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Challenges and Prospects of Creativity in a Basic Science Classroom: The Perception of the Basic Science Teachers

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Authors' contributions

This work was carried out in collaboration between both authors. Author PFH wrote the first draft of the manuscript. Authors ANOO and PFH performed the structural analysis. Author ANOO wrote the discussion and conclusion. The two authors read and approved the final manuscript.

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ABSTRACT

The study looked into the perception of basic science teachers on the challenges and prospects of creativity in a basic science classroom. The researchers adopted a survey research design. Random sampling technique was used to select 100 basic science teachers from secondary schools in Benue State. The questionnaire, tagged Basic Science Teachers' Creativity Perception Questionnaire (BSTCPQ), was the instrument used to collect data for the study. Data collected was analyzed using percentages and means. Results of the findings revealed that most of the teachers of basic science in secondary schools in Benue State were not qualified. Again, absence of well-equipped laboratory was the most challenging factor militating against creativity in a basic science classroom. Also it was discovered that if teachers of basic science are encouraged to attend seminars and workshops on improvisation and use of modern teaching techniques, creativity can be enhanced in the basic science classrooms. It was therefore recommended that well-equipped basic science laboratories should be established in all secondary schools in Benue State and that the basic science curriculum should be relaxed for creativity to be enhanced in a basic science classroom.

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Keywords: Creativity; basic science; perception; challenges; prospects; achievement.

1. INTRODUCTION

Education is so basic to nation building that nations all over the world strive to make it available not only to the few that can afford it but to all citizens [1].

[2] said that Science is a dynamic and objective process of seeking knowledge, and an enterprise that involves people searching, investigating and seeking verification of natural phenomena.

The Basic Science as viewed by [3] aims at presenting a holistic picture of science and technology content to the pupil. This is because its content basically encompasses all the various components of sciences being presented to the learner in a holistic manner. The Basic Science courses at the basic science level in Nigeria are core courses and occupy unique position in the school curriculum. This is because they equip students with the necessary introductory scientific and technological knowledge and skills necessary to build a progressive society and this form bedrocks on which further scientific and technological studies rest [4].

Despite the importance of basic science to individuals and society globally, students have been performing poorly in the subject in Nigeria in general and Benue State in particular as attested to by the data on Table 1.

Table 1. Achievement of students in basic science in Benue State 2011-2013

Year	Total no of candidates	% Pass	% Fail
2011	12,623	35.92	64.08
2012	13,011	42.34	57.66
2013	16,623	39.05	60.95

Source: [5].

The dismal student's performance in Basic Science at the upper basic level of the Universal Basic Education (UBE) closes many candidates from the university entry into prestigious science –based courses at the university.

According to [6] such students switch to the arts and social sciences due to insufficient pre-requisite science subjects, leading to low enrolment and turnover in the sciences, thus creating a gap in national development.

A lot of reasons have been attributed for the dismal performance of students in Basic Science at the upper basic level of education. Most researchers are of the view that, the method in which a subject is taught could either mar or increase students' achievement. Many researchers agree that there is a demand for a shift in the rethinking of curriculum content and ways in which students' are taught [7,8,9,10]. They observed that the uninspiring teaching methods adopted by science teachers have led to under-achievement of students in the sciences and Basic science in particular. These studies show that teachers shy away from activity oriented teaching methods and rely heavily on methods that are easy but most inadequate and inappropriate for teaching many science concepts.

[2] says that science is both an organized body of knowledge and a process of finding out knowledge; it therefore demands that it should be taught through hands – on – method approach. This implies placing the students in a problem solving situation and surrounding them with appropriate materials, an enriched environment that will enable them process information with a view to solving scientific problems.

Also, Basic science been a core subject at the Upper Basic level of the Universal Basic Education means all the students offer it, leading to a large class and an enormous task for the Basic Science teacher. This makes it difficult for meaningful learning and the development of process skills, necessary for coping with the present challenges of today's society. Large classes also make it impossible for teacher – students or students – students' interaction [11].

The need for students to be effective and efficient in their achievement in schools makes for worry and thus makes for the study of creativity. [12] defined creativity as a mental and social process involving the generation of new ideas or concepts. Also, [13] viewed creativity as a tool that propels organization, catapults careers and generates potent growth and viable outcomes. For a sustainable development in any field of human endeavour, generative thinking, perception, dynamics, construction and design should be the key.

For education to be used in nation building, creativity must be enhanced. This is made clear

in a statement by Piaget as quoted in [14] when he said that;

The principal goal of education is to create men who are capable of doing new things, not simply repeating what other generations have done - men who are creative, inventive and discoverers.

Just as challenges are synonymous with life and to education too, creativity in schools has its own challenges. On this, [15] listed some school conditions that hinder creativity in students. These include, shortage of teachers to teach the subject, lack of equipment in teaching and learning which makes teachers and students to concentrate on the theoretical aspect of the course, large classes where regimentation is essential instead of effective practical exercise, the belief of teachers that creative students are hard to manage and their work harder to grade, discouragement of anything outside the prescribed pattern, teaching strategy that do not contextualize learning to provide students reflection over an extended period of time and finally teachers not serving as facilitators allowing students to construct their knowledge through learning application, action, review and reflection. Funding also remains a strong militating factor in provision of study materials. The plague of insufficient textbooks and journals, some textbooks are outdated, while others are perhaps of foreign background, which may not actually meet our local needs. These challenges of creativity are related to the factors that lead to poor achievement in science generally and in Basic science in particular. One might therefore rightly say that if creativity is enhanced in a basic science classroom, achievement of students in basic science may increase.

The quality of any curriculum rests on the quality of its teachers in the implementation of its programme [16]. Hence, the training of teachers is rated high. In the national policy of education [17], it is stated that no education system may rise above the quality of its teachers. Again, teacher education shall continue to be given major emphasis in all educational planning and development. It follows that the teacher can either make or mar the interest of the students in the teaching and learning of basic science. The minimum qualification for entry into the teaching profession as stipulated in the National Policy in Education [17], is the Nigerian Certificate in Education (NCE). It is emphasized that all teachers in educational institutions shall be professionally trained. Hence, teacher-education programmes shall be structured to equip teachers for the effective performance of their duties.

The quality of education is directly related to the quality of instruction in the classroom [16]. The teacher is considered the most crucial factor in the implementation of all education reforms at the grass root level. It is a fact that the academic qualifications, knowledge of the subject matter, competence, skills of teaching and the commitment of the teacher have effective impact on the teaching. The need for competency of the teacher arises because the competent teacher possesses the ability to provide for and personally utilize more position reinforcement and the elimination of tension within the classroom and to facilitate the development of more positive feeling within the students [18]. Since the enhancement of creativity in the classroom rests more on the shoulders of the teachers and again, it has been noted that enhancing creativity in a Basic science classroom could go a long way in solving or at least ameliorate the poor achievement of students in Basic Science, the study wants to find out the perception of the Basic Science teachers on the challenges and prospects of enhancement of creativity in the Basic Science classroom.

1.1 Statement of the Problem

One glaring unfortunate situation bedeviling science education in Nigeria for the past three decades is students' poor achievement in science subjects at the secondary school level. The poor achievement of students in science has been blamed on science teachers' use of conventional instructional approaches which have been found to be ineffective, and this may be responsible not only for the observed students' poor achievement in science but may also account for the declining positive attitude of students towards science subjects generally. The persistent poor achievement of students in Basic science examinations at the Upper Basic Education Level in Nigeria and Benue state in particular casts doubt as to the effectiveness of the teaching methods utilized by basic science teachers in the schools.

Due to the position of basic science in the overall development of the nation, science educators have continued to explore approaches that will enhance effective teaching and learning of the subject in schools. It has been noted that

practical oriented teaching methods allow teachers to serve as facilitators while the students are given opportunities to construct their knowledge through creative thinking. Creativity is defined as a mental and social process involving the generation of new ideas or concepts [12]. Earlier, [13] has defined creativity as a tool that propels organization, catapults careers and generates potent growth and viable outcomes. This implies that for education to be used in nation building, creativity must be enhanced.

Since enhancement of creativity in a Basic science classroom can go a long way in solving or at least ameliorate the poor achievement of students in Basic science; and the teachers being the architect of enhancement of creativity in the classroom, the question is; what is the perception of the basic science teachers on the challenges and prospects of creativity in a basic science classroom?

1.2 Research Questions

The study was guided by three research questions.

i. What are the qualifications of Basic science teachers in secondary schools in Benue State?
ii. What are the perceptions of Basic science teachers on the challenges of creativity in a Basic Science classroom?
iii. How can creativity be enhanced in a Basic science classroom?

2. METHODOLOGY

The study adopted a survey research design. The population was all the 445 Universal Basic Education (UBE) schools in Benue State. Random sampling technique was used to select 100 Basic science teachers from the secondary schools in the State. The Basic Science Teachers' Creativity Perception Questionnaire (BSTCPQ) was the instrument used to collect data for the study. The questionnaire consists of three Sections A, B and C. Section A deals with the personal data of the respondents, Section B deals with the challenges of creativity in a basic science classroom while Section C is concerned with the prospects of creativity in a Basic science classroom. The instrument was validated by two Scientists in the University of Agriculture Makurdi, Benue State. The data was analyzed using percentages and means.

3. RESULTS AND DISCUSSION

The results of the study were presented in line with the research questions that guided the study.

3.1 Research Question 1

What are the qualifications of Basic science teachers in secondary schools in Benue State?

Data on Table 2 shows that out of all the teachers that responded to the questionnaire, only 19.15% were qualified to teach basic science in secondary schools while 80.85% were not qualified. This finding is in agreement with the findings of [7,9] when they noted that most science teachers rely on methods that are inappropriate for teaching science concepts. Also, [10] observed that science teachers adopt uninspiring teaching methods in teaching science. This finding is likely to be true since Basic Science is relatively new in schools and as such enough teachers have not been trained in the area. The implication of this finding is that the unqualified teachers will likely read and explain the contents of the Basic Science curriculum to the students since they may lack the necessary illustrations and strategies that will challenge creative thinking of the students.

Table 2. Teaching qualification of the basic science teachers

Qualified teachers	Unqualified teachers
19.15%	80.85%

Note: Qualified Teachers are taken to be those teaching Basic Science in secondary schools, have education qualifications and also specialize in Basic Science, while Unqualified Teachers are taken to be those teaching Basic Science in secondary schools but who do not have education qualifications and/or specialize in Basic science

3.2 Research Question 2

What is the perception of Basic science teachers on the challenges of creativity in a Basic Science classroom?

Data on Table 3 shows that out of the eleven (11) statements on the challenges of creativity, the respondents agreed to eight (8) of them and disagreed to three (3) of them. A close inspection of the table reveals that absence of basic science laboratory (Mean 3.67) is the number one challenge of creativity in a basic science

classroom, followed by the nature of basic science curriculum (Mean 3.60) and inability to commend creative students (Mean 3.55). However, the teachers disagreed with the statement that difficulty in handling creative students (Mean 1.94) is a challenge to enhancing creativity in a basic science classroom. This finding is closely related to that of [15] when he discovered that things that hinder creativity in schools were lack of equipment, discouragement of anything outside the prescribed pattern, among others. This finding is likely to be true since research reports show that most secondary schools in Nigeria do not have well-equipped laboratories for virtually all science subjects [16,7]. The implication of this finding is that even if qualified teachers are recruited to teach Basic Science in secondary schools, if equipped basic science laboratories are not provided coupled with relaxing the basic science curriculum, creativity may not be possible in a basic science classroom.

3.3 Research Question 3

How can creativity be enhanced in a Basic science classroom?

Looking at the data on Table 4, it can be seen that the respondents agreed to all the ten (10) statements on the prospects of creativity in a basic science classroom. Out of the ten statements, the necessity of basic science laboratory in schools for creativity to be enhanced in classroom scored the highest mean of 3.70. This implies that the presence of basic science laboratory in schools is the most important factor that can enhance creativity in a basic science classroom. The issue of improvisation scored the second highest mean of 3.55 showing that the teachers being able to improvise scarce instructional materials is the second most important factor that will help to enhance creativity in a basic science classroom.

Table 3. Mean ratings of challenges of creativity in a basic science classroom

S/No.	Statement	Mean	Decision
1	Laboratory for teaching Basic Science meaningfully are not available in the schools.	3.67	Agree
2	Instructional materials such as charts, models are not available for use.	2.10	Disagree
3	Time is always a constraint in teaching for creativity in a basic science classroom	3.35	Agree
4	Most Teachers of Basic science in secondary schools are not knowledgeable on the modern methods of teaching.	3.30	Agree
5	Whenever I request for monetary assistance for teaching Basic science, I am assisted.	1.58	Disagree
6	Teachers of Basic science are not Motivated.	2.95	Agree
7	Inability to commend creative students damping their spirit.	3.55	Agree
8	Scolding students can kill the spirit of creativity in him or her.	2.96	Agree
9	Creative students are difficult to handle.	1.94	Disagree
10	The plague of insufficient textbook and journals hinders creativity in a Basic science classroom.	2.99	Agree
11	The Basic science curriculum poses a challenge to teaching for creativity in schools.	3.60	Agree

Table 4. Prospects of creativity in a basic science classroom

S/No	Statement	Mean	Decision
12	Basic science laboratory is necessary in secondary schools.	3.70	Agree
13	Instructional materials must be available in the basic science classroom for creativity to be enhanced.	3.05	Agree
14	Adequate time should be given for teaching in a basic science classroom for creativity to be enhanced.	3.50	Agree
15	The use of modern methods of teaching can enhance creativity in the classroom.	3.52	Agree
16	Teachers must improvise scarce and inadequate instructional material for creativity to be enhanced in a basic science classroom.	3.55	Agree

Table 4 continued……..

17	Financial assistance should be given to teachers to enable them improvise scarce and inadequate instructional material.	3.38	Agree
18	Commending creative students can enhance creativity.	2.85	Agree
19	Current textbooks and journals should be available in schools for creativity to be enhanced.	3.25	Agree
20	Scolding students can hinder creativity.	2.75	Agree
21	Teaching for examination hinders creativity.	3.09	Agree

Again the use of modern methods of instruction for teaching Basic Science is the third most important factor that can enhance creativity in a Basic Science classroom. These findings agree with that of [2] which stated that it is demanded that Basic science should be taught through hands-on method approach. It is also agreed among science educators that method in which a subject is taught could either mar or increase students' creative thinking and achievement. These findings are likely to be true since it has been established that the science teacher is the facilitator of instructions in a science classroom [16]. All other things being equal, if the science teacher cannot effectively utilize the available resources in teaching and learning science, learning cannot take place in a science classroom. Hence it is stated in the National policy on education that no education system can rise above the quality of the teachers [17]. The implication of these findings is that if teachers continue to use the conventional lecture and discussion methods to teach basic science, enhancing creativity in a basic science classroom will not be possible.

4. CONCLUSION

Based on the findings of the study, it is concluded that most basic science teachers in secondary schools in Benue State were not qualified to teach basic science. Also some of the challenges of creativity in a basic science classroom in the state were absence of basic science laboratory, incompetency on the part of basic science teachers, and the nature of basic science curriculum among others.

It is therefore recommended that for creativity to be enhanced in a basic science classroom, well-equipped basic science laboratories should be provided in all secondary schools in the state. Also teachers of basic science should be encouraged to attend seminars and workshops on regular basis to acquire the skills on improvisation of scarce instructional materials and the use of modern methods of teaching.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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