AN ASSESSMENT OF THE EFFICACY OF METACOGNITION FOR LIFELONG LEARNING IN NIGERIA COLLEGES OF EDUCATION

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Abstract

Metacognition is a major lifelong skill which is essential for competence stability. The absence of metacognition in the teaching/learning process has been identified as a major cause of teachers' difficulty in recognizing when they have failed to adequately meet learning goals or complete tasks. A majority of teacher-trainees do not exhibit ability to adapt to unfamiliar context while practising. The researcher observed that students who had CGPA performances of upper credit and distinction were still found to have shortcomings while practicing, which tend towards the absence of metacognitive skills. The aim of this study was to investigate the effects of the use of metacognition as a teaching/learning strategy on students' acquisition of lifelong learning skills in colleges of education. This is a quasi-experimental study which also made use of exploratory-sequential research design. The sample size for this study was 80 NCE students from the department of English language education. Simple random sampling technique was used to select 80 NCE students in the 2020/2021 session while the use of fish bowl method was used to assign the participants into experimental and control groups. Data was collected using the College Applied English Language Achievement Test (CAELAT) was Teacher Skill Assessment Observation Rubric (TSAOR). The descriptive statistics comprising mean and standard deviation was

used to analyse data. Analysis of covariance (ANCOVA) was also computed on the pretest-posttest values for the experimental and control groups to determine the effects of metacognition on students' acquisition of lifelong learning skills by comparing the experimental group with the control group based on the variables under study. Variables were tested at 0.05 level of significance. One hypothesis was tested; the effect of metacognition on students' acquisition of lifelong learning skills in the experimental and control group was significant with F-ratio (2, 78) = 235.7, P<0.05 was significant. Lecturers in colleges of education need to teach to impart metacognitive skills in their students. Also, in colleges of education, lecturers should have the ability to observe that teacher-trainees have good metacognitive skills before they graduate from training so as to ensure competence-stability in their profession. It was found that by applying metacognition to the teaching/learning process lecturers can equip teacher- trainees with critical thinking, self-awareness abilities, and the capacity to adapt to any learning environment while meeting the needs of every learner in their care. It was also found that Metacognition sustains teacher competence-on-the- job and lifelong learning through self- directed assessments.

Keywords: Metacognition, lifelong learning, competence stability, metacognitive skills

Introduction

Assessment is a fundamental part of teaching and learning, and has led to educational growth and development in any society. Farrell (2017) says assessment can simultaneously validate and enable learning both within and beyond the university; he referred to it as 'sustainable assessment' or assessment that 'meets the needs of the present without compromising the ability of the students to meet their own future learning needs. According to (Saskatchewan Ministry of Education, 2010b, p. 33) assessment can be viewed under three (3) categories:

Assessment *of* Learning: Under this category of assessment, evidence of learners' achievements is provided to the learners themselves as well as other stakeholders in education. This category deals majorly with assessment that are diagnostic, formative, summative, norm-referenced and criterion-referenced in nature; with activities such as examinations, tests and observations.

Assessment *for* Learning: This category of assessment goes in two ways. Firstly, it enables teachers to make use of information derived from learners' performance, to guide the teaching/learning process. Secondly, it helps learners know-how to improve, through the feedback they get from assessment. Formative assessment is mainly evident under this category with activities such as the use of Socratic

Method of teaching, class exercises, in-class discussions, assignments, tests and classroom observations.

Assessment *as* Learning: Under this category, learning only takes place through assessment. Here the learners take more responsibility for their learning while monitoring future directions. This involves *metacognition* and peer assessment.

The use of any of the three categories of assessment depends on the purpose of assessment. In Nigeria colleges of education, however, assessment *of* learning and assessment *for* learning are the only recognized categories of assessment due to the nature of the curriculum in use. Purposeful assessment practices help teachers and students to judge their performances in a bid monitor the of quality input as well as ensure quality output in an educational system.

This paper however, focuses on Metacognition which is a procedure under the category of *Assessment as learning,* as a teaching/learning strategy in Nigeria Colleges of Education.

Lifelong Learning in the Context of Assessment

Lifelong Learning is not a recent development. According to Smith (2001) lifelong learning was first proposed by Basil Yeaxlee in 1929. The concept was later adopted and discussed in detail during a United Nations Educational Scientific Cultural Organization (UNESCO) conference organized in 1960. However, its importance has grown over the years as a result of rapid changes in the world which has made its pertinence more pronounced in the educational system (Karaman 2012). Hürsen (2012) and Akbaş and Özdemir (2002) summarized the statements in the UNESCO international education commission. However, only a few of their observations are pertinent to this study; They highlighted that educational activities should have a more flexible structure. They also posit that education should be designed as a lifelong process.

One of the primary aims of higher education is to equip students for professional success as well as to graduate students who have the knowledge as well as skills to navigate the complexities of their various professions and the society at large. (Barnett, 2006) Farrell (2017) acknowledged according to Organization for Economic Cooperation and Development (OECD, 2014), that the increased complexity of learning needed by the 21st century graduate cannot be adequately assessed through examinations. He further posits that traditional assessment practices do not equip students for the assessment challenges they will face as graduates or for learning throughout their lives. Boud and Fachichar (2006) opine that assessment must equip students to learn beyond the academy once the infrastructure of teachers, courses and formal assessment is no longer available. Assessment can be a unique tool to prepare students for a lifetime of learning; to achieve this it must build students' capacity to learn for themselves, assess the learning of others, as well as make value judgement. (Jessop & Elhakin, 2014)

Metacognition

Metacognition deals with individuals' awareness and judgments about their cognitive abilities (Flavell, 1976; Zohar and Barzilai, 2013; Yerdelen-Damar et. al., 2015) This is an aspect of *Assessment as learning*. Under this category, learning only takes place through assessment. Here the learners take more responsibility for their learning while monitoring future directions. Mytkowicz et al. (2014) while stating Flavell's (1976) view on metacognition, defined it as knowing your cognitive processes or anything related to them. This means metacognition has to do with self-monitoring of one's academic activities. Metacognition skills and strategies are important for critical thinking ability (Ku & Ho, 2010). This makes it a key component for academic success in tertiary education. Uwazurike (2010) recommends using teaching methods that encourage students to apply metacognitive strategies in their efforts to master content. Bembenutty (2009) also urged educators to support students in becoming self- regulated learners by assisting them to develop metacognitive skills There are three (3) categories of metacognition as stipulated by Flavell in Karowski (2014); which include:

- Cognition of person variables: this refers to having a general knowledge of one's learning abilities.
- Cognition of task variables: this is to do with having adequate understanding of tasks.
- Cognition of strategy variables: this refers to having the technical know- how to accomplish given tasks.

What are Metacognitive Skills?

According to Flavell (1979) cited in Patterson (2011), Metacognitive skills are strategies applied consciously or automatically during learning, cognitive activity and communication to manipulate cognitive processes before, during or after a cognitive activity. According to Von According to (Neer, 2016) Metacognitive skills involve, identifying one's own learning style and needs, planning for a task, gathering and organizing materials, monitoring mistakes, evaluating task success and evaluating the success of learning strategy. These depict that the ability for learning to occur and/or continue lies in metacognition i.e., metacognition facilitates cognitive abilities. Metacognition also involves taking conscious control of learning, planning and selecting strategies, monitoring the progress of learning, correcting errors, analyzing the effectiveness of learning strategies, and changing learning behaviours and strategies when necessary (Ridley, Schultz, Glanz, & Weinstein, 1992). If self-regulatory skills are developed during instruction, it results in metacognition which makes an impact on problem-solving capacity as well as transfer of knowledge across domains. (Bereiter & Scardamalia, 1985; Bransford, Sherwood, Vye, & Rieser, 1986). On the other

hand students would have difficulty recognizing when they have failed to adequately meet learning goals or complete tasks if these self-regulatory skills are not developed (Bransford et al., 1986). Since these are skills utilized by successful practitioners and experts (Chi, Feltovich, & Glaser, 1981; Bransford et al., 1986), adequately developed metacognitive ability is needed to engage in effective problem-solving and reasoning activities.

Self-directedness as a metacognitive skill for lifelong learning

Students need self-directed learning skills to be successful within the domain. They should be able to develop strategies for identifying learning issues and locating, evaluating, and learning from resources relevant to that issue. (Savery & Duffy, 1995) According to Barrows (1995) the process of self-directed learning is described as the utilization of the following skills to solve a problem or fulfill a learning requirement: the ability to identify and define a problem/ learning need; the ability to identify, find, use, and critique resources for solving the problem or meeting the learning requirement; the ability to capture and apply information from resources to the problem or learning need; and the ability to critique information, skills, and processes used to solve the problem or meet the learning requirement. According to Dunlap (1997), there are instructional methodologies that help students develop the metacognitive and self-directed learning skills needed for lifelong learning. These methodologies include:

Problem-based Learning (PBL): is an instructional methodology that uses an authentic problem, need, or challenge as a context for students to learn problem- solving and lifelong learning skills. (Barrows & Tamblyn, 1980; Boud, 1985). The basic outline of the problem-based learning process is: encountering the problem first, problem-solving with reasoning skills and identifying learning needs in an interactive process, self-study, applying newly gained knowledge to the problem, and summarizing what has been learned. (Barrows, 1985) In a PBL environment, the students work with problems in a way that enables them to apply critical thinking. While working on the problem collectively, students can identify areas of learning to guide individualized study. The skills and knowledge acquired through the individualized study are applied back to the problem to evaluate the effectiveness of learning and to reinforce learning. The learning that has occurred in working with the problem and in an individualized study is summarized and integrated into the student's existing knowledge structure. The development of self-monitoring skills is an important part of being metacognitive and, therefore, contributes to students' ability to be lifelong learners.

Intentional Learning: Intentional learning is learning that is actively pursued by and controlled by the learner (Resnick, 1989). Palincsar and Klenk (1992) describe intentional learning as an achievement resulting from the learner's purposeful, effortful, self-regulated, and active engagement. Intentional learning helps students learn how to not only monitor and be aware of their thinking and

learning processes (i.e., metacognitive skills), but also to take responsibility for learning on their own (i.e., self-directed learning) (Brown & Palincsar, 1989). When the teacher-trainees are aware of their cognitive abilities they are either encouraged to maintain their cognitive standard or be spurred to improve on it.

Reciprocal Teaching

Reciprocal teaching is a teacher-led, cooperative learning methodology developed to improve students' understanding of complex text (Brown & Palincsar, 1989; Palincsar & Brown, 1984). Reciprocal teaching is a system of learning that is based on a collaborative support structure "within which novices could take on greater responsibility for more expert roles" (Brown & Palincsar, 1989). Palincsar and Klenk (1992, p. 213) describe reciprocal teaching as an instructional procedure that takes place in a collaborative learning group and features guided practice in the flexible application of four concrete strategies to the task of text comprehension: questioning, summarizing, clarifying, and predicting. The teacher and group of students take turns leading discussions regarding the content of the text they are jointly attempting to understand. When you allow students to learn by teaching one another, they are able to rate their individual performance in comparison with their peers. Reciprocal teaching helps students develop comprehension-monitoring and comprehension-fostering skills (i.e., metacognitive skills) needed to enhance understanding of texts. (Slavin, 1994).

Lifelong Learning Skills

Hürsen (2014) examined lifelong learning skills that evolve from the application of metacognition, from the perspective of six competencies:

1. Self-management competencies: this is the ability to make decisions for individual development; make self-evaluation in the learning process; make collaborative research; motivate oneself for occupational development and new learning; take individual responsibilities in team work; actively participate in activities; find creative solutions for problems which might occur in occupational life; adjust to new ideas; manage projects which aim to achieve occupational development; and study continuously to learn a new subject.
2. Learning to learn competencies: this is the ability to identify available opportunities for occupational development and know necessary learning activities which include; asking questions in the learning process without hesitation; selecting the important components and documents when learning a new subject; identifying problems which might occur in the learning process; using language effectively in the learning process; and developing empathy.
3. Initiative competencies: ability to make decisions about any subject; adjust to information change; convert ideas for occupational development into

action; plan the activities which can meet the information needs in occupational life; direct oneself to reach determined targets and select the appropriate learning environment; use knowledge for the determined targets; produce creative solution suggestions for problems.

4. Information acquisition competency: ability to communicate in effective ways in the process of acquiring information; express ideas about any subject without hesitation; provide information transfer via e-mail; use the methods of accessing information on the internet; use mobile devices to access new information; use social networks in the process of acquiring information.
5. Digital competencies: ability to use a computer for storing information; use the internet and other communication tools.
6. Decision-making competency: ability to evaluate to what degree he or she has reached determined targets; resolve all problems that prevent occupational career development; evaluate the possible risks in the process of occupational development; make evaluations about time when learning a new subject.

Good teacher preparation programmes will give birth to quality teachers who in turn will produce quality school leavers, quality school leavers will give quality manpower in all spheres of life that can support, sustain and trigger development (Thomas, 2013). There have been incidents of mass failure recorded at the primary and junior secondary examinations conducted in the country. The cause of the poor performance was attributed to teacher factors (Fakeye, 2012), with emphasis being on the teaching strategies employed by teachers (Faniran and Olatunji, 2011). However, the focus has shifted to the quality, skills and adequacy of the training of teachers (Faniran and Olatunji, 2011). Teaching-practice is a fundamental part of the teacher-education programme, however, a majority of teacher-trainees do not exhibit the ability to adapt to unfamiliar context while practising.

Despite the recommendation that metacognition be a core component of teacher preparation (Duman, 2018; Halamish, 2018), teachers' programmes and studies to promote metacognitive competencies are still scarce. The teacher- trainees face multiple challenges during their training process and will continue to do so while on the professional field. They will find themselves in unfamiliar contexts that may challenge their understanding of the world as a whole, which would necessitate the development of new dispositions, knowledge as well as skills. It is thereby imperative to discuss the efficacy of incorporating metacognitive activities into the traditional teaching/learning processes in Nigeria colleges of education.

Purpose of the Study

The quality of teachers in primary and junior secondary education is paramount as these stages of learning serve as the bedrock of educational pursuit. Recent studies have shown the low-quality of NCE teachers in primary and junior secondary schools. Similarly, there has been a drastic decline in enrolment for NCE programmes in Nigeria; a possible cause is that school proprietors no longer desire to employ NCE graduates due to their incompetence despite being certified. Teaching-practice is a fundamental part of the teacher-education programme, however, a majority of teacher-trainees do not exhibit ability to adapt to unfamiliar context while practicing. Using college of education, Ikere-Ekiti as a case study, the researcher observed that students who had Culmulative Grade Point Average (CGPA) performances of upper credit and distinction were still found to have shortcomings while practising. These shortcomings tend towards the absence of metacognitive skills. This prompted a look inwards into the teaching/learning processes in the colleges of education which calls for the need to emphasize metacognition as an important tool for lifelong learning. A teacher or anyone in the academia needs lifelong learning skills for the sustenance of competence and relevance in the profession. It is therefore imperative to advocate for teaching to impart metacognition as a skill as well as a teaching/learning strategy in order to ensure self-sustenance and competence stability of teacher- trainees when they practice.

Hypothesis

This study tested the following hypothesis:

1. There is no significant effect of the use of metacognition as a teaching/learning strategy in Nigeria colleges of education on students' acquisition of lifelong learning skills.

Methodology

This is a quasi-experimental study which made use of exploratory-sequential research design with the aim to investigate the importance for metacognition in teaching/learning processes in Nigeria Colleges of Education. Participants in the experimental group were exposed to metacognition as a teaching/learning strategy while those in the control group were only taught using the conventional teaching/learning method. The population of this study was made of all NCE students in the 2020/2021 session from the English language department in college of education, Ikere-Ekiti. Simple random sampling technique was used to select (eighty) 80 Part Two NCE students in the 2020/2021 session while the use of fish bowl method was used to assign the participants into experimental and control groups as shown in table 1. The College Applied English Language Achievement Test (CAELAT) was the instrument used to test the achievement of participants in each of the groups. The achievement test underwent pilot study and the reliability was ascertained using KR_{21} with a reliability coefficient r=.76. In

addition, Teacher Skill Assessment Observation Rubric (TSAOR) was used to observe some of the students during their teaching-practice, to ascertain life-long learning skills. Content and Construct validation of the instrument were ensured by two Measurement and Evaluation experts from the Institute of Education, University of Ibadan, before usage.

Table 1: Breakdown of Participants for the Study

Participants	Sex	Experimental	Control	Total Students in
the English Language Department (2020-2021)	Female	25	20	40
	Male	15	20	40
Total		40	40	80

Table 1 above shows the breakdown of how participants who were selected for the study, were assigned to each of the groups.

The data was analyzed using descriptive statistics of frequency count, percentages, mean and standard deviation. Inferential statistics of Analysis of Covariance (ANCOVA) with level of significance set at 0.05 was also used to analyze the data collected for the study.

Results

In this section, the results obtained through the objectives of this research are provided and discussed.

Table 2: Sex of Participants

Sex	Frequency	Percent (%)
Female	45	56.3
Male	35	43.7
Total	**80**	**100**

Table 2 indicates the sex distribution of participants used for this study. It shows that 56.3% of the participants were female while 43.7% of them were male.

Hypothesis 1: There is no significant effect of the use of metacognition as a teaching/learning strategy in Nigeria colleges of education on the NCE graduate- teachers' acquisition of lifelong learning skills.

Table 3a: Descriptive Statistics of Students' Performance in CELAT Achievement Test

Teaching /Learning Strategy	**No**	**Pre-test**		**Post-test**	
		Mean	**SD**	**Mean**	**SD**
Conventional	**40**	**10.92**	**3.78**	**17.88**	**3.49**
Metacognition	**40**	**9.90**	**3.42**	**24.60**	**3.79**

Table (3a) shows that there is an apparent difference between the two arithmetic means of the post-test for the performance of the students in the achievement test due to the different teaching/learning strategies employed.

Table 3b: The adjusted arithmetic means for post-test of NCE students' performance in CAELAT achievement test.

Post-test		
Teaching/Learning Strategy	**Adjusted Mean**	**SE**
Conventional	**17.85**	**0.75**
Metacognition	**24.37**	**0.54**

Table (3b) shows that the primary difference was in favour of the participants of the experimental group who had undergone the Metacognition teaching/learning strategy compared to their counterparts in the control group who were taught by applying the conventional teaching/learning strategy.

Table 4: ANCOVA of Observation of Lifelong Learning skills of Participants

Source of Variation	**SS**	**MS**	**Df**	**F**	**P**	**Remarks**
Covariates	6949.1	6949.1	1	235.7	0.000	Sig.
Explained	29203.3	14601.6	2			
Residual	1827.7	29.48	78			
Total	31031.1		80			

*Significant at 0.05 level

The analysis of covariance in table 4, on the effects of the use of metacognition as a teaching/learning strategy on Students' acquisition of life-long learning skills, in the experimental and control groups shows F-ratio (2, 78) = 235.7, $P<0.05$ was significant. Therefore, the null hypothesis which states that there is no significant

effect of the use of metacognition as a teaching/learning strategy in Nigeria colleges of education on students' acquisition of lifelong learning skills by NCE graduates, was rejected.

Discussion

The results obtained in this study showed that there was a significant effect of the use of metacognition as a teaching/learning strategy in Nigeria colleges of education on students' acquisition of lifelong learning skills by NCE graduates, among the experimental group when compared with the control group. In the current study, the result (post-test) shows significant improvement when compared with the baseline result (pre-test) and control group. Improvement in performance after undertaking the CAELAT test can thus be attributed to the use of metacognition as a teaching/learning strategy, confirming the importance of metacognition as previously reported by other researchers. Bakiolu et al. (2015) found a connection between metacognitive awareness levels, technology attitudes, and problem-solving skills, and they concluded that the studied curriculum has an impact on metacognitive awareness and problem-solving skills. In addition, Aykut et al. (2016) discovered a disparity between special education students' academic grade averages, grade levels, and metacognitive awareness in their research. Alkan et al. (2017) stated in their study that although pre-service teachers had insufficient theoretical knowledge, they believed that they would be successful after becoming a teacher, so students' self-efficacy beliefs were high. Accordingly, it can be said that as the age of the students in the university progresses, they tend to act with belief rather than cognition. In the research, there is a result in favour of the cognitive awareness of the students who have high scores according to the arithmetic average results between the metacognitive awareness levels of the teacher candidates and their weighted grade averages. According to the findings of other studies, there was a statistically important positive association between pre-service teachers' general academic grade averages and their cognitive knowledge inventory scores. It is seen from the research results that cognitive awareness has a positive effect on success, that is, cognitive awareness affects success positively and high success also brings high cognitive awareness (O 'Neil and Abedi, 1996). Ozcakmak, et. al. (2021) in their study's results, revealed that there was a strong relationship between metacognitive awareness and academic achievement, and that metacognitive awareness increased significantly as performance level increased. Considering that academically highly successful students have high cognitive awareness (Meichenbaum and Biemiller, 1998; as cited in: Hartman, (2001) and considering the relevant literature. Sahin and Kendir (2013 and Ibe (2009) concluded in different studies that different metacognitive strategies had different effects on the enhancement of students' achievement. Olson and Johnson (2012) also concluded

from their study that journal writing (which is also a metacognitive skill) gave students the opportunity to deepen their understanding, content knowledge and make connections. Knapper and Cropley (2000), opined that individuals who have lifelong learning skills, are active and open to learn in any kind of environment. They are also able to plan their own learning, evaluate their own learning, integrate the knowledge to different subject fields in appropriate situations and use different learning strategies for problems or different situations.

The orientation toward lifelong learning is derived from the learning experience (Solmaz and Aydin, 2016; Oates, 2019). (Boud, 2000) While assessing the students, we must look out for traits that depict their capacity to think independently, act responsibly, communicate effectively and develop continuously. (Farrell, 2017)

Conclusion and Recommendation

In this research, which examined the importance of metacognition as a teaching/learning strategy for lifelong learning, assessed several literatures concerned with the application of metacognition in teaching/learning processes, metacognitive skills and lifelong learning skills, varied results were obtained. The notion that the metacognitive ability is needed to engage in effective problem solving and reasoning activities is one of the most distinct and general results. It was resolved that lecturers in colleges of education need to teach to impart metacognitive skills in their students. This is possible by giving the students the opportunity to imbibe the culture of making valid value judgments about their learning which will in turn groom their self-appraisal skills during practice. It is therefore highly recommended that lecturers in colleges of education have the ability to observe that teacher-trainees have good metacognitive skills before they graduate from training so as to ensure competence-stability in their profession. It is also highly recommended that more empirical studies are done to facilitate the development of a standardized Teacher Metacognitive Competence Test which will require observational techniques for such an evaluation to be carried out. The teacher competence test can be a part of the evaluation the Teachers Registration Council of Nigeria (TRCN) will ensure, before awarding qualifying certificates to teachers. When such a test comes to be, it can form part of the requirements for being awarded the National Certificate in Education in Nigeria colleges of education.

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