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INNOVATIVE METHODS IN TEACHING BASIC SCIENCE AND ITS IMPACT ON THE ACADEMIC PERFORMANCE OF PRIMARY SCHOOL PUPILS IN AWKA SOUTH LOCAL GOVERNMENT AREA OF ANAMBRA STATE

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ABSTRACT
This study examined innovative methods in teaching basic science and its impact on the academic performance of primary school pupils in Awka south Local Government Area of Anambra state. The study was guided by two research questions. The study adopted descriptive survey design. The population of the study comprised 652 primary school teachers in the 45 public primary schools in Awka South L.G.A. 184 primary school teachers were selected as sample for the study through simple random sampling. The instrument used for data collection was a validated structured questionnaire drafted by the researcher. The reliability of the instrument was determined using Cronbach Alpha correlation coefficient which yielded coefficient an overall coefficient of 0.77 obtained. Arithmetic mean was used for data analysis. Findings from the study show that hands-on-activity, interactive lessons, team teaching, inquiry-based learning, peer tutoring, use of information and communication technology, guided play and multimedia approach were the innovative methods used in teaching basic science. It was further revealed that innovative teaching methods improves academic performance and achievement of pupils. The study recommended among all that, teachers should interchange innovative methods during basic science lessons as this would contribute to active participate of pupils in learning and enhance better understanding of what is been taught.

Keywords: Innovation, Innovative Methods, Teaching, Basic Science, Academic Performance

Introduction

Primary school is an educational institution where children are enrolled for learning prior to their entry into secondary school. It is also where the basic educational foundation of a child is laid. The Federal Republic of Nigeria (FRN, 2013) refers to primary education as the education given in institutions for children between the ages of six to eleven years plus. The researcher defines primary school as that educational institution a child is enroll before entry into secondary school. This level of education is the key to the success or failure of the whole system of education as the rest of the education system is built upon it.

The objectives of primary school education according to National Policy on Education (2013) includes: to inculcate permanent literacy and numeracy, and ability to communicate effectively; lay a sound basis for scientific and reflective thinking; give citizenship education as a basis for effective participation in and contribution to the life of the society; mould the character and develop sound attitude and morals in the child; develop in the child the ability to adapt to the child's changing environment; give the child opportunities for developing manipulative skills that will enable the child function effectively in the society within the limits of the child's capacity, and provide the child with basic tools for further educational advancement, including preparation for trades and crafts of the locality. One of the activities done in primary school is teaching.

Teaching is a tedious profession that demands one's dedication irrespective of numerous challenges faced in the profession. Teaching as a profession demands that a teacher equips himself with prerequisite knowledge and skills which are essential tools in the profession. Olaniyan (2015) defines teaching as the action of someone who is trying to assist others to reach their fullest potentials in all aspects of development. According to Isola (2019) teaching is regarded as both an art or science. As an art, it lays stress on the imaginative and artistic abilities of the teacher in creating a worthwhile situation in the classroom to enable students to learn. As a science, it sheds light on the logical, mechanical, or procedural steps to be followed to attain an effective achievement of goals. One of the subjects taught in primary schools is basic science.

Basic science is an academic subject taught in Nigeria primary and junior secondary schools. According to Oka (2015) basic science formally known as integrated science is a subject taught at both public and private schools at the Junior Secondary school level. It is an introductory course to the study of the sciences in the senior secondary school. Akani (2016) defined Basic Science as a science in undifferentiated form which stresses the fundamental unity of science. Akani averred that Basic science involves the study of elementary biology, anatomy, earth/solar system, ecology, genetics, chemistry and physics as a single science subject in the Junior Secondary school. It offers the basic training in scientific skills required for human survival, sustainable development and societal transformation. The teaching of science in Nigerian schools started as far back as 1878. Science was taught as general science to classes one and two in the secondary schools

and as biology, chemistry and physics to upper classes of three, four and five. However, according to Omiko (2015), this general science continued until 1970 when Integrated Science, now Basic Science, was introduced as a base to express the fundamental unity of scientific thought. The teaching and learning of integrated science replaced the general science and was taught in Nigerian schools up to 1980 when the Federal Government restructured the 5-years secondary school system into 6-3-3-4 system. The teaching and learning of integrated science in Nigerian schools especially at the Junior Secondary school level continued till 2009 when the Federal Government of Nigeria restructured the 6-year secondary school system into 9-3-4 system. The reform Agenda in Education in Nigeria brought a change in integrated science both in content and name. The content was broadened and the name changed from integrated science to basic science.

The overall objectives of the new Basic Science Curriculum outlined by Adeniyi in Chima (2021) are to enable the learners to; develop interest in science and technology; acquire basic skills in science and technology; apply their scientific and technological knowledge and skills to meet societal needs; take advantage of the numerous career opportunities offered by science and technology; and become prepared for further studies in science and technology. To achieve these objectives, it is suggested that the teaching of basic science should involve the use of innovative methods of teaching.

Innovative methods are new and creative ways of doing things that often involve thinking outside the box and coming up with original solutions to problems. Mikheeva and Pankova (2021) referred to innovative method as an educational process and training of a person in a unique way. The authors further said that innovative method involves helping a person with certain ways so that such person develops their creative abilities, as well as their skills in self-learning and self-improvement. Nur and Nurfaradilla (2023) defined innovative method as a systematic process, defining goals, selection of particular learning environment, determination of a measure of success, and interaction with the environment. In the researchers view, innovative teaching method is a teaching strategy aimed at introducing new ideas that makes the lesson more unique and learner centered. There are many innovative teaching methods used by teachers in teaching basic science. Akani (2016) mentioned them to include: discovery, problem-solving, open-ended field trips and laboratory methods and among others. Nwaeze, Onuoha and Ukpgo (2016) enumerated some innovative methods in teaching of basic science to include Multimedia Learning Process, Activity-Based Teaching on Science Principles and Z to A Approach. Omebe and Omiko (2015) observed that these suggested methods of teaching Basic science have been utilized for several years by the integrated science teachers and yet the results of the students in the Junior Secondary School Certificate Examination (JSSCE) has not been encouraging. The researcher perceived that the use of innovative teaching methods would reflect to pupils academic performances.

Academic performances mean how well or not, a child had gone in his academics.

It is the extent to which a child attained in a short or long academic exercise. Ani and Osuji (2022) asserted that academic performance is the extent to which a learner, teacher or institution has attained their short- or long-term educational goals. Mkon (2024) stated that academic performance represents performance outcome that indicate the extent to which a person has accomplished specific goals that were the focus of activities in instructional environment, specifically in school, college and university. The academic performance of a child is mostly determined by the methods adopted by the teacher.

Having researched these few innovative methods, the researcher is yet to identify the innovative methods used by primary school teachers in teaching basic science in public primary schools in Awka South L.G.A and this becomes a gap this study intends to fill. To fill these gaps, the researcher sought to examine innovative methods in teaching basic science and its impacts on academic performance of primary school pupils in Awka South L.G.A.

Statement of the Problem

Basic science is one of the subjects taught in Nigeria primary schools. The subject is meant to introduce pupils into the world of science. Based on this idea, basic science and its content lessons is made available to pupils through teaching methods that would see the pupils practically involved in the lesson. Before this time, the conventional methods were used to teach this subject which placed emphasis on what the teacher does during lessons. As time unfolds, the education industry came up with some innovations which includes better or to say, innovative ways of teaching basic science to pupils. The innovative ways are bringing in new ideas into the system which ensures that emphasis are placed on what the child does as the lesson progresses. However, the researcher is not aware if teachers in primary schools in Awka south utilize Innovative teaching methods in teaching basic science and this becomes a major problem in this study. Even though teachers might be using innovative methods, the researcher is not aware about the impacts these methods have on primary school pupils ad this becomes another problem in this study. To tackle these problems, the researcher sought to investigate innovative methods in teaching basic science and its impacts on the academic performance of primary school pupils in Awka south L.G.A. Specifically, the study sought to:

1. Investigate innovative teaching methods used in teaching basic science in public primary schools in Awka South L.G.A
2. Examine the impacts of innovative teaching methods on academic performance of pupils in basic science in public primary schools in Awka south L.G.A

Research Questions

The following research questions will guide this study

1. What are the innovative teaching methods used in teaching basic science in public primary schools in Awka south L.G.A?
2. What are the impacts of innovative teaching methods on academic performance of pupils in basic science in public primary schools in Awka south L.G.A?

Methodology

This study adopted a survey design. The population of the study comprised of 652 primary school teachers in the 45 public primary schools in Awka South L.G.A. A total number of 184 primary school teachers were selected as sample for the study through simple random sampling. The instrument for the collection of data for this study was a structured questionnaire drafted by the researcher. It was titled "Innovative Teaching Methods in Basic Science and Impact on Pupils Academic Performance Questionnaire (ITMBSIPAPQ)".

The validated questionnaire has two sections answering the two research questions. Section A which has eleven items takes a look innovative method used in teaching basic science while section B with seven items takes a look at the impacts of innovative methods on pupils' academic performances. Response modes for the questionnaire were organized under a 4-point likert scale of Strongly Agreed (SA), Agreed (A), Disagreed (D) and Strongly Disagreed (SD). Scores generated were computed using the Cronbach Alpha coefficient technique which yielded coefficient value of 0.75 and 0.79 with a general reliability index of 0.77 respectively. The data collected were analyzed using simple mean as items had four-point rating scale. The midpoint for the scale was 2.5. The cut-off point of 2.50 was adopted and it was decided that an item with a mean of 2.50 or above showed an agreement while an item mean below 2.50 showed disagreement.

Results

Research Question One: What are the innovative methods used in teaching basic science in public primary schools?

Table 1: Innovative methods used in teaching basic science

S/N	ITEMS	SA	A	D	SD	N	$\bar{X}$	Decision
1	Story Telling	12	17	72	83	184	1.77	Disagree
2	Hands-on-activities	62	78	25	19	184	2.99	Agree
3	Interactive lessons	81	67	13	23	184	3.11	Agree
4	Teach Teaching	72	79	20	13	184	3.14	Agree
5	Inquiry-based learning	58	82	19	25	184	2.94	Agree
6	Peer tutoring	61	88	13	22	184	3.02	Agree
7	Project based learning	30	22	75	57	184	2.14	Disagree
8	Flipped classroom	27	36	64	57	184	2.17	Disagree
9	Information and Communication Technology	72	86	19	7	184	3.21	Agree
10	Guided play	57	79	23	28	184	2.92	Agree
11	Multimedia approach	74	67	21	32	184	3.10	Agree

Analysis in Table 1 above shows that the mean scores of items 1-11 were 1.77, 2.99, 3.11, 3.14, 2.94, 3.02, 2.14, 2.17, 3.21, 2.92 and 3.10 respectively. Item 1, 7 and 8 were disagreed because their mean scores were below 2.50. Other items were agreed because their mean scores were from 2.50 and above. It shows that hands-on-activity, interactive lessons, team teaching, inquiry-based learning, peer tutoring, use of information and communication technology, guided play

and multimedia approach were the innovative methods used in teaching basic science.

Research Question Two: What are the impacts of innovative methods on academic performance of pupils in basic science in public primary schools?

Table 2: Impacts of innovative methods on academic performance of pupils in basic science

S/N	Impacts of innovative methods on academic performance of pupils in basic science	SA	A	D	SD	N	$\bar{X}$	Decision
12	Innovative methods improves academic performance and achievement of pupils	61	74	26	23	184	2.94	Agree
13	Student are actively involved in lessons when taught with innovative methods	71	86	19	8	184	3.19	Agree
14	Pupils are more creative when taught with innovative methods	66	73	19	26	184	2.97	Agree
15	Pupils taught through innovative methods tend to retain instruction	76	58	21	29	184	2.98	Agree
16	Provides opportunity for children to learn on their own pace	61	68	31	24	184	2.90	Agree
17	All pupils in the class perform academically better	18	24	73	69	184	1.95	Disagree
18	The use of innovative methods brings to end to exam malpractice among pupils	10	21	86	67	184	1.85	Disagree

Analysis in Table 2 above shows that the mean scores of items 12-18 were 2.94, 3.19, 2.97, 2.98, 2.90, 1.95 and 1.85 respectively. Item 17 and 18 were ejected because their mean scores were below 2.50. Other items were accepted because their mean scores were from 2.50 and above. The impacts of innovative methods include that in improves academic performance and achievement of pupils, helps children to be active during lessons, makes pupils become creative, helps pupils retain instruction, and helps children to learn at their own pace.

Discussion of Findings

Innovative methods used in teaching basic science

Findings show that hands-on-activity, interactive lessons, team teaching, inquiry-based learning, peer tutoring, use of information and communication technology, guided-play and multimedia approach were the innovative methods used in teaching basic science. One of the above findings is in agreement with Ossai (2023) who reported guided play as an innovative method in teaching basic science. Okechukwu and Opara (2021) mentioned team teaching as an innovative strategy while Ukala (2018) identified manipulations, multimedia and use of Computer Assisted instruction as innovative ways that can be adopted in teaching of basic science. The use of manipulations is synonymous hands-on-activity and guided play. This is because manipulative and hands-on-activities involve manipulation of objects. It is now clear that there exist numerous innovative methods by which basic science can be taught to primary school pupils. The good use of these innovative methods contributes to meaningful impacts to learning.

Impacts of innovative methods on academic performance of pupils in basic science

Findings show that innovative methods impact on academic performance of pupils in basic science as improves academic performance and achievement of pupils, helps children to be active during lessons, makes pupils become creative, helps pupils retain instruction, and helps children to learn at their own pace. Some of the above findings agree with Ossai (2023) who discovered that innovative methods and their application enhances learning and contributes to good teaching and better achievement of pupils. The above findings also agree with Ossai and Ramsaroop (2022) that innovative method like the Reggio Emilia approach helps to capture pupils' interest and sustain them for a long time in a classroom by providing such a satisfying and enjoyable experience. The above findings is also in agreement with Nweze, Nelson-Ogbaeja, Obo, Nwizi, Ucha, Nwafor and Ogbodo (2020) reported that multimedia applications have been found to significantly augment engagement levels amongst early learners. The auditory and visual cues provided by these applications support the development of listening skills, compression and vocabulary expansion. Qualitatively, teachers reported increased enthusiasm and participation among students, while parents observed more pronounced interest in learning activities at home, while Oladele, Akano, Joseph and Owolabi (2024) maintained that there is high academic performance of students who were actively taught with innovative teaching methods. On the whole, it means that innovative teaching methods have meaningful impact in the academic performance of pupils in primary schools.

Conclusion

There are different innovative methods used in teaching basic science in primary schools. These methods which are learner-centered ranges from inquiry-based learning, team teaching, use of information and communication technology, use of multimedia and other strategies. The use of innovative methods of teaching has meaningful impact in the academic performance of primary school pupils.

Recommendations

Based on the findings from this study, the researcher recommends as follows;

1. Teachers should interchange innovative methods during basic science lessons as this would contribute to active participate of pupils in learning and enhance better understanding of what is been taught.
2. Teachers should make their classroom environment unique when adopting innovative methods as this would make their lesson have meaningful impact in the educational development of school children.

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