link in the chain, thereby it becomes possible for the student to master even the most complex skills. Its principle states that behavior is a function of its consequences. The mastery learning model advocates that learners with different aptitudes should be provided different time to study the same unit (Bergmamn, 2022). If each learner is provided an ideal time for learning taking into cognizance his attitude, the same degree of mastery will be achieved by the group of learners. This implies that this approach is learner centred and gives learner opportunity for active engagement in the learning process (Wayne, 2006). Hence, it is capable of integrating educational technology in the learning process.

Audio-Tutorial System of Instruction

Audio-tutorial system of instruction combines the characteristics of instructional media materials with learning principles derived from learning theories. Postlethwait introduced this method of instruction through experiment in which students engage in a dialogue, using study guides that required students to bring into the learning additional resource materials. It requires

lessons to be broken into small units and well sequenced.

Programme Instruction

Programme instruction is an individualized self-instructional method of teaching/learning in which there is an inbuilt opportunity for active participation by the learner. The lessons are split into sub-units and sequenced. The learner progresses from one sub-unit to another and is reinforced through a feedback mechanism. There are two types of programmed instructions: linear programmed instruction and intrinsic or branching programmed instruction (Tomei, 2010). Linear programmed instruction requires students to progress from a less difficult task to a more difficult task in accordance with the way frames or small units are sequenced. The intrinsic or branching programmed instruction does not restrict students to this pattern, rather the learner's entry behavior is used to determine what sub-unit to tackle before the other.

Conclusion

It is now clear that educational practice is not what it was in the past. One of its manifestations is the paradigm shift from analog to digital approach of teaching and learning. This change will permeate the entire educational system from primary to university, both inside and outside the formal school system globally. Students (learners) and teachers as the key players in the education sector would certainly need transformation to cope with the exigencies resulting from this charge. The Nigerian education system is slow in responding to the demands of the new learning environment in comparism to the developed countries of the world.

The main conclusion of the study is that to enhance student learning, teacher

education must be digitalized. Learning must be conceived as a process as well as change. Emphases should be on studying the process of student learning rather than teaching. The teacher's role shifts from one of impacting knowledge to resource person, a facilitator, a guide, etc.

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