

Effects of Inadequate Use of Graphics and Digital Graphics in Delivery of Instructional Contents in Public Higher Educational institutions in Nigeria

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Abstract: This paper investigated effects of inadequate use of graphics and digital graphics in public higher educational institutions in Nigeria. Descriptive research survey design was adopted for this study. Imo State University Owerri is among the universities in Nigeria therefore, Imo State University is chosen to represent entire universities in Nigeria. Two research questions and two hypotheses guided this study. Population of this study is 7,000 which comprised 4,500 males and 2,500 female students in Imo State University Owerri. Stratified random sampling technique was used to select 34 male and female students each in life science education and business administration. In the same vein, 23 male and female students were selected each in department of health science and economics, which gave a total sample size of 114 students selected as sample size. Researcher developed questionnaire titled “effects of inadequate use of graphics and digital graphics in public higher educational institutions in Nigeria” was used, with four rating scales of strongly agree, agree, disagree and strongly disagree. The instrument was validated by two specialists in Business Education, Madonna University Nigeria, Okija campus, Anambra State. Cronbach alpha statistics was used to determine the reliability coefficient of this study at 0.78 and 0.97, which shows that the instrument was reliable for use in this study. The instrument was administered to students with the help of two research assistants. Student’s responses were collected and analyzed using mean and standard deviation. Chi Square -test of independent was used to test the hypotheses. Findings of from this study revealed that students’ performance in quiz and examinations were very poor due to inadequate use of graphics and digital graphics in delivery of instructional contents by lecturers. The findings also revealed that inadequate power supply, instructional materials such as drawing boards, pens, pencils, workbook, lap tops, internet facilities were among the constraints hindering the use of graphics and digital graphic soft wares during teaching and learning in Imo State University Owerri. It was recommended from this study that government should provide adequate instructional materials for teaching and learning in Imo State University Owerri. It was also, recommended in this study that adequate power supply should be provided in Imo state University Owerri. This would enable lecturer’s make use of graphics and digital graphics for effective teaching and learning in Imo State University Owerri.

Keywords: Evolution of Graphics Between 16th and 17th Century, Meaning of Graphics, Meaning of Digital Graphics, Types of Computer Graphics, Examples of Graphics, Functions of Graphics and Digital Graphics, Learners in Modern Classroom in Higher educational institutions.

Introduction

At different levels of education in both Nigeria and Diasporas countries of the world, learning contents simplified with graphics arouses the interest of students to learn. Students understands instruction simplified with charts, diagrams, formats and maps easily than instructions delivered with use of non- graphics and digital graphics materials. In this 21st century, students prefer instructions delivered with diagrams, maps, charts than with long note making. Teaching is bidirectional or a two way process. Inadequate teaching caused by inadequate use of needed instructional materials results to poor receptivity among students.. Poor receptivity is caused by lack of effective instructional materials both modern, local or improvised instructional materials (Christian, 2025). It is of no doubt that lecturers skip the use of drawing and engage students with long note making in the lecture hall thus making comprehension uneasy. During teaching and learning panoramas students grasp easily concepts diagrammatized or reduced into charts, format written on the board by lecturers. Graphics and digital graphics have provided easy recall to learned instructions by students. Learning difficulties student’s exhibits in their learning are caused by long note making. These have thus, caused students inability to summarize and comprehending large volumes of notes students make in the classroom. Large note making has not only caused poor comprehension to students, it has caused poor retention and regurgitation of learned concepts to students. In Diasporas countries of the world students are trained on the ability to draw and as well write or make notes. Use of graphics, digital graphics,

note making and fluent voice of lecturers during teaching and learning remonstrate and invigorate receptive or perceptive understanding from students.

Evolution of Graphics

Use of graphics started in the medieval age. The early men who lived in caves, made use of graphics to draw pictures of animals they wanted to snare or kill. Drawing then, provided easy recall to the early men on the animals they wanted to kill or ensnare. Early apostles of Jesus Christ used graphics to draw maps and distances of countries they have visited or about to visit during propagation of the gospel.. Use of graphics cannot be over emphasized in biblical writings. In 17th century, use of graphics was efficacious for propagation of Christianity in Nigeria and in the whole world (Urukapa & Ihebereme, 2005). Education proceeds from Christianity therefore, Christianity and education are complimentary or interwoven in Nigeria..

Graphics have existed from time immemorial. In the 18th century, graphics then were used to teach students about longitudes and latitudes of different countries of the world. Teachers in 18th centuries ago used graphics to teach students how to draw graphs, maps, letters, charts and shapes. Graphics were also useful for teaching arithmetic, distances and sizes of objects to students in the 18th century.

In this 21st century, efficacy of graphics and digital graphics are pivotal and formidable for effective teaching and learning in the lecture hall. Poor use of graphics and digital graphics materials have led to poor drawing, chart making, maps and diagrammatizations (Uruakpa e tal, 2005). In this 21st century ability of students to measure distance width, health of an object have been a harculian task. Students cannot differentiate between width, height and distances of an object let alone measure or read meters. Vast majority of lecturers have divorced use of graphics and digital graphics during delivery of learning contents in higher educational institutions in Nigeria. It is very saddening that some lecturers today do not know how to draw, diagrammatize in the lecture hall. Some instructions made up of charts, diagrams, maps or shapes are skipped and replaced with theories.

Meaning of Graphics

Graphics is derived from Greek word “Graphikos” this means writing. Graphikos also, means the art of engraving or drawing. Graphics is made up of static and visual information. In the same vein, digital graphics provides both motionless and motion pictures of objects such as shapes, letters, human or animated pictures (Iwu, Ike & Anwuagboke 2015). Graphics provide visual representations in the form of information or ideas; Some information that are not letters are in the form of realia images, designs, texts that are informative and illustrative during teaching and learning. Vast array of graphic materials provide rewarding learning experiences to students. In broadcasting services, media men make use of graphics to disseminate information to students. Graphical illustrations invigorate effective learning to students. Graphics present both large and simple information. Diagrams, shapes, letters, maps made available for students and public use are simple, attractive and reinforcing students to develop their imaginations to learn. Graphics include: charts, posters, cartoons, comics, graphs, maps, diagrams, shapes and letters. Letters of graphic origin can be gothic, italics, roman, texts and gothic condensed letters (Uzoagba, 1982). Gothic condensed letters are classified alphabets used for grid lettering (Ekeda, 1988). T-square and Set- square are used for drawing upper case and lower case letters with spaces in-between the letters (Ekeada 1988). In this new age, teachers, lecturers and media personnel use both visual images, graphics interchangeably during teaching and learning and presentation of media reports (Iwu, Ike & Onwuagboke 2015). Graphics are visuals that symbolize or identify information or ideas to students during delivery of instructional contents by lecturers. They are also used to deliver information or reports to wide audiences during media broad casting services. Media personnel and other information disseminators such as health, aviation, business analysts, weather forecasters, emergency management agencies, make use of graphics to communicate to wide audiences in the whole world (Braden 1996, in Spector, Merrill, Mirrienboer and Driscoll, 2009). Graphics materials are contrived experiences used to make learning vivid to students (Ike, Iwu & Onwuagboke, 2006),

Meaning of Digital Graphics

Digital graphics are known as computer graphics. They are both static, motion and visual images. Digital graphics are effective digital communication tools for both educators and media personnel (Spector 2009). They provide multimedia information to students and wide audiences. Some digital graphics are static or motion illustrative graphics. They are used to provide synchronized tapped lectures for students use in both collaborative and personalized learning modes (Hoska, 2009). Digital graphics are fulcrums for effective teaching and learning of science subjects in secondary schools (Onyegegbu, 2006, Nwagbo, 2008 & Rotimi etal, 2012). They are also, used in teaching and learning of physical and social science courses in higher educational institutions. They provide improved teaching and learning by displaying images of objects, shapes, diagrams of all kinds on digital screens (Braden, 1996 & Aggarwal, 2007). Both digital graphics and handmade graphics are effective teaching tools used by educators and news reporters (Efebo, 1996).

Types of Digital Graphics

Digital graphics are categorized into raster graphics, vector graphics, graphic designs and motion graphics. Vast majority of graphics are informative and knowledge driven. However, raster graphics provides images with tiny dots. Vector graphics provide mathematical equations. Graphic designs are designs used in creating visual compositions. They bring solutions to students learning difficulties. Motion graphics incorporates animations with visual experiences (Smicker, 2012). Digital graphics software's are enhanced with electricity and internet facilities. They are used to create static, motion images, letters, charts, diagrams, maps and formats that are meaningful to human perceptions when they are viewed or observed.

Examples of Graphics

There are numerous examples of graphics. Graphics include: Images, shapes, diagrams that create awareness about events or scenes to wide audience. In engineering and arts classrooms, graphics and digital graphics materials provide rewarding learning experiences to students. Graphics and digital graphics provides easy memorization of concepts to students. They also, enable students to draw, paint and animate (Smicker, 2012).

Functions of Graphics and Digital graphics

There are many purposes on which graphics are used; those purposes include:

- i. They are used during delivery of instructional contents to students.
- ii. Graphics creates appealing visuals experiences to viewers.
- iii. In manufacturing and service sectors, graphics provides visual identity on products and services of companies.
- iv. Graphics make learning more understandable and vivid to students.

Learners Modern Classroom in Higher educational Institutions

Higher educational institutions are majorly made up of students and lecturers. When there are no students in higher educational institutions there are no classroom or lecture hall. A classroom qualify to bear its name where there are learners otherwise it will seize to stand as a classroom and described as a room. In a classroom, emphasis is on the quality of instructions and instructional materials lecturers make use of, to impacts knowledge to students or learners in higher educational institutions. In modern classroom, presence of local and modern instructional materials influences learning and make students active participants collaborating together in learning with their lecturers and colleagues or class mates. Hence, learners in the modern classroom are multimedia learners, critical and creative learners, multitasking learners, collaborators that can adapts with any teaching styles and instructional materials especially with use of graphics and digital graphics materials. In the same vein, lecturer in the modern classroom integrate multimedia learning facilities and have clear understanding of how instructional materials used in teaching and learning should be capable of bringing good learning outcome.

In this modern age, instructions carried out without the use of graphics or digital graphics results to inadequate learning outcome to students. Students derive understanding with instructions made up of annotated diagrams, maps, charts, mounted pictures and images of objects. Receptivity of instructional contents are not only comprehended by students with lecturer's voice in the classroom or lecture hall alone. lecturers combine their teaching with handmade or digital graphics such as diagrams, charts, maps, cartoons, formats. Different images of human motion, still pictures, objects, mounted images and grid letters which vivify or clear students learning doubts are unavoidably incorporated for effective teaching in higher educational institutions (Mayer, 2001). Graphics and digital graphics materials are important educational tools lecturers make use of from the point of their training to the classroom. Both lecturers and teachers are obliged to make use of graphics, digital graphics, and educational tools and resources during teaching and learning because, that would help to revolutionize (Christain & Rukhma, 2024). In traditional, virtual, flipped or hybrid classroom learning modes, local and modern instructional materials should be used to create rewarding learning experiences.

Use of voice or shout is not only a sure way to students grasp of any learning contents. Some students feels so ill and disappointed when they observe entrance of lecturers that do not make use of both digital and handwritten graphics getting closer to the lecture hall. Effective learning is observed when students understand lectures delivered to them by their lecturers to marshal out needed points on students learning.

Effective use of graphics by lecturers in the lecture hall clears students learning doubts. In this 21st century, lecturers instructional skills revolves on use of both local and modern technological learning equipment (Owolabi, 2014). Use of graphics and digital graphics materials enables students to identify salient points in their learning and ask rewarding questions (Kearsely, 2002). Graphic materials are veritable tools that provide effective medium of instruction to students (Mayer, 2003). Both digital and hand drawn

graphics provide arouses students interest to learn because they can manipulate with them (Smicklass, 2012). Both digital and hand drawn graphic materials are efficacious in delivery of instructional contents in biology, mathematics, business, geography, chemistry, physics and social science courses in higher educational institutions in Nigeria and in the whole world. Digital machines such as, DVD/ VCD, power point presentations, and other soft and hard ware devices are reinforced with electricity to provide digital graphic illustrations to students but they are not used because of their unavailability, frequent power outages in higher educational institutions (Tanner, 2016, Maurice, 2008, Nkweke 2010). When classroom situations become more inviting and decorous, use of graphics to demonstrate or actualize effective instructional delivery are enhanced (Ifebo, 1996). Use of graphics and digital graphics reinforces slow learners intellect. Slow learners that have difficulty in writing can use diagrammes to identify, define particular concept during classroom learning in higher educational institutions especially in science classes (Pamafes, 2007, Aggawal, 2007 Bartsch, 2009). Graphic and digital graphics encourages personalized and collaborative learning thus, students can use graphics digital graphics to understand learning concept and the learning concepts vividly (Kellerman, 2004, Owolabi, Ogini 2014 & Staylor, 2002). Graphic materials enhances speedy recall of learned concepts by slow and fast learners in higher educational institutions in Nigeria and diasporas countries of the world (Onyegegbu, 2006). Use of graphics makes learning more competitive and rewarding to both students and lecturers in higher educational institutions.

As stated in the previous pages of this article, graphic materials include: drawings, charts, graphs, dynamic graphs like animations and videos, maps or photos (Clark and Mayer, 2008). However, use of digital graphics courtesy of information and communication technology ICT, have revolutionized learning in this modern world. Digital graphics are both static, motion and visual communications which include: Pictographic symbols, maps, graphs, diagrams, illustrations, pictures, composite graphics, photographs, and models (Sanders 1994, in Lohr and Gall, 2009). In the same vein, Importance of graphic soft wares cannot be over emphasized during teaching and learning. Students use digital graphics to draw, paint, edit and make images. Knowledge of digital skills in varied learning tasks have encouraged students to explore in other learning they can feat in with thus, helping students to solve their social, technological and economic problems (Mangal &Mangal 2009).

Cognitive Theory of Multimedia Learning

Cognitive theory of multimedia learning was propounded by Mayer, in 2002 and Spector, e tal 2009). This theory identified that cognitive theory of human multimedia learning aid information processing. Mayer asserts that cognitive theory of multimedia learning aid in processing of audio and audio visual information for human intellectual and emotional development. Students learn better when they are provided with hand drawn and digital graphics to improve their learning (Kumar, 2008).

Statement of the Problem

Digital and handmade graphics are panaceas for effective delivery of instructional contents to students. It is observed that some lecturers do not make adequate use of graphics and digital graphics during delivery of instructions to students. Some -lecturers do not know how to make hand drawing let alone operate ICT facilities like computers, lap tops, pam tops and android phones in today's technological driven societies. Some lecturers resisted change with use of ICT facilities because they are techno phobia. These are reasons why some students find it uneasy to measure up with students in Diasporas countries of the world where graphics and digital graphics are used to convey teaching to students. However, in Nigeria, some students that do not know how to make effective constructs of sentences, performs very poor during examinations. But with effective use of diagrammes, charts, formats to learn, students can confidently regurgitate what they learned in quiz and examinations. Effective use of charts, diagrams, maps, formats to deliver instructional contents to students rejigs students learning but, when charts, diagrams, maps shapes, images are not incorporated in students, they creates poor or inadequate learning to students (Vikoo, 2010). Inadequate use of graphics and graphics causes students to develop perceptual deficit. This is because some students find it uneasy to study with large volumes of notes given to them by lecturers. Inadequate use of graphics and digital graphics to simplify learning to students have caused some students to perform very poor in quiz and semester examinations. It is of no doubt that some higher educational institutions are into power outages, internet facilities, inadequate instructional materials. These hinders effective students learning in higher educational institutions in Nigeria (Salami, 2001, Vikoo, 2007).

Methods

This paper investigated effects of inadequate use of graphics and digital graphics in public higher educational institutions in Nigeria. Descriptive research survey design was adopted for this study. Imo State University Owerri is among the universities Nigeria therefore, Imo State University is chosen to represent entire universities in Nigeria. Two research questions and two hypotheses guided this study. Population of this study is 7,000 which comprised 4,500 males and 2,500 female students of Imo State University Owerri. Sample size of this study is 170. Stratified random sampling technique was used to select 34 male students each in life science education and business administration. In the same vein, 23 female students were selected each in department of health science and economics, which gave a total sample size of 114 students selected as sample size. Researcher developed questionnaire

titled “effects of inadequate use of graphics and digital graphics in public higher educational institutions in Nigeria” was used, with four rating scales of strongly agree, agree, dis agree and strongly disagree. The instrument was validated by two specialists in Business Education, Madonna University Nigeria, Okija campus, Anambra State. Cronbach alpha statistics was used to determine the reliability coefficient of this study at 0.78 and 0.97, which shows that the instrument was reliable for use in this study. The instrument was administered to students with the help of two research assistants. Student’s responses were collected and analyzed using mean and standard deviation. Chi Square -test of independent was used to test the hypotheses.

Results

What are the effects of inadequate use of graphics and digital graphics use during teaching and learning in Imo state University Owerri?

Table 1: Shows the effects of inadequate use of graphics and digital graphics use during teaching and learning in Imo state University Owerri.

S/N	Statements	X	S.D	X	S.D	Mean	
1.	Inadequate perception of learning	2.60	0.20	Agree	2.40	0.30	Agree
2.	Students develop confusion In their learning.	3.10	0.10	Agree	2.50	0.20	Agree
3.	Students poor comprehension of Learning concepts	2.80	0.00	Agree	2.60	0.10	Agree
4.	Some students are unable to recall Learned concepts with voluminous notes	2.70	0.30	Agree	3.10	0.20	Agree
5.	Students develop inability to grasp factual Points due to their inability to comprehend from large volumes of notes to them by their lecturers	3.30	0.10	Agree	3.00	0.30	Agree
6.	Some students develop perceptual deficit from learning with large volume of copied notes	3.50	0.40	Agree	3.10	0.20	Agree
7.	Some students perform very poor due poor writing skills.	3.10	0.50	Agree	3.20	0.10	Agree
8.	Some students are denied areas of of learning where they are conversant with	3.40	0.10	Agree	3.10	0.30	Agree
9.	Some students prefer the use of diagrammes, charts for easy learning than with large volume of time wasted with note making.	3.20	0.40	Agree	2.60	0.60	Agree
10.	Some students are weak in spelling and therefore prefer the use of graphics and digital graphic materials but students are denied their use due to inability of lecturers to consider them during delivery of instructional contents.	3.90	0.50	Agree	4.10	0.30	Agree
Total		27.10	2.60	Agree	27.00	2.60	Agree

Research Question Two

What are the causes of inadequate use of graphics and digital graphic materials in Imo state University Owerri?

Table 2: Shows the causes of inadequate use of graphics and digital graphic materials in Imo state University Owerri.

S/N	Statements	X	S.D	Decision	X	S.D	Decision
11.	Lackadaisical attitudes of lecturers from making Improvised instructional materials	2.60	0.20	Agree	2.40	0.30	Agree
12.	Inadequate ICT facilities for both students and lecturers.	3.10	0.10	Agree	2.50	0.20	Agree
13.	Frequent power outage	2.80	0.00	Agree	2.60	0.10	Agree
14.	Inadequate internet broad band	2.70	0.30	Agree	3.10	0.20	Agree
15.	Techno phobia among lecturers	3.30	0.10	Agree	3.00	0.30	Agree
16.	Inadequate competency skills on use of ICT facilities among students and lecturers	3.50	0.40	Agree	3.10	0.20	Agree
17.	Inadequate manual graphic non digitalized instructional materials	3.10	0.50	Agree	3.20	0.10	Agree
18.	High cost of acquisition of ICT facilities and devices.	3.40	0.10	Agree	3.10	0.30	Agree
19.	High cost data	3.20	0.40	Agree	2.60	0.60	Agree
20.	Inadequate technologists and ICT assistants.	3.30	0.50	Agree	5.00	0.30	Agree
Total		27.10	2.60	Agree	27.00	2.60	Agree

Test of Hypotheses

Table 3: Shows hypothesis test on inadequate use of graphics and digital graphic materials in Imo state university Owerri.

	N	X	S.D	D.f	X0- cal	Xe-tab	Decision
Male staff	80	27.10	2.60	0.05	40.6	3.84	Rejected
Female Staff	90	27.00	2.60				

In table 3: Calculated Xo value is 40.6 which is greater than the table value of Xe of 3.84. Since the calculated Xo is greater than the Xe table value, the null hypothesis was rejected.

Table 4: Shows hypothesis test on the causes of inadequate use of graphics and digital graphic materials in Imo state University Owerri.

No of respondents	N	X	S.D	D.f	X0- cal	Xe-tab	Decision
Male staff	80	30.10	2.60	0.05	60.1	3.84	Rejected
Female Staff	90	30.00	2.60				

In table 3: Calculated X_o value is 60.1 which is greater than the table value of X_e of 3.84. Since the calculated X_o is greater than the X_e table value, the null hypothesis was rejected. This shows that lecturers inadequate use of graphics and digital graphics materials causes lecturers poor delivery of learning contents and students inadequate receptivity of learning contents in Imo State University Owerri. This result represents inadequate use of graphics and digital graphics by lecturers and students in higher educational institutions in Nigeria.

Discussion of Findings

Graphic material encourages speedy recall and participative learning among slow and fast learning students in higher education institutions in Nigeria (Onyegegbu, 2006).

Graphics are static visual illustrations or digital motion illustrations, or symbols used by both teachers and lecturers to make learning more comprehensive or vivid to students (Iwu, Ike & Anwuagboke 2015).

Digital graphics are effective digital communication tools for both educators and media personnel (Spector 2009).

Use of hand drawn or digital graphics materials enables students to identify salient points in their learning and ask rewarding questions (Kearsely, 2002). Graphic materials are veritable tools that offer effective medium of instruction to students in this modern age (Mayer, 2003).

Today, some lecturers have refused to acclimatize themselves with the use of digital graphic software's because they are techno phobia. In the same vein, inadequate internet broad band and hand on learning ICT assistants have retarded effective learning with the use of digitalized graphic software's among students.

Recommendations

1. Use of graphics and digital graphics are inadequately used by some lecturers during delivery of instructional contents. Public universities lecturers should incorporate the use of graphics and digital graphic materials during delivery of learning contents to students. This would enable students develop understanding on the learning contents they are taught with.
2. Some lecturers that are techno phobia do not know how to use digital graphics to draw hence, effective learning is jeopardized. Lecturers should embrace the use of ICT facilities and as well, develop ability to draw even without ICT facilities on the board. This would enable students get perceptions to what they are taught in the lecture hall.
3. Nigerian government should equip public universities with adequate ICT facilities. This would enable lecturers and students develop more skills on use of ICT facilities in public universities in Nigeria.

Conclusions

Graphics and digital graphics are pivotal to student's mastery of instructions delivered to them by lecturers. Evidence abound that students understands more effectively when vagaries of learning contents offered to them are shortened or reduced into charts, diagrams, formats among others. Evidence also, abound that during examinations, some students prefer use of diagrams or charts to explain some concepts they are examined with, therefore, some students find it difficult or cumbersome to use long writings to express examinations questions.

During classroom teaching and learning panoramas, majority of students prefer use of diagrams, charts as easy and fast means of note making. Students can confidently recall what they are taught in the classroom or lecture hall with use of diagram, charts, formats than being engaged into long riggours of note making. Some lecturers do not make use of diagrams, charts, formats, maps, to deliver learning contents in the lecture hall due lack of drawing and digital skills. Some lecturers are of the opinion that use of diagrams, chats, formats waste them time in delivery of learning contents. Inadequate knowledge of graphic and digital graphic skills have caused perceptual deficit to students in this 21st century educational system.

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