

EXTENT OF BIOLOGY CURRICULUM CONTENT DELIVERY WITH POWERPOINT PRESENTATION IN SECONDARY SCHOOLS: THE CHALLENGES OF IMPLEMENTATION AND SOLUTION

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Abstract

The use of ICT facilities and software have been found to be effective in instructional delivery in secondary schools. However, the extent of their application in instructional delivery in Biology in secondary schools is yet to be determined. This study was therefore conducted to determine the extent of teaching in the biology classrooms that is implemented using PowerPoint (PP) presentation, and also the challenges of such implementation with a view to proffering solution. Guided by three research questions, the study employed descriptive survey research design. The study used a sample size of 56 Biology teachers drawn using purposive sampling technique from secondary schools in Nsukka Local Government Area, of Enugu State, Nigeria.. The instrument for data collection was a questionnaire constructed on a 4-point scale which has three clusters (A-C) whose reliability indices determined using Cronbach's Alpha were 0.93, 0.89, and 0.58 respectively; with the overall reliability of 0.80. Data collected were analyzed using mean and standard deviation as well as histogram. Results revealed that the extent of Biology curriculum content delivery using PP presentation in secondary schools is low. The results also revealed the challenges that hinder effective use of PowerPoint presentation and ways to remediate such challenges were proffered. It is recommended among other things that teachers be taught the use of PP presentation, and that textbook writers give examples of topics amenable to PP presentation to help teachers.

Keywords: PowerPoint, Instructional delivery, Curriculum

Introduction

The role of Biology curriculum in guiding teaching and learning cannot be over emphasized. It ensures uniformity in the content students are exposed to as well as makes students become relevant and functional to the society after undergoing its contents. Curriculum is the ground which learners and teachers cover in order to attain the goals of education (Onwuka, 2002). It

is also defined as the set of courses offered in an educational institution, and which constitute an area of specialization (Nwosu, 2015). From the foregoing definitions, one can delineate curriculum to be the planned programmes of studies recommended to be offered as subjects across schools which is geared towards bringing positive changes in the learners' behaviours for personal and societal developments. The curriculum is therefore expected to develop the learners cognitively (head), affectively (mind) and in psychomotor domain (hand/skill) to enable them have desirable adaptations for functionality in the society. Biology curriculum, in addition to the above-stated importance, was developed in order to prepare students to acquire adequate laboratory and field skills in Biology; meaningful and relevant knowledge in Biology; ability to apply scientific knowledge to everyday life in matters of personal and community health and agriculture; as well as reasonable and functional scientific attitude (Nigerian Educational Research and Development Council NERDC, 2008) In the dynamic world of today, the curriculum is expected to inculcate in learners; life and career skills such as creativity skills, critical thinking skills, problem-solving skills as well as ICT skills (Nwosu, 2015). The information and communication technology (ICT) skills are needed by learners in this digital age for them to be employable and become relevant globally. ICT skills also are needed by teachers in recent times for effective instructional delivery in the modern technology-oriented classrooms.

Instructional delivery mode deals with the approaches or means employed by the teacher to effectively and meaningfully deliver the curriculum contents to the students. The mode of instructional delivery adopted by the teacher during teaching and learning process tends to contribute towards the attainment of the objectives of the lesson specifically, and quickens the attainment of the educational goals generally. Applying instructional delivery mode that appeals to the learners' senses of hearing and seeing is pertinent to enhance retention of the contents learnt by the students (Gier & Kreiner, 2009). This is upheld by Ngwoke (2004) in the aphorism that says "What I hear, I may forget but what I see, I remember". Students are able to transfer what they have learnt in the classroom to real life situations when they are able to retain the contents they have learnt. The mode of instructional delivery should therefore not be neglected in teaching and learning episodes. The instructional delivery mode could be conventional and/or innovative. It is conventional when it involves the use of chalkboards which has been reported to have some limitations such as inability to accommodate illustrations to support the teaching, inability to allow information storage for future use, and health hazard for teachers from chalk particles (Gambari, Yusuf & Balogun, 2017). On the other hand, it is innovative when it is ICT driven; involving the

use of computers, projectors and internet among others. In this era of science and technology, there seems to be a shift in the mode of instructional delivery of curricula contents towards the use of ICT-based approaches such as PowerPoint (PP) presentation.

PowerPoint presentation is an electronic presentation that involves slideshows prepared on a topic. It is a presentation that is created using Microsoft PowerPoint software (Krizo, 2017). The PP is designed to work in combination with other peripheral devices in addition to projectors. It could be used to support students' learning in the classroom since it has better visual effects, deeper impression, and increases students' interest and attention on the lesson (Szabo & Hastings, 2000). The effectiveness of PowerPoint presentation is enhanced by combining its usage with marker-boards and/or chalkboards otherwise known as blended learning (Xingeng & Jianxiang, 2012). The combination fosters detailed explanations of contents and adequate students-teacher interactions. PP enables its user to integrate videos and sounds for quality presentations. These features among other things make studies interesting to students and could also improve students learning.

Some researchers, for instance, Gürbüza, Köo÷lub, Erkola, Alaú b, and Kahraman (2010) found a significant effect of PowerPoint presentations on prospective Biology teachers' achievement and attitude towards Biology. Kareem (2018) stated that PP presentation has significant impact on Biology students' learning outcomes and modes of instruction and thus, recommended that Multimedia Assisted Instruction should be used in the teaching of Biology at secondary schools to improve students' learning outcomes in the subject. Lari (2014) also stated that teaching based on the use of technology such as PP presentations had a significant positive effect on learners' scores and their motivation towards learning. Although the use of PP presentation has been found to be efficacious in enhancing students' learning outcomes in Biology, there is need to carry out studies to determine the extent of its usage in delivering Biology curriculum contents to secondary school students.

Some studies have been conducted to determine the extent of use of ICT facilities generally in teaching and learning. For examples, Akabogu, Attama, Uloh-Bethels, Nnamani, Ukoha, and Ede (2018) studied the extent of the use of ICT facilities in teaching of Oral English in secondary schools and discovered that teachers use laptop computers, audio-tape recorders, DVD recorders, handset, Desktop computers, internet services, e-mail and MP3 to a very high extent in teaching Oral English, while PowerPoint, digital camera, scanner and television were used to a less extent. This study though in Oral English reported that the extent of use of PP presentation is low. In a related development, Mwanda, Mwanda, Midigo, and Maundu (2017) conducted a

study on integrating ICT into teaching and learning Biology, and discovered that most teachers did not use computer technology for instructional purposes. Teachers' inability to integrate computer technology for instructional purposes may be as a result of some challenges.

In this context, challenges to PP presentation mean those things that serve as barriers to effective use of PowerPoint presentation during teaching and learning process. Generally speaking, some challenges to the use of ICT in secondary schools include insufficient computers, insufficient peripherals and insufficient immediate internet access (Pelgrum, 2001). Also, lack of training of teachers in the use of ICT in teaching is another challenge suggested by Beggs (2000) that limits its use across schools. In addition, lack of time for teachers to plan for technology lessons, discover the different internet sites, or look at various aspects of educational software is a problem of using ICT facilities in schools (Sicilia, 2005). Newhouse (2002) discovered that many teachers lacked the requisite knowledge and skills to use computers and were unenthusiastic about the integration of computers into their teaching practices. Could these challenges of the use of ICT in secondary schools also affect the use of PowerPoint presentation? Or, is there another major challenge like curriculum factor that is limiting adequate use of PP presentation across secondary schools? All these were investigated in this study.

This study therefore investigated the extent of Biology curriculum content delivery with PowerPoint presentation in secondary schools: the challenges of implementation and solution.

The study examined:

- Extent of delivering Biology curriculum contents using PowerPoint presentation in secondary schools.
- Challenges militating against effective Biology content delivery with PowerPoint Presentation in secondary schools.
- Ways to remediate the challenges militating against effective Biology content delivery with PowerPoint presentation in secondary schools.

The following research questions guided the study.

- To what extent is PowerPoint presentation being used to deliver Biology curriculum contents in secondary schools?
- What challenges militate against effective Biology content delivery with PowerPoint Presentation in secondary schools?
- What are the ways to remediate the challenges militating against effective Biology content delivery with PowerPoint presentation in secondary schools?

Methods

The study employed descriptive survey research design. This design was appropriate because it aims at collecting data on, and describing in a systematic manner, the characteristics about a given population (Nworgu, 2015). The study was conducted in Nsukka Local Government Area Enugu State, Nigeria. The population of the study was all the fifty-six Biology teachers in public secondary schools in the area for 2018/2019 session. The researcher purposively used all the fifty-six Biology teachers in the zone since the population is not too large to manage. The instrument for data collection was a structured questionnaire on a four-point scale organized in three clusters. Cluster A was on the extent to which PowerPoint is used to deliver Biology curriculum contents in secondary schools while Clusters B and C were on the challenges that militate against effective Biology content delivery with PowerPoint Presentation in secondary schools and the ways to remediate the challenges militating against effective Biology content delivery with PowerPoint presentation respectively. The instrument was validated by two experts in the Department of Science Education of the University of Nigeria, Nsukka. The reliability indices of the three clusters determined using Cronbach Alpha were 0.93, 0.89, and 0.58 respectively; with overall reliability of 0.80. The instrument was given to the respondents in which they responded as it concerns them by ticking in the appropriate columns. In scoring the instrument, VHE (Very High Extent) was given a score of 4, HE (High Extent) was assigned a score of 3, LE (Low Extent) has a score of 2 and VLE (Very Low Extent) received a score of 1. Also, SA (Strongly Agree) was given a score of 4, A (Agree) was assigned a score of 3, D (Disagree) has a score of 2 and SD (Strongly Disagree) received a score of 1. Data were analyzed quantitatively using mean and standard deviation as well as graphically illustrated using histogram.

Results

The results are presented according to the research questions as follows:

Table 1: Extent of delivering Biology curriculum contents using PowerPoint presentation in secondary schools

Item Statements	VHE	HE	LE	VLE	\bar{X}	S. D
Use PowerPoint presentation in teaching school Biology lessons.	4	12	23	17	2.05	0.90
Illustrate diagrams of living organisms during Biology lessons with PowerPoint.	2	10	27	17	1.94	0.79
Demonstrate some experiments during practical Biology lessons with PowerPoint.	2	11	24	19	1.92	0.82

Integrate videos and sounds in PowerPoint presentation to make Biology lessons interactive.	2	8	22	24	1.78	0.82
Use PowerPoint presentation in combination with other devices like projector during Biology lessons.	2	10	23	21	1.87	0.83
Combine PowerPoint presentation with marker-board in teaching Biology lessons.	2	10	25	19	1.91	0.81

Acceptable Mean = 2.50, Cluster Mean = 1.92, Std. Dev. = 0.72, N = 56

Data in Table 1 shows the extent of delivering Biology curriculum contents using PowerPoint presentation in secondary schools by teachers. The use of PowerPoint presentation in teaching school Biology lessons has mean value of 2.05 and standard deviation of 0.90. Other items, their means and standard deviations are respectively shown as follows in the brackets: illustrate diagrams of living organisms during Biology lessons with PowerPoint (1.94, 0.79), demonstrate some experiments during practical Biology lessons with PowerPoint (1.92, 0.82), integrate videos and sounds in PowerPoint presentation to make Biology lessons interactive (1.78, 0.82), use PowerPoint presentation in combination with other devices like projector during Biology lessons (1.87, 0.83) and combine PowerPoint presentation with marker-board in teaching Biology lessons (1.91, 0.81). All these have mean values that are below the acceptable mean value of 2.50. This is also seen in the cluster mean value of 1.92 with a standard deviation of 0.72. This shows that the extent of use of PowerPoint presentation in delivering Biology curriculum contents is low.

Further illustration of the extent of use of PowerPoint presentation in delivering Biology curriculum contents using histogram in figure 1 below shows that most of the bars including the tallest are clustered between 1 and 2 which depict very low extent (VLE) and low extent (LE) respectively. The normal curve of the histogram also has its peak within the range of (LE) but descends towards 3 (HE) and 4 (VHE).

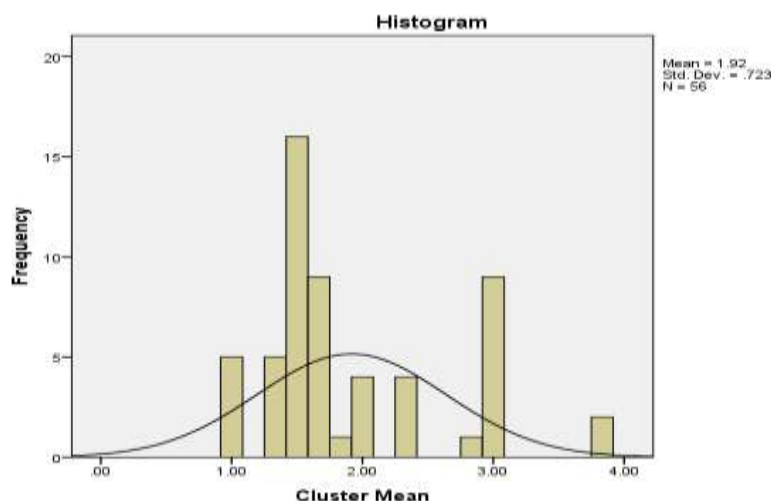


Figure 1: Histogram on the extent of use of PowerPoint presentation in delivering Biology curriculum contents

Table 2: Challenges militating against effective Biology content delivery with PowerPoint Presentation in secondary schools

Item Statements	SA	A	D	SD	\bar{X}	S. D
Inadequate supply of functional laptops to secondary schools.	22	20	8	6	3.03	0.99
Lack of projectors.	15	33	6	2	3.08	0.72
Teacher’s incompetency in slides’ preparation and presentation.	15	34	3	4	3.07	0.78
Lack of power supply.	17	33	4	2	3.16	0.70
Lack of training opportunity for serving teachers on the preparation of slides and presentation.	15	29	10	2	3.01	0.77
PowerPoint presentation of some topics is not recommended in the Biology curriculum.	25	23	4	4	3.23	0.87

Acceptable Mean =2.50, Cluster Mean = 3.10, Std. Dev. = 0.66, N= 56

Data in Table 2 shows the challenges militating against effective Biology content delivery with PowerPoint Presentation in secondary schools. These challenges, their mean values and standard deviations are respectively shown in the brackets as follows: Inadequate supply of functional laptops to secondary schools (3.03, 0.99), lack of projectors (3.08, 0.72), teacher’s incompetency in slides’ preparation and presentation (3.07, 0.78), lack of power supply (3.16, 0.70), lack of training opportunity for serving teachers on

the preparation of slides and presentation (3.01, 0.77), and PowerPoint presentation of some topics is not recommended in the Biology curriculum (3.23, 0.87). The mean values of the item statements above are more than the acceptable mean value of 2.50 which indicate that those were among the challenges that militate against effective Biology content delivery with PowerPoint Presentation in secondary schools. This is also explained by the cluster mean value of 3.10 with a standard deviation of 0.66.

Graphical illustration of the challenges using histogram in figure 2 reveals that most of the bars including the tallest are clustered between 3 and 4 which indicate agree (A) and strongly agree (SA) respectively. The normal curve on the histogram also has its apex around 3 (A). This shows that teachers agreed that those were the challenges militating against effective use of PowerPoint presentation in delivering Biology curriculum contents.

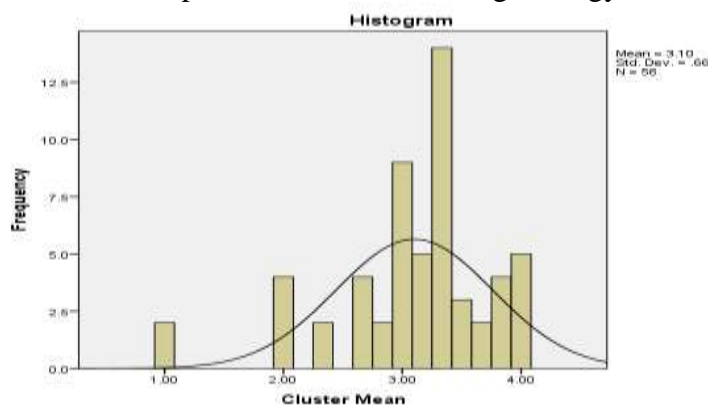


Figure 2: Histogram on the challenges militating against effective Biology content delivery with PowerPoint Presentation in secondary schools

Table 3: Ways to remediate the challenges militating against effective Biology curriculum contents delivery with PowerPoint presentation in secondary schools

Item Statements	SA	A	D	SD	\bar{X}	S. D
Supply of functional laptops to secondary schools.	25	24	2	5	3.23	0.89
Supply of projectors to secondary schools.	19	29	2	6	3.08	0.90
Training of Biology teachers in slides' preparation and presentation.	25	25	2	4	3.26	0.84
Procuring source of power.	21	24	4	7	3.05	0.98
PowerPoint presentation of some topics should be recommended and integrated in the Biology curriculum.	27	25	2	2	3.37	0.72

Acceptable Mean =2.50, Cluster Mean = 3.21, Std. Dev. = 0.53, N= 56

From Table 3, the ways to remediate the challenges militating against effective Biology curriculum contents delivery with PowerPoint presentation in secondary schools include: Supply of functional laptops to secondary schools, supply of projectors to secondary schools, training of Biology teachers in slides' preparation and presentation, procuring source of power, and PowerPoint presentation of some topics to be recommended and integrated in the Biology curriculum. The mean values of the item statements above are more than the acceptable mean value of 2.50 which reveal that the respondents agreed that with these suggested ways, the challenges militating against effective use of PowerPoint presentation in delivering Biology curriculum contents in secondary schools could be remedied. This is also shown by the cluster mean value of 3.21 with standard deviation of 0.53.

Further, illustrating the ways to remediate the challenges militating against effective Biology curriculum contents delivery with PowerPoint presentation in secondary schools using histogram in figure 3 reveals that most of the bars including the tallest among them clustered between 3 and 4 representing agree (A) and strongly agree (SA) respectively. Also, the normal curve on the histogram has its peak above 3 (A) which also purports that the respondents agreed that the challenges militating effective use of PowerPoint presentation in delivering Biology curriculum content delivery in secondary schools can remediated with the suggested ways.

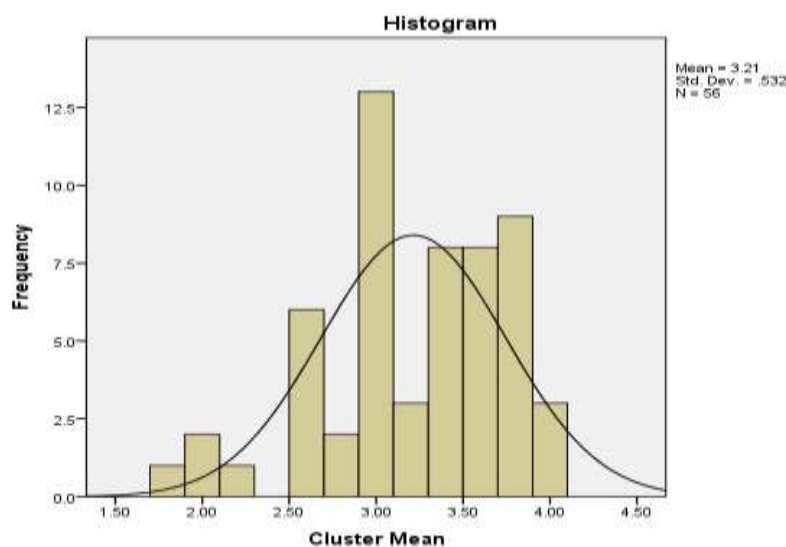


Figure 3: Histogram on ways to remediate the challenges militating against effective Biology curriculum contents delivery with PowerPoint presentation in secondary schools

Discussion

The results revealed that the extent of use of PowerPoint presentation in delivering Biology curriculum contents in secondary schools is low. This is because teachers rarely use PowerPoint presentation in teaching school Biology lessons, illustrate diagrams of living organisms during Biology lessons, demonstrate some experiments during practical Biology lessons, integrate videos and sounds in PowerPoint presentation to make Biology lessons interactive, use PowerPoint presentation in combination with other devices like projector during Biology lessons, and hardly combine PowerPoint presentation with marker-board in teaching Biology lessons. This supports the findings of the study conducted by Akabogu, Attama, Uloh-Bethels, Nnamani, Ukoha, and Ede (2018) though in Oral English that the extent of use of PowerPoint presentation is low. It is also in line with Mwanda, Mwanda, Midigo, and Maundu (2017) that most teachers did not use computer technology for instructional purposes. The low extent of use of PowerPoint presentation in secondary schools can be attributed to some challenges.

The challenges are shown in table 2. For instance, inadequate supply of functional laptops to secondary schools is a barrier militating against effective use of PowerPoint presentation in delivering Biology curriculum contents. Many secondary schools do not have functional laptops and projectors that are required for slides' preparation and PowerPoint presentation. In some schools, there may be some functional desktops but they don't have projectors. This supports Pelgrum (2001) who stated that the challenges to the use of ICT in secondary schools include insufficient computers, insufficient peripherals and insufficient immediate internet access. In addition, teacher's incompetency in slides' preparation and presentation, lack of training opportunity for serving teachers on the preparation of slides and presentation, lack of power supply, and PowerPoint presentation of some topics not recommended in the Biology curriculum are other challenges. Many serving Biology teachers lack the skills needed for slide preparation and presentation which hinders its usage during instructional delivery. They also do not have the training opportunity on the preparation of slides and presentation perhaps, because of cost of participation. In some cases, many schools do not use electricity because of lack of fund to pay electricity bills and they don't have other power source either. This hinders effective use of PowerPoint presentation that requires electricity. Yet, another challenge that negatively affect the extent of PowerPoint implementation in instructional delivery in secondary schools is the inability of the Biology curriculum to recommend and integrate PowerPoint presentation in some topics. This delays its implementation since serving teachers will not take it seriously when it is recommended in any portion of the curriculum for delivering contents to students. These challenges if not

nipped in the bud will delay the use of PowerPoint presentation in instructional delivery and the general application of ICT in secondary schools' teaching and learning process. Hence, the quest for sustainable solutions.

The ways to remediate the challenges that militate against effective use of PowerPoint presentation in instructional delivery of Biology curriculum contents are: supply of functional laptops and projectors to secondary schools, training of Biology teachers in slides' preparation and presentation, as well as procuring alternative source of power such as generators and supply same to secondary schools. Training of serving teachers on slides preparation and usage can be done by organizing free workshops and make their participation compulsory for serving teachers. Also, sponsoring of teachers to attend conferences in order to understand the trends in instructional delivery in our twenty-first century classroom is ideal. This enables them to apply the innovative instructional delivery approaches which promote interactions as well as retention of materials learnt among learners and teachers.

Finally, another sustainable way to eradicate the challenges is by the use of curricula approach. PowerPoint presentation of some topics should be recommended and integrated in the Biology curriculum. When this is done, it becomes functional as teachers will see its need and work towards implementing it in their instructional deliveries. This they do because they are convinced that school inspectors will monitor such instructional delivery mode each time they embark on monitoring of instructional deliveries across secondary schools.

Conclusion

The extent of Biology curriculum content delivery with PowerPoint presentation in secondary schools is low. This is caused by a number of challenges such as inadequate supply of functional laptops and projectors to secondary schools, teacher's incompetency in slides' preparation and presentation, lack of training opportunity for serving teachers on the preparation of slides and presentation, lack of power supply, and PowerPoint presentation of some topics not recommended in the Biology curriculum. In order to ensure effective implementation of PowerPoint presentation in delivering Biology curriculum contents in secondary schools, the challenges need to be remediated sustainably through several ways among which is curricula approach.

Recommendations

From the results of the finding and discussions, the following are recommended for effective implementation of PowerPoint presentation in delivering Biology curriculum contents in secondary schools:

- There should be adequate training of Biology teachers in slides' preparation and presentation through organizing workshops and conferences.
- PowerPoint presentation of some topics should be recommended and integrated in the school Biology curriculum.
- Government and non-governmental organizations should assist in procuring and supplying functional laptops, projectors and source of power to public secondary schools.
- Since ICT generally has come to stay, serving teachers should start implementing them during instructional delivery.

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