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The teachers' awareness and utilisation of innovative strategies for teaching and learning in Awka South

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Abstract: Basic science's role in instilling a love of science and laying the groundwork for science studies in senior secondary school prompted the survey of teachers' awareness and utilization of innovative teaching strategies for effective teaching and learning of basic science in upper basic education. The study adopted a survey research design. The population comprised all the 36 basic science teachers in the 19 public secondary schools in Awka South local government area. Questionnaire was used to collect data. Data was analyzed using descriptive statistics of frequency and mean scores. The study found that the teachers are aware of majority of innovative teaching strategies for teaching Basic science. The extent basic science teachers use innovative teaching strategies in enhancing basic science teaching in upper basic education was to a low extent. The study concluded that the basic science teachers are aware of the majority of innovative teaching strategies but their application within the classroom remains low. This discrepancy between awareness and practice highlights a critical gap in the implementation of effective pedagogical approaches for basic science education. The study recommended that the government through her relevant educational agencies should design and implement comprehensive training programs focused on equipping teachers with the necessary skills and knowledge to effectively utilize various innovative teaching strategies in the basic science classroom.

Keywords: Academic achievement, basic science, innovative teaching strategies

Abstrak: Peran sains dasar dalam menanamkan kecintaan terhadap sains dan meletakkan dasar bagi studi sains di sekolah menengah atas mendorong dilakukannya survei kesadaran guru dan pemanfaatan strategi pengajaran inovatif untuk pengajaran dan pembelajaran sains dasar yang efektif di pendidikan dasar atas. Penelitian ini mengadopsi desain penelitian survei. Populasinya adalah seluruh guru IPA Dasar di 19 sekolah menengah negeri di wilayah pemerintah daerah Awka Selatan yang berjumlah 36 orang. Kuesioner digunakan untuk mengumpulkan data. Data dianalisis menggunakan statistik deskriptif frekuensi dan skor rata-rata. Studi ini menemukan bahwa para guru menyadari sebagian besar strategi pengajaran inovatif untuk mengajar sains dasar. Sejauh mana guru sains dasar menggunakan strategi pengajaran inovatif dalam meningkatkan pengajaran sains dasar di pendidikan dasar atas masih sangat rendah. Studi ini menyimpulkan bahwa guru sains dasar menyadari sebagian besar strategi pengajaran inovatif namun penerapannya di dalam kelas masih rendah. Kesenjangan antara kesadaran dan praktik ini menyoroti kesenjangan kritis dalam penerapan pendekatan pedagogi yang efektif untuk pendidikan sains dasar. Studi tersebut merekomendasikan agar pemerintah melalui lembaga pendidikan terkait harus merancang melaksanakan program pelatihan komprehensif yang berfokus pada membekali guru dengan keterampilan dan pengetahuan yang diperlukan agar dapat secara efektif memanfaatkan berbagai strategi pengajaran inovatif di kelas sains dasar.

Kata kunci: Prestasi akademik, sains dasar, strategi pengajaran inovatif

INTRODUCTION

Science is a crucial endeavour on which nations rely to make technological progress. Nwuba, Egwu, Nwoye, et al. (2023) defined it as the systematic study of nature, acquired through the use of scientific method. As a field of study, science has been recognized as a tool relevant to life and society and as such needs to be emphasized in schools. Supporting the premise, Nwuba (2021) asserted that science has done a lot for mankind as through science, man has been able to understand the environment, enabling man to manipulate the conditions of the environment to the benefit of him and the society. Among the fundamental branches of science, basic science serves as the bedrock upon which more specialized disciplines are built.

Basic science is a branch of knowledge involving systematized observation and experiment. It acts as a foundation for more specific areas of study within the field of science. Basic science is a foundational component of science education that introduces students to fundamental scientific concepts, principles, and methodologies (Afuwape and Olugbuyi., 2016). It provides the essential groundwork for more advanced scientific disciplines. Basic science is a basic subject offered in Basic 1-9 in Nigerian System of Education. Basic science as a subject lays the foundation for the take-off of major core science subjects (biology, chemistry, and physics) in senior secondary classes. It cultivates scientific mindset, fosters curiosity and inquiry, builds a strong foundation for advanced science studies, and equips students with practical scientific knowledge applicable in everyday life. Thus, adequate knowledge in basic science improves students' academic achievement.

Academic achievement is the performance recorded in an academic process. It is a result that is measured in the form of grades based on hard work and devotion over time by someone after following a learning program (Nwuba, Egwu, Awosika, et al., 2023). Agree with Damopolii, Botutihe et al. (2019), it can be said with confidence that academic achievement is determined by student achievement after taking the exam. Student achievement can be accurately assessed through their test results (Nasir et al., 2023; Syaugi et al., 2024; Thenu et al., 2023). Abdulwahab et al. (2016) asserted that to determine the students' achievement, performance tests are designed which will aid to assess students' level of accomplishment in a specified subject area. It serves as an indicator of the effectiveness of science education. The researchers observed that students' academic achievement in basic science is important as it will enable the school, parents, and the teacher to assess and determine the level of improvement of the student in the subject. Despite its importance, basic science education in Nigeria has faced persistent gaps and challenges in terms of poor academic achievement among students. These gaps and challenges according to Ogunniyi (2011) include curriculum gaps, limited access to resources, inadequate teaching methods, and lack of engagement among students. According to the chief examiners report (2020-

2023) in Anambra State, basic education certificate examination (BECE) had more of credits than distinction. This is termed to be unsatisfactory by the researchers.

Several authors and researchers had conducted empirical studies focusing on the unsatisfactory academic achievement of students in basic science in Nigeria. Adesoji and Olatunbosun (2008) study found that effective teachers and good school environment are determinants of achievement in BECE. Khurshid and Zahur (2013) researched the comparison of teachers' awareness of utilizing innovative teaching strategies in public and private secondary schools. They have noted that students' failure in the Basic Educarion Certificate Examination (BECE) results in teachers' low awareness of using suitable teaching strategies. Samba et al. (2010) study noted that teachers' awareness and utilization of innovative teaching strategies in secondary school science can help improve students' results and achievement in BECE. These findings show that the students learning is tied to use of appropriate teaching strategies

Teaching strategies encompass a diverse range of methods and approaches used by educators to facilitate learning. Teaching strategies refer to the teachers' techniques used in the classroom, their activities, behavioural actions taken to improve learners' interest, participation and performance in the subject (Yusuf, 2014). Teaching strategies are unique to subject matter and vary from educator to educator. Lamidi et al. (2015) opined that teaching strategies include not only the manner of presentation that the educator employs but everything that he does in the way of grouping the learners, guiding activities, marking assignments and providing information to aid learning. Other forms of teaching strategies can be jigsaw, cooperative learning, lectures, read-aloud, reciprocal teaching, debate, modeling, feedback, experiential learning, class discussion and so on. Most especially, traditional teaching strategies, such as lectures and textbook-based instruction, have been augmented by more engaging approaches known as innovative teaching strategies

Innovative teaching strategies represent a subset of teaching methods characterized by creativity, technology integration, and learner-centered approaches. They refer to approaches to teaching and learning that puts learners first and foremost and thrive to bring learning to the doorstep of the learners (Nwuba et al., 2022). The innovative teaching strategies encompass a wide array of approaches, such as project-based learning, inquiry, RQA, flipped classrooms, problem-based learning, gamification, and the integration of digital tools and simulations (Alahmari et al., 2023, Choirunisa' et al., 2024; Damopolii, Nunaki, et al., 2019; Oyelekan et al., 2017; Santos et al., 2023). Teaching strategies can take various forms, including traditional didactic instruction, collaborative learning, inquiry-based learning, and technology-enhanced instruction. Tufail and Mahmood (2020) posited that science teachers employ innovative methods of teaching science as modern instructional strategies to facilitate interactions with their students and the resultant outcome of the entire teaching-learning process.

Data for the study was collected using structured questionnaire developed by the researchers after an extensive review of literature and consultations with experts in the field. The instrument titled "basic science teachers' awareness and utilization of innovative teaching strategies for teaching and learning questionnaire" (BSTAUITQ)" was divided into two clusters of B1 to B2 according to the research questions. The questionnaire was structured on a 2-point option of "Aware" and "Not Aware" for research question one while the scales of Very High Extent - VHE; High Extent- HE; Low Extent- LE; and Very Low Extent- VLE was used to answer research question two. The instrument was validated by three experts. This was to ensure that the test items measured accurately what they were intended to measure in response to the research questions. The questionnaires were distributed to the respondents with the help of three research assistants. Data collected was analyzed using descriptive statistics, frequency and mean scores. The decision rule for research question one was that any score below 50% is termed to not aware while the score from 50% and above indicated to be "Aware" , for research question two , any mean score less than 2.5 indicated high extent while mean score of 2.5 and above indicated high extent.

RESULTS AND DISCUSSION

Innovative teaching strategies the teachers are aware of in teaching basic science in upper basic education

Table 1 shows that the innovative teaching strategies the teachers are aware of teaching basic science in upper basic education are peer to peer technique, collaborative technique, concept mapping learning approach, think-pair, computer assisted instruction (CAI), project method, blended learning, injury-based learning, project-based learning, mind-mapping, jigsaw, experiential learning, mind game learning approach, game based learning, visual learning, technological enhance learning. However, the respondents attested that they are not aware of the innovative teaching strategies such as virtual science lab, flipped classroom, phenomena based instruction and science flash card for teaching basic science in upper basic education. This implies that the teachers are aware of majority of innovative teaching strategies for teaching basic science education.

Table 1. Percentage scores on the innovative teaching strategies basic science teachers are aware of in teaching basic science in upper basic education

S/N	Items	Percentage	Decision
1	Peer to peer Technique	83.3%	Aware
2	Collaborative Technique	86.1%	Aware
3	Concept Mapping learning approach	97.2%	Aware
4	Think-pair	77.8%	Aware
5	Computer Assisted Instruction (CAI)	69.4%	Aware
6	Project Method	100%	Aware
7	Virtual Science Lab	30.5%	Not Aware
8	Blended learning	91.6%	Aware

9	Inquiry-based learning	88.8%	Aware
10	Project-based learning	88.8%	Aware
11	Flipped Classroom	41.6%	Not Aware
12	Mind-mapping	77.7%	Aware
13	Science flash Card	44.4%	Not Aware
14	Jigsaw	72.2%	Aware
15	Experiential learning	91.6%	Aware
16	Mind game learning approach	75.0%	Aware
17	Phenomena-based instruction	47.2%	Not Aware
18	Game based learning	88.8%	Aware
19	Visual learning	69.4%	Aware
20	Technological enhance learning	75.0%	Aware

Data from Table 1, shows that the innovative teaching strategies the teachers ate aware of teaching basic science in upper basic education are aware on majority of the items such as peer to peer technique, collaborative technique, concept mapping learning approach, think-pair, Computer Assisted Instruction (CAI), project method, blended learning, injury-based learning, project-based learning, mind-mapping, jigsaw, experiential learning, mind game learning approach, phenomena-based instruction, game based learning, visual learning, technological enhance learning. This result is in line with the study of Nwaeze et al. (2016) who stated that innovative teaching strategies are very useful for improving learning and that teachers are usually aware of the types of innovative teaching strategies that they can apply in the classroom. Mostly, teachers are aware of the peer to peer technique, collaborative technique, concept mapping learning approach, and the think-pair strategies among others. In support of the above findings, Oyelekan, et al (2017) also found that Computer Assisted Instruction (CAI), project method, and blended learning among others were the innovative teaching strategies that are very much knowledgeable to the teachers and the extent of their use depends on this awareness of these innovative teaching strategies

Extent basic science teachers use innovative teaching strategies in enhancing basic science teaching in upper basic education

Table 2 shows that the extent basic science teachers utilize innovative teaching strategies in teaching and learning of basic science in upper basic education are low on think-pair, computer assisted instruction (CAI), virtual science lab, blended learning, flipped classroom, mind-mapping, science flash card, jigsaw, mind game learning approach, phenomena-based instruction, game based learning, visual learning, and technological enhance learning. However, the respondents attested that the extent the basic science teachers utilize innovative teaching strategies in teaching and learning of basic science in upper basic education was high on peer to peer technique, collaborative technique, concept mapping learning approach, project method, injury-based learning, project-based learning, and experiential learning. This implies that the cluster mean of 2.28 shows that the extent

basic science teachers use innovative teaching strategies in teaching and learning of basic science in upper basic education was to a low extent.

Table 2. Mean scores on the extent basic science teachers use innovative teaching strategies for teaching and learning of basic science teaching in upper basic education

S/N	Items	Mean	Decision
1	Peer to peer Technique	3.34	High Extent
2	Collaborative Technique	3.06	High Extent
3	Concept Mapping learning approach	2.88	High Extent
4	Think-pair	1.34	Low Extent
5	Computer Assisted Instruction (CAI)	1.56	Low Extent
6	Project Method	2.67	High Extent
7	Virtual Science Lab	1.98	Low Extent
8	Blended learning	1.81	Low Extent
9	Injury-based learning	2.77	High Extent
10	Project-based learning	2.96	High Extent
11	Flipped Classroom	2.08	Low Extent
12	Mind-mapping	2.11	Low Extent
13	Science flash Card	2.21	Low Extent
14	Jigsaw	1.33	Low Extent
15	Experiential learning	3.41	High Extent
16	Mind game learning approach	2.49	Low Extent
17	Phenomena-based instruction	2.04	Low Extent
18	Game based learning	1.60	Low Extent
19	Visual learning	2.09	Low Extent
20	Technological enhance learning	1.88	Low Extent
	Cluster Mean	**2.28**	**Low Extent**

Data from Table 2, it indicated the extent basic science teachers use innovative teaching strategies in enhancing basic science teaching in upper basic education are low on majority of the items such as think-pair, Computer Assisted Instruction (CAI), virtual science lab, blended learning, flipped classroom, mind-mapping science flash card, jigsaw, mind game learning approach, phenomena-based instruction, game based learning, visual learning, and technological enhance learning. This result is in line with the study of Eriba and Iwanger (2018) who stated that basic science teachers hardly use the innovative teaching strategies such as virtual science lab, blended learning, flipped classroom, and mind-mapping in teaching the students in the classroom. The reason may be that these tools needed to activate the use of these innovative teaching strategies are not available. In support of the above findings, Chukwuemeka et al. (206) also noted that basic science teachers do not use majority of the innovative teaching strategies in their teaching process in the classroom. Innovative teaching strategies such as science flash card, jigsaw, mind game learning approach, and phenomena-based instruction are less used in enhancing basic science teaching in the classroom.

CONCLUSION

The study investigated the awareness and utilization of innovative teaching strategies for teaching and learning of basic science in upper basic education in Awka South Local Government Area. The findings revealed that while basic science teachers are aware of the majority of innovative teaching strategies, their actual application within the classroom remains low. This discrepancy between awareness and practice highlights a critical gap in the implementation of effective pedagogical approaches for basic science education. Several factors likely contribute to this low level of utilization. These may include inadequate training and support for teachers in implementing innovative strategies, limited access to resources and technology, and insufficient opportunities for collaboration and professional development. Additionally, traditional teaching methods may continue to hold significant influence within the educational system, creating resistance to change and adoption of new approaches. By addressing these issues and implementing effective interventions, the gap between awareness and practice in the use of innovative teaching strategies can be bridged. This will ultimately lead to the widespread adoption of innovative teaching strategies in basic science education, promoting a more stimulating, engaging, and effective learning environment for students in Awka South LGA and beyond.

Based on the findings of this study, which highlighted a discrepancy between teachers' awareness of innovative teaching strategies and their actual application in practice, several key recommendations were made to improve the situation:

1. The government through her relevant educational agencies should design and implement comprehensive training programs focused on equipping teachers with the necessary skills and knowledge to effectively utilize various innovative teaching strategies in the basic science classroom.
2. The government should provide hands-on workshops that allow basic science teachers to actively engage with and experiment with different innovative strategies, fostering practical understanding and application.
3. The government should bridge the digital divide by equipping schools with adequate technology infrastructure, including computers, software, and internet connectivity, ensuring use of innovative teaching strategies and enabling equitable access for all students and teachers
4. There should be a dedicated mentorship programs and peer learning communities where experienced teachers can support and guide novice teachers in implementing innovative strategies.
5. The government through her relevant educational agencies should create curriculum materials and lesson plans that seamlessly integrate technology and innovative teaching strategies, providing readily available resources for teachers.

6. Government should encourage school leaders and administrators to actively support and model the use of innovative teaching strategies, creating a positive environment for experimentation and change.

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PAGE 1

PAGE 2

PAGE 3

PAGE 4

PAGE 5

PAGE 6

PAGE 7

PAGE 8

PAGE 9

PAGE 10