Appraising Classroom Instructional Delivery Method of Post Basic School Students' Motivation in Science: Tehnological Impact

By

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Abstract

This study investigated appraising technological impact of classroom instructional delivery method of post basic students' motivation in Science. The study was carried out in Nsukka education zone, Enugu state. Descriptive survey design was adopted while three research questions were formulated to guide the study. The population comprised 2080 teachers in the 62 post basic schools in Nsukka education zone. Four schools were sampled from Nsukka L. G. A., and 100 teachers constituted the sample. The instrument used titled: Technology –Based Classroom Instruction Scale. Three experts from Department of science education, University of Nigeria, Nsukka, validated the instrument. The reliability of the instrument was 0.88. The data were analyzed using mean and standard deviation. The result indicated that technology helps teachers to prepare lessons on time; allows each student to construct knowledge; encourage independent learning skills, enables the teachers to deliver instruction through physical or virtual classrooms; enables them create a safe and supportive learning environment. Furthermore, the findings revealed that using technological facilities encourage students to gather information from multiple internet sources, edit and format information, draw diagrams, facilitates students typing skills, helps students to organize their work for presentations. The result also revealed that some challenges were observed in delivering classroom instructions, such include: Non-availability of new technological devices, teachers are technologically unskilled and lack knowledge of using new technological devices in classrooms, inadequate funding among others. Recommendations highlighted that educational authorities should create conditions and seminars that encourage teachers to utilize the new technological device in classroom instructions. The study concludes that technology-driven instructions need to be incorporated in classroom instructions in post - basic schools.

Keywords: Biology, classroom instructional delivery method, technology, motivation, post basic school students.

Introduction

Institutions of learning are striving for novel effective teaching and learning encompassing technology- driven based instructional delivery- a new trend spreading in educational institutions. However, the students of this generation have surrounded themselves with iphone, laptops and other advanced modern technological tools. This was supported by Cox (2021) who noted that modern technologies should be incorporated in our schools to ensure effective teaching in the

learning process. Since the world is dynamic and changing at an increased rate, science instructions in our schools has become a guide to look beyond the theoretical aspect of science, making science real to the students. This will helps the students become more innovative and critical thinkers in science especially in the area of Biology. Hence, the need for quality instruction through re-engineering the Biology instructional delivery.

Biology is one of the science subjects offered at post basic schools as a preparatory ground for students' development, discovering their potentials and talents. Biology has influenced the society owing to its numerous importance. Biology knowledge plays an important role in the industrialization and other sectors of the economy. The aim of studying Biology provides the learner with the necessary knowledge with which to change or control the environment for the benefit of the individual, family and the nation. Biology knowledge has provided improvement in many spheres of society including social, economic, political and cultural life (International Council for Science, 2011). As a result, Biology literacy is needed in Nigeria where Biologically literate citizenry apply biological knowledge to solve societal problems. Nwagbo and Adams (2012) believed that a Biology literate person should regard controversies in areas such as agriculture, pollution, conservation and medicine as something one sufficiently need to understand in order to make informed decisions while applying fertilizers to crops; siting industries near residential areas, whether to dump refuse in water channels and whether to support abortion or mercy killing. A Biology literate individual should understand biological principles and the major concepts of Biology, develop spirit of creativity, think logically, and make personal and ethical decisions to societal issues. This will help the students to change the way they explain the world around them and be able to face the challenges of the society and wider community. This can be done only if the classroom instructional delivery method emphasize the use of activity-oriented method and instructional strategies that will make students achieve their learning objectives.

Instructional delivery methods are strategies, approaches or even techniques that a teacher employ while delivering his/her lesson (s) to make the students strategic learners. It is all activities engaged in by the teacher with the aim of facilitating change in learner behavior using different kinds of delivery attempts (Jeremiah & Alamina, 2017). Classroom instruction is more effective when it is informed by an understanding of how students learn. It brings about understanding as it involves the learner, subject matter and materials under the guidance of the teacher. Therefore, to bring about meaningful learning, the teacher engages in certain activities such as talking, demonstration, giving instruction among others. These various strategies bring about learning (Adediran, 2014), making learning more meaningful. Teachers need to utilize different instructional activities to ensure student- centered learning in the classroom for creativity, innovative and critical thinking purpose in students. For this reason, the nature of Biology will demand for the teachers to employ innovative methods or techniques to ensure that the learners learn after being exposed to a period of instruction. Many challenges are encountered in delivering classroom instruction, and need to be tackled with ease.

One of the challenges in helping students to learn is taking care of each student in the classroom especially urban classes with a large number of students with diverse background, unique talents, interest, needs and attitudes to learning. However, education technology has greatly helped teachers to design a quality learning management system that improves and facilitates the transfer of knowledge. Today, massive amounts of information are provided by the internet through different technological sources such as Khan academy, MOOCs, podcasts and traditional

online degree programs, creating more access to learning opportunities, enabling students to engage in any form of communication and collaboration. Word processing and e-mail promote communication skills (Simuforosa, 2013). This is because education technology has provided the materials for easy access to learning. In addition, greatly facilitating the learning process, bringing improvement in collection of data, marking of students' tests, timely release of students' results among others.

In today's classroom, the advancement in technology is becoming a more prominent form of learning actively engaging both the teachers and the students. With the ever-changing world of technology, teachers work hard to incorporate technology into their instructional delivery in order to connect students' passion with meaningful learning (Harris, 2016). Engaging in meaningful learning truly makes learning interactive and communicative. Fisher *et al*. (2014) discussed how classrooms are turning to technology for the purpose of teaching and learning, and how teacher's roles have changed. The teacher becomes the facilitator providing guidance to the students on their learning journey and as well learning with them instead of 'teaching' them. This is because technology has changed the way the society lives including the way we learn. In a study conducted by Purcell *et al.* (2013) to investigate teachers' views regarding the impact of incorporating digital tools in teaching writing on middle and high school students' writing skills. A sample of 2,462 teachers from the U.S.A. and Puerto Rico were involved. The findings revealed that 68% of surveyed teachers admit that digital tools make students take shortcuts, instead of investing effort in writing; 67 % reported that students have difficulty reading and comprehending complicated texts, while 46 % were of the view that digital tools make students write fast and carelessly, using more abbreviations in their writings, following the way students write when communicating electronically. However, the integration of the technology still encounters many obstacles ranging from teachers' inability to use technology as media and Biology learning resources, difficulty applying learning strategies, delivering complicated materials, poor access to internet facilities, unsteady power supply, lack of devices and software used in recording and preparing lessons, poor funding for data subscription among others.

However, technology in the life of 21st century learners create a huge gap between the rich and the poor in contemporary society. Students in developed countries show better understanding than those from developing countries in line with what Van Dijk and Hacker, (2011) referred to as digital divide- a situation where there is a big difference between students coming from different social backgrounds.s The report of National Telecommunications and Information Administration (NTIA) stated that townspeople in the US are 50% more likely to have internet access than those living in rural areas (Steele-Carlin, 2017)**.** Thus, the reason for poor students from developing countries facing big problems to find a well-paid job, or find it too difficult to compete in the global market is because during their schooling, they lack utilization of technological devices (PCS, laptops, tablets, projectors and Internet access) or that the devices were considered a luxury item and not accessible. Using modern technological devices motivates students' and makes learning meaningful.

Sriyanti (2009) defines motive as a force that comes from inside a person, causing the person to perform an act. Behaviour is affected by motivation, constitutes a factor that may inhibit student learning behaviour. The most significant environment that a child is exposed to is the classroom setting, which has a tremendous effect on learning behaviours and academic achievement of the child. Teachers are required to motivate students in their learning as number

one priority. The more motivated students are to learn something new, the more likely the student is to retain the material, they achieve. Research showed that while growing up in the ever-growing technology world, the incorporation of technology helps motivate students to learn. For example, Schaen, *et al.* (2016), discussed a project conducted which allowed third grade leaders and first graders to work together and create an app that will allow kindergarteners to practice mathematics strategies. This weeklong project allowed students to use technology, collaborate, and teach. The use of technology allowed all students the opportunity to actively participate in classroom activities. Hence, brought improvement in their learning. Therefore, teachers should present information in a way to meet post-basic school students' needs in ever technology-driven to be able to face the challenges of 21st century learners' skills.

Considering the advancement in technology and importance of Biology, post-basic school students are expected to demonstrate good knowledge of Biology with considerable level of motivation. The students of this generation have surrounded themselves with computers, laptops, and other advanced technological tools and perceive the use of these tools as a necessary function in their daily lives. However, it is observed that there is still a high rate of failure among post-basic school students' achievement in public examinations because of neglecting the acceptance of technology in the society. Also noted that the methods of classroom instructional delivery adopted by teachers do not highly motivate the students nor encourage educational growth in the country. Because of these, the study, therefore, investigated appraising teachers' classroom instructional delivery method on post-basic school students' motivation in Biology in Nsukka education zone, Enugu state. Thus, the question, could classroom instructional delivery method on post-basic school students' motivation determine improvement in learning of Biology?

The purpose of the study appraised classroom instructional delivery method on post-basic school students' motivation in Biology learning. The following issues were addressed;

1. What are teachers' views on integrating technology in classroom instructional delivery of post basic school students in Biology?
2. What is the influence of technological facilities on post-basic students' motivation in Biology?
3. What are the Challenges militating post-basic school instructional delivery method in Biology.

Method

Design of the Study

The study employed a descriptive survey research design. Nworgu (2015) described descriptive survey design as a type of research design aimed at collecting data and describing n a systematic manner the characteristics, features, or facts about a given population. Descriptive design according to Eze, (2015) can be used when collecting information about people's opinion, attitude, habits or any of the variety of education or social issues.

Study Participants

The population of the study comprised all 2080 senior secondary school teachers in Nsukka Education zone (Post- Primary Schools Management Board, Nsukka Zone, 2024). The zone was made up of 3 local government areas: Nsukka has 32 schools, Igbo-etiti has 15 schools and Uzo-uwani has 15 schools. Multi-stage sampling procedure were employed in which purposive

sampling procedure was used to select one L.G. A out of the 3. The sample of the study comprised 100 teachers drawn from four public secondary schools in Nsukka L.G.A using simple random sampling technique. 25 teachers were selected from each of the four schools sampled.

Data Collection

The instrument used for data collection was Classroom Instructional delivery Scale (CIDS). The rating scale was made up of two sections -A and B. Section A contains demographic data of teachers while section B has three clusters-A, B and C. The CIDS consists of 45 -item statement. The respondents were required to indicate their level of agreement with items in the scale by ticking one of the options as follows: **SA** = Strongly Agree; **A** = Agree; **SD** = Strongly Disagree; **D** = Disagree. The options are from 4- point Likert rating scale as follows: **SA** = Strongly Agree- 4 points; **A** = Agree- 3 points; **SD** = Strongly Disagree- 2 points; **D** = Disagree- 1 point.

Validity Procedures

The instrument was subjected to face validation. Two experts from the Biology Unit and one from the Measurement and Evaluation Unit validated the instrument, all from the Science Education department, University of Nigeria, Nsukka. The instrument was trial tested and subjected to reliability test using the Cronbach alpha method (because the test items were polytomously scored) and an internal consistency reliability of 0.88 was obtained.

Data Analysis

Research question were answered using mean and standard deviation. The study used 2.50 as benchmark for the agree and disagree of the mean responses. Therefore, a mean score of 2.50 and above indicate positive response to the research questions which was accepted while a mean score below 2.50 indicate negative response to the research questions, and was rejected.

Results

From table 1, the responses of teachers on items 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 had mean scores greater than the cut-off mean of 2.50. Hence, they were all accepted. This implies that teachers have similar reason for incorporating technology in post-basic school students' classroom instructions.

Table 1. Teachers' Views on Integrating Technology in Biology Classroom Instructional Delivery

S/NO	Item Statement	Mean	SD	Decision
1	Provides the teachers with knowledge and skills in the use of computer-based technology.	3.65	0.56	Agree
2	Help teachers to prepare lessons on time.	2.99	1.05	Agree
3	Technological learning environment allows each student to construct his or her own knowledge, encouraging independent learning skills.	3.43	0.73	Agree
4	With technology, the teacher is in tune with the students and knows how to pace lessons.	2.98	0.94	Agree

5	Technology enables the teachers to deliver instruction through physical or virtual classroom.	3.27	0.92	Agree
6	Technology creates safe and supportive learning environment for all learners.	3.33	0.90	Agree
7	Technology will provide insight for teachers in managing multiple learning experiences in classroom.	3.44	0.71	Agree
8	Develops students' critical thinking skills as well as creative thinking and problem- solving skills.	3.44	0.79	Agree
9	Using technology makes teachers facilitators of learning and not just teachers.	3.52	0.75	Agree
10	Skills required for technology-based instruction are used for personal purposes.	2.61	1.08	Agree
	Grand Mean	**3.27**	**0.84**	Agree

From statistics of Table 2, the opinion of teachers on the influence of technological facilities on post-basic school students' motivation in Biology, items number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14 and 15 had a mean score greater than the mean of 2.50. Hence, they were accepted because the respondents agreed that technological facilities had influence on post-basic school students' learning, which enhances the students' motivation in Biology. However, item 13 had a mean score of 2.44, which was less than the cut-off mean score. This item was therefore rejected because the respondent disagreed that technological facilities had influence on post-basic school students 'motivation.

Table 2. Influence of Technological Facilities on Post- Basic School Students' Motivation in Biology**.**

S/N	ITEM STATEMENT	Mean	SD	Decision
1	Technological facilities enable students to conduct appropriate investigations in their project writing.	3.38	0.81	Agreed
2	It makes students feel valued as they collaborate on projects with team spirit.	3.19	0.54	Agreed
3	Stimulate students' curiosity and promote intrinsic motivation to learn.	3.38	0.62	Agreed
4	Technology provides meaningful work that actively engages students in their learning.	2.94	0.25	Agreed
5	Fosters cooperation among the students in the classroom.	3.50	0.73	Agreed
6	Encourage students to gather information from multiple internet sources.	3.31	1.08	Agreed
7	Enables students to edit and format information	3.31	0.60	Agreed
8	Makes students lifelong learners	3.25	0.77	Agreed
9	Helps students in drawing diagrams.	3.75	0.77	Agreed
10	Facilitates student's typing skills	2.81	0.98	Agreed
11	Enable students to copy and paste information	3.60	0.63	Agreed
12	Enable students to attend class using real-time synchronous video conferencing technology.	3.19	1.05	Agreed

13	Produces students who are highly productive and effective communicators.	2.44	1.03	Agreed
14	Helps students to become creative and inventive thinkers.	3.00	1.03	Agreed
15	Helps the students to organize their work well for presentation at seminars and assignment.	3.88	0.50	Agreed
	Grand Mean	**2.63**	**1.09**	Agreed

From Table 3, items number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 13 had mean scores greater than the cut-off mean of 2.50. Hence, they are accepted because the respondents agreed that certain challenges militates post-basic school instructional delivery methods. However, items 11, 12, 14, and 15 had a mean score which is less than the cut-off mean score of 2.50. The items therefore were rejected because the respondents disagreed that those challenges enumerated does not militate post-basic school instructional delivery methods.

Table 3, Challenges Militating Post-basic School Instructional Delivery Methods

S/N	**Item Statement**	**Mean**	**SD**	**Decision**
1	There are unavailability of teaching equipment.	3.43	0.85	Agreed
2	Inadequate funding.	3.35	0.85	Agreed
3	Non-availability of new technological devices.	2.98	0.99	Agreed
4	Teachers are technologically unskilled and lack knowledge of using technological devices in the classroom.	2.59	0.95	Agreed
5	Curriculum content is voluminous and cannot be covered within the speculated period	3.23	1.01	Agreed
6	Teachers are poorly remunerated/ motivated.	3.16	0.92	Agreed
7	Inadequate reagents impede practical activities.	2.56	1.12	Agreed
8	Inefficient and inappropriate teaching strategies.	2.82	1.06	Agreed
9	Inadequacy of time allocated for teaching students.	3.23	0.87	Agreed
10	Lack of teaching aids hampers learning.	2.62	1.10	Agreed
11	Large teacher-student ratio.	2.38	1.14	Disagreed
12	Enable students to attend class using real-time synchronous video conferencing technology.	2.43	1.11	Disagreed
13	Students view learning without technology as not important to their career therefore discouraging the teacher.	2.74	0.98	Agreed
14	Students display poor/negative attitudes to learning.	2.40	1.04	Disagreed
15	Teachers show poor attitude to work.	1.83	0.38	Disagreed
	Grand Mean	**2.74**	**0.96**	Disagreed

Discussion

The result from research question one revealed that teacher' views on integrating technology in classroom instructional delivery show that it can provide the teachers with knowledge and skills in technology-based instructional delivery. It also showed that technology helps teachers to prepare lessons on time, allows each student to construct knowledge that encourage independent learning skills, enables the teachers to deliver instruction through physical or virtual classrooms,

enables them to create a safe and supportive learning environment and provide insight for teachers in managing multiple learning experiences in the classroom. Furthermore, integrating technology in classroom instruction develops students' critical thinking skills, creative thinking and problem-solving skills, makes teachers facilitators of learning and not just teachers. The above findings are in agreement with Cox (2021) who noted that modern technologies should be incorporated in our schools for instructional delivery for their use help to facilitate students learning and prepares them for the future. The findings also corroborate Aniago *et al*. (2021) who stated that technologies particularly the internet, in recent times have influenced the way of learning by modifying the concept of distance and time in access to information. Thus, the teachers views of integrating technologies in classroom instructional delivery in post basic schools.

The findings from research question two revealed that integrating technology in classroom instructional delivery creates room for technological facilities, which have influence on post- basic school students' motivation to learn. It showed that it could enable students to conduct appropriate investigation in their project writing, make students feel valued as they engage in collaborative activities, provide meaningful work that actively engages students in their learning, foster cooperation among students in the classroom, which stimulates students' curiosity and promote intrinsic motivation to learn. The findings also revealed that using technological facilities encourage students to gather information from multiple internet sources, edit and format information, drawing of diagrams, copy and paste information, facilitate students typing skills, helps students to organize their work well for presentation at seminars and assignment as well as helping the students to become life- long learners. These findings corroborate with Eneritz (2019) who maintained that the aim of integrating technology in the classroom is never to replace the teacher but to assist both the teacher and the learners, allowing them to make classroom experiences unforgettable. It is also in line with Osemebo (2020) who opined that there is considerable achievement and positive shift towards technology-based instruction especially among privately owned schools in Nigeria. Therefore, integrating technology in classroom instructional delivery involves the use of various technological tools which makes learning more student-centered because the students are readily using the tools at home.

The findings of the study with respect to research question three, showed that some challenges are militating post -basic school instructional delivery method in the Nigerian contemporary society. Such challenges include unavailability of teaching equipment, inadequate funding, non-availability of new technological devices; teachers are technologically unskilled and lack knowledge of using technological devices in the classroom. The result further revealed among others that curriculum content is voluminous, teachers are poorly remunerated and students view learning without technology as not important to their career therefore discouraging the teacher. The findings corroborate with Carstens *et al*. (2021) who noted that some teachers felt that more technology training would be beneficial for their students and themselves while some felt they are not adequately prepared. The finding is also in line with Strom (2021) who opined that since many educators are not given enough professional development opportunities to keep up with the quickly changing world of technology, they are unfamiliar with or intimidated by technology.

Conclusion

Based on the findings of the study, it was concluded that classroom instructional delivery method in our contemporary society has shifted to more rewarding measures that is technology-based

because technology is now considered as one of the most important skills 21st-century learners acquire. Therefore, adequate funding should be provided for infrastructure and equipment so that teachers can deliver instruction through virtual classrooms. More so, appropriate conditions and seminars should be created to encourage teachers to utilize the new technological device in classroom instructions. The use of technology in classrooms may not serve its intended purpose if the teachers are not properly trained. The consequence is that, students will not attain future height or progress in their learning. However, the conversion of traditional face-to-face learning into technology-based learning has become a challenge for Biology teachers due to non-availability of new technological devices; teachers are technologically unskilled and lack knowledge of using technological devices in the classroom. The result further revealed among others that curriculum content are voluminous and cannot be covered within the specified period. Therefore, Curriculum developers should off-load the Biology curriculum for effective instructional delivery. Technology has found its way to the classroom and has indomitably altered the face of learning and teaching. A new literacy that facilitates access to multiple sources of knowledge that gives students opportunity of fulfilling their ambitions. Whether positive or negative, this move towards integrating technology in the classroom will never end, and each new development will nurture another more appealing one. Technology- driven learning is therefore, the basic tool for lifelong education for the 21st century learners. Therefore, teachers should adopt appropriate instructional strategies in combination with technology to make learning of Biology more meaningful and enhance students' motivation to learn.

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