

CHAPTER 6

PROBLEMS AND PROSPECTS OF COMPUTER SCIENCE EDUCATION

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Learning Outcomes:

After reading this chapter, you should be able to:

- i. explain the concept of computer education;
- ii. highlight the prospects of computer education;
- iii. enumerate some of the problems facing the implementation of computer education and;
- iv. discuss solutions to the problems facing the implementation of computer education;

Concept of Computer Education

The goal of Information and Communication Technology (ICT) in education is to familiarize students with the use and operations of computers. ICT has also allowed learning through multiple intelligence, thus it has introduced learning through simulation games; this enables active learning with all senses. Therefore, ICT in education can be categorized in the following ways; ICT as a subject - i.e., computer studies; ICT as a tool to support traditional subjects - i.e, computer-based learning, presentation, research, and ICT as an administrative tool - i.e., education management information systems/EMIS (Saha & Upadhyay, 2015).

Ogunlade, Ogunlade, Owolabi and Amosa (2014) reported that ICT enhances students' educational, social and cultural experiences and enrich learners' horizon of knowledge. It was also submitted that ICT has a vital role to play in facilitating the learners' understanding and to disseminate complex information in the process of teaching. Thus, ICTs are all forms of computer-based tools to record, store, preserve, transmit or retrieve information for the purpose of teaching and learning. Therefore, schools need sufficiently equipped laboratory with computer desktops or laptops which can be used to implement computer education in institutions.

The need to have a standardized and harmonized development of ICT in education informed the development of the National Policy on ICT in Education in 2010. The policy defines a broad vision for ICT integration encompassing engaging, empowering, enriching and enabling ICT-furthered education (FME, 2010).

The policy objectives of ICT in Education are:

- To facilitate the teaching and learning processes.
- To promote problem-solving, critical thinking and innovative skills.
- To promote life-long learning.
- To enhance the various teaching/learning strategies required to meet the needs of the population.
- To foster research and development.
- To support effective and efficient education administration.
- To enhance universal access to information.

- To widen access to education and the range of instructional options and opportunities for any-where, any-time, any-place and any-path learning.

In order to implement ICT in Education agenda the policy thrust is to:

- Encourage the development of ICT manpower required for ICT-furthered education,
- Establish ICT infrastructure platform for Education and
- Encourage development of a national Education and research infrastructures,
- Ensure and encourage ICT Research and Development (R&D)
- Provide appropriate legal, regulatory and security frameworks to ensure ICT-furthered Education

Computer education is the process of learning or teaching about computers. It has become an indispensable tool in our society. Computer can be integrated into the teaching-learning process at all levels of education and for all categories of learners. Computer education caters for learning experiences where learning is based on the utilization of computers for instructions. Computer based instruction is an interactive and individualized learning strategy which allows students to work at their own pace individually or in group with immediate feedback. Computer creates learning communities of education and learners who use computers to enhance education within and beyond Nigeria, and contribute to the transformation of the education system into one which participates in and benefits from the knowledge society (Jibril, 2006).

According to the National Policy on Education (FRN, 2013) computer science is classified as one of the pre-vocational subject. It was stipulated that all pre-vocational subjects are taught alongside the basic subjects such as English language, mathematics, among others. It was recommended that prevocational subjects should not be made elective in order to achieve effective teaching and learning. Therefore, if the aim of pre-vocational subjects is to be achieved, there is need for effective teaching and learning of computer studies. For an enhanced teaching and learning of computer science, the method of teaching should not be theoretical alone but also practical-based. Teaching theoretical aspect of computer science and no practical sessions will not aid quick understanding of the subject that is being taught. However, students lack interest in computer science because they don't have hands-on opportunity.

Prospects of Computer Education

The utilization of computer in a computer education is beyond a tool used only in the classroom. Integration of computer in teaching-learning process provides motivation and enthusiasm to achieve various skills irrespective of areas of specialization. Computer being brought into the system is an innovative technology which has come to improve the traditional methods involved in the teaching and learning processes. Therefore, there is the need for proper integration of computer in instructional delivery for purposeful learning to take place.

Computer education has been incorporated in all teachers training programme. Therefore, all lecturers have access to possess adequate knowledge of computer utilization for instruction to harness the advantages of educational

delivery. Computer education gives enlightenment to more information faster and in an efficient manner. Teachers have to be familiar with the type of technology that will allow students to be connected more than ever before. The manners through which computer education students relate, interact and share learning experience in their daily learning endeavours cannot be underestimated. Computers can be used as tools to connect learners to an advance level of thinking and provide a productive learning environment to assist the learners actively build up their own knowledge and improve their understanding. Students' engagement in the utilization of computer prepares and assists to be computer literates and competent for future success in their places of work.

Problems Militating against the Implementation of Computer Education

There are problems militating against the implementation of computer education, which has made the exercise to be less productive. These problems arise from; inadequate supply of computer laboratory, insufficient computers in the laboratory, inadequate supply of information and communication technology facilities, inexperienced computer science teachers, parents' attitude towards computer studies, lack of adequate motivation among the instructors, among others.

Lack of Computer Laboratory/Insufficient Computers in the Laboratory

Most public institutions cannot boast of adequate and functional computer laboratory, of which the computer would go round the students even when the lecturers may be ready to teach the students. There are some cases where computer laboratories are built but no sufficient technical equipment to furnish the laboratory. This has definitely led to frustration among the computer educators. With insufficient computers in the laboratory, it is difficult for a class of twenty students to use just one/two computers. Not all students can comprehend or understand what the teacher is demonstrating without laying their hands on the computer. Thus, computer resources and related instructional aids should be made available for effective teaching of subjects in schools.

Inadequate Supply of Information and Communication Technology Facilities

ICT facilities such as internet connected laptops, CD-ROM Data base, institutional cyber cafe, multimedia classroom, digital library, institutional website, departmental website, computer networking, among others are very vital instruments in the utilization computer. However, federal and state governments have not addressed this critical issue of writing examinations on the basis of students' population.

Inexperienced computer science teachers

A computer science educator who is not well trained or competent in the field of computer science will not be able to teach computer science in education perfectly. If the teachers are not experienced in the field of computer science education, suitable application of computer practical will be very difficult in schools. However, inexperienced computer science teachers taking the subject may not have adequate knowledge of the subject. Hence, training of computer education teachers is highly required.

Parents' Attitude towards Computer Studies

Parents and educators who deplore the passion with computers in schools observe computers as eroding children's basic skills and knowledge, since they only perceive computers being utilized as copy-and-paste. However, computers have more prospective beyond that. Moreover, the factual benefits of a computer may not be accomplished until the users can apply it not only as a **presentation tool** and as a **productivity tool**, but also as a **cognitive tool** (Yusuf & Onasanya, 2004).

Lack of Adequate Motivation among the Instructors

Computer instructors are subjected to deplorable working conditions. They are barely found in equipped offices; instead they are found in large staff rooms, a time with students in the laboratory.

Position of Computer education in the Education Curriculum

Selected subjects like English language and mathematics amongst few other subjects are made compulsory for students to be offered in secondary schools and to be examined in secondary school certificate examination but computer science is presently not included. Since computer education is currently not included, stakeholders in education do not see the significance of encouraging computer education at tertiary institutions.

Erratic Power Supply

Functionality of computer education relies upon the electricity but in most public institutions, epileptic power supply in Nigeria create problem for its integration. Hence, computer facilities cannot be used for instruction whenever there is power failure.

Remedies to the Problems Facing the Implementation of Computer Education

In spite of the challenges facing computer science education in Nigerian institutions, there are expectations in its implementation. Therefore, to ensure the future of computer science education, the following measures are suggested for enhancing and advancing the implementation of the programme:

- i. Computer equipment/facilities are largely capital intensive, thus all stakeholders in education must be enlightened in the need for computer education so that they can donate generously to finance the installation of systems in all institutions.
- ii. If computer science education will be elevated to acceptable level, computer lecturers and instructors should be highly motivated for purpose of getting them to have satisfaction from their job.
- iii. The federal and state government should make frantic efforts to provide functional computer laboratory not only for the examinations but cater for teaching and learning of computer science education.
- iv. Governments and the school authorities should release funds for the procurement of ICT facilities for lecturers and students for better implementation.

- v. Only qualified and experienced computer scientists should be allowed to teach computer study courses.
- vi. Needed classroom facilities should be provided for effective teaching and learning of computer study courses.
- vii. Computer scientist educators should be encouraged to proceed on in-service training on innovative issues and development in computer study courses.
- viii. The government should procure standby generators to tackle the problem of epileptic or erratic power supply in order to support the full integration of computer education in institutions.
- ix. Web based instruction should be encouraged with the provision of functional internet connectivity in schools.
- x. There should be internet connectivity in every location in the school.

Revision Questions

1. Explain the term "computer education"
2. Explain the prospects of computer education in Nigeria
3. What are the limitations to the implementation of computer education curriculum?
4. Briefly discuss the remedies to the problems facing the implementation of computer education in Nigeria.

References

- Federal Ministry of Education (2010). National Policy on Information and Communication Technologies (ICT) in Education, Abuja, MFE
- Federal Republic of Nigeria (FRN, 2013). *National Policy on Education*. Lagos: Nigerian Educational Research and Development Council Press.
- Jibril, M, (2006), Information and Communication Technology in the service of education. A paper delivered at the 2006 annual conference of the Institute of Education, University of Nigeria, Nsukka, Nigeria. 15-18 May, 2006
- Ogunlade, O. O., Ogunlade, A. A., Owolabi, O, O. & Amosa, A. A. (2014). Influence of innovative technology devices on senior secondary school students' attitudes to chemistry in Ilorin, Kwara State: Nigeria. *Journal of Science, Technology, Mathematics and Education (JOSTMED)*, 10(2), 67-72.
- Saha, S. & Upadhyay, S. (2015). Difference between educational technology, instructional technology and information & communication technology. Retrieved from, <http://ict3year.wikispaces.com/>
- Yusuf, M. O. & Onasanya, S. A. (2004). Information and communication technology and teaching in tertiary institutions. In E. A. Ogunsakin (ed.), *Teaching in tertiary institution*. A paper presented at the workshop on teaching for newly recruited university lecturers by the Faculty of Education, University of Ilorin.

Expert Rating and Undergraduate Students Attitude towards Developed Interactive Multimedia Instructional Package on Selected Educational Technology Concepts in Kwara State

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Abstract

Instructional technology which is the use of different techniques and methods of passing instruction had undergone different evolutionary changes overtime. Among recent development is the imploration of interactive multimedia tools, and techniques to enhance instructional delivery to learners. Disparities in learning abilities among learners necessitated the need to develop a complementary individualized instructional multimedia package that could assist learners to concretize knowledge. This study explored design and development of interactive multimedia instructional package (IMIP) on selected concepts in educational technology for undergraduates in Kwara State, Nigeria. Specifically; it was developed to teach selected educational technology concepts in modules, determined experts' rating of IMIP on the selected concepts and, determined students' attitude towards the effectiveness of the package. The study was a design and development research type. Three research instruments were used to elicit responses from participants. A total of 30, 300-level undergraduates and 10 experts selected through purposive sampling technique participated in the study. Reliability test on the instrument using Cronbach's alpha was 0.76. The data collected were analysed using grand mean. The findings revealed among others that: experts rated IMIP high for instructional delivery with grand mean of 3.61 > benchmark mean score of 2.50; while undergraduate students considered it to be highly effective as a learning tool, with grand mean of 3.44. It is therefore recommended that: instructional models should be used to guide the design and development of instructional packages; and students should make use of instructional packages to enhance their learning.

Keywords: Education, Interactive, Multimedia Package, Attitude

Introduction

Education is a life-long activity; it involves impartation, acquisition of knowledge and skills from the teacher to learners, instructor to the tutored, and trainer to trainees. Educational processes has gone beyond the conventional methods, emerging technological tools such as information and communication technology (ICT), social networking sites (SNS) and multimedia are reshaping educational activities.

ICT describes a range of technologies for gathering, storing, retrieving, processing, analysing, and transmitting information. The role of ICT in the 21st century education system has been described as vital to keeping abreast with rapidly changing technologies (Atureta, 2011). This has introduced important changes in the educational system and impact the way we communicate information to learners (Neo & Neo, 2000). Kwasha (2007) opined that, ICT has influenced the quality and quantity of teaching, learning and research in the institutions using it.

Multimedia is a range of technologies that are used for gathering, storing, processing and disseminating information that appeals to various human senses. **Interactive multimedia** normally refer to products and services on digital computer-based systems which respond to the user's actions by presenting content such as text, graphics, animation, video, audio, games, and others.. It is a method of communication in which the output from the media comes from the input of the users. The interactive media lets the user go back with the media, it works with the user's participation. Interactive multimedia in education and training emerged out of the need to share information and knowledge on the research and practices of using multimedia in various educational settings. Students' attitude towards technology based learning is an important factor to be considered in the design and development of such media.

Expert rating is also an important phenomenon in the use of developed instructional resources in the teaching and learning activities. This research therefore, strived to present instructional modules in multi-sensory modes to cater for different learners' preference and motivate them to learn. It explored development of interactive multimedia package to enhance instruction delivery in Nigerian universities and thereby ensure effective increase in learning outcomes as well as providing useful tools for self-study.

Statement of Problem

Multimedia technology adds new dimension to learning experiences because concepts were easier to present and comprehend when the words are complemented with images and animations (Ogunbote & Adesoye, 2006). Despite this advantage, in Nigerian universities, the use of interactive multimedia packages to deliver lectures is not as it is expected to be in this technological dispensation. There is shortage of interactive multimedia instructional facilities for instructional delivery. Furthermore, disparities in learning abilities among learners necessitated the need to develop a complementary individualised instructional multimedia package that could assist undergraduates to concretize knowledge.

These issues prompted the development of interactive multimedia package in selected concepts in educational technology for undergraduates in Nigeria.

Purpose of the Study

The general purpose of the study was to develop a multimedia instructional package for teaching selected educational technology concepts in Universities in Kwara State, Nigeria.

Specifically, the study;

1. designed and developed interactive multimedia instructional package to teach educational technology concepts in modules;
2. determined the experts' rating of the package on the selected educational technology concepts; and
3. determined students' attitude to the effectiveness of the interactive multimedia instructional package.

Research Questions

The following questions were answered in the study;

1. What are the steps involved in design and development of the Interactive Multimedia Instructional Package (IMIP)?
2. What are the experts' ratings of the package on the selected educational technology concepts?
3. What are the students' attitudes towards the effectiveness of IMIP?

Literature Review

Students Attitude towards Interactive Multimedia Instructional Packages

Attitude is the way an individual will feel about an event or object. Attitude is a part of cognitive structure people use to organize, systematize their experiences and behaviors Oladosu, (2011). Guoyuan et al (2009) described attitude as predisposition to respond favorably or unfavorably to an object, person or event. To support this definition, Okoli (2000) expressed attitude as established mental set that a person use to evaluate something favorably or unfavorably. He went further to say that, attitude are inferred from overt behavior both verbal and non-verbal which could be appropriate or inappropriate. In the opinion of Hema (2005), attitude is the mental and neural state of readiness organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects with which it is related. Therefore, this study defined attitude as students attitude towards to effectiveness of the developed interactive multimedia instructional package. Katz (2000) affirmed that, attitudes of students towards the use of ICT are of paramount importance when evaluating effectiveness. Additional research has found

Students with positive attitudes toward computer-based instruction scored significantly better on posttests than students with negative attitudes. This will suggest that the importance of attitude in technology-based instruction cannot be underplayed.

Methodology

This study adopted a research design of design and development type. The production work adapted 'Easy test' internet software and relevant YouTube video clips incorporated into power point slides for the development of the Interactive Multimedia Instructional Package (IMIP), and to develop the concepts in modular instructional format. The target population for this research comprised ten lecturers and experts from relevant disciplines and thirty 300-level undergraduates of educational technology offering computer education course. Purposive sampling was used to select the participants in the study. The instrument for the study comprised four items; Educational Technology Experts' rating form (ERF1), Instructional Design Expert's Rating Form (ERF2), and Computer /Telecommunication Expert's Rating Form (ERF3). Each of them contained two sections. Section A contained demographic record of the respondent while section B elicited their rating response regarding the structure, organisation, screen designs, interactivity, instruction ability and adaptability of the interactive multimedia instructional package (IMIP).

The fourth instrument for the study is a researcher designed questionnaire titled; student attitude towards interactive multimedia instructional package. The instrument comprised of two sections, section A dealt with demographic data of the respondent while section B contained ten items which required the respondents to tick appropriate options using the four likert scale ranging from strongly agree (SA) to strongly disagree (SD). The instrument was validated by two educational technology experts, and one lecturer in other related discipline from University of Ilorin for face and content validity. Following the validation reports, some items were modified to enhance the quality of the research.

In order to determine the reliability of the instrument, the package was administered on ten undergraduates from the department of telecommunication, university of Ilorin, which was not part of the sample. Croubach's alpha was used to test the internal consistency of the instrument at 0.05 level of significance and the result was 0.76, hence, the instrument was found to be consistent and reliable. The data gathered were analysed using mean scores at benchmark of 2.50.

Data analysis and Discussion

Table 1:
Educational Technology Expert's Rating

	Mean
A STRUCTURE	
The package content is relevant to the selected educational technology concepts	3.50
Contents are structured in a clear and understandable manner	3.75
B ORGANISATION	
The Package is well organised	3.50
The materials are well presented	3.50
Navigation through the package is easy	3.50
C SCREEN DESIGN	
Screens are designed in a clear and understandable manner	3.25
The quality of texts, illustrations and graphics is good	3.25
D INSTRUCTIONABILITY	
The multimedia instructional package enhances instruction	3.25
The assessment questions are relevant to the contents	3.50
E ADAPTABILITY	
It allows learner to learn at his/her pace	3.50
The multimedia instructional package motivates learners to learn	3.75
D INTERACTIVITY	
The level of interactivity is satisfactory	4.0
Its immediate feedback enhances learning	3.75
Grand Mean	3.54

The educational technology experts rating of the IMIP in terms of structure, organisation, screen design, instructionability, adaptability and interactivity are; 3.63, 3.50, 3.25, 3.38, 3.63 and 3.88 respectively, each of which was greater than the benchmark of 2.50. The grand mean is 3.54 which is also greater than the benchmark mean of 2.50. The educational experts considered IMIP's contents to be relevant to the contents of selected educational technology concepts, satisfactory in terms of organisation, screen designs, instructionability, adaptability and interactivity.

Table 2:
Instructional Design Expert's Rating

	Mean
A STRUCTURE	
The package content is relevant to the selected educational technology concepts	4.0
Contents are structured in a clear and understandable manner	3.75
B ORGANISATION	
The Package is well organised	3.75
The materials are well presented	3.25
Navigation through the package is easy	3.50
C SCREEN DESIGN	
Screens are designed in a clear and understandable manner	3.50
The quality of texts, illustrations and graphics is good	3.75
D ADAPTABILITY	
It allows learner to learn at his/her pace	3.50
The multimedia instructional package motivates learners to learn	3.50
E INTERACTIVITY	
The level of interactivity is satisfactory	3.0
Its immediate feedback enhances learning	3.50
F INSTRUCTIONABILITY	
The multimedia instructional package enhances instruction	3.75
The assessment questions are relevant to the contents	3.50
Grand Mean	3.56

The mean scores of instructional design experts rating showed that the relevance of IMIP in terms of structure is 3.88. Organisation's mean score is 3.50. Others are; screen design : 3.63, adaptability : 3.50, interactivity : 3.25 and instructionability :3.63, each of which is greater than the benchmark of 2.50. The grand mean is 3.56 which is also greater than the benchmark mean of 2.50. From table two, instructional design experts considered IMIP to be satisfactory in terms of structure, organisation, screen designs, adaptability, interactivity and very suitable for instruction,

Table 3
Computer/Telecommunication Expert's Rating

	Mean
A STRUCTURE	
The package content is relevant to the selected educational technology concepts	3.50
Contents are structured in a clear and understandable manner	4.00
B ORGANISATION	
The Package is well organised	4.00
The materials are well presented	3.50
Navigation through the package is easy	3.50
C SCREEN DESIGN	
Screens are designed in a clear and understandable manner	3.50
The quality of texts, illustrations and graphics is good	4.00
D INTERACTIVITY	
The level of interactivity is satisfactory	4.00
Its immediate feedback enhances learning	3.50
E INSTRUCTIONABILITY	
The multimedia instructional package enhances instruction	4.00
The assessment questions are relevant to the contents	3.50
F ADAPTABILITY	
It allows learner to learn at his/her pace	4.00
The multimedia instructional package motivates learners to learn	3.50
Grand Mean	3.73

One computer and one telecommunication experts did rated IMIP and the mean scores of their ratings is as follows: Structure : 3.75, Organisation : 3.67, Screen Design : 3.75, Interactivity : 3.75, Instructionability :3.75 and Adaptability :3.75. Each of their rating mean score, as well as the grand mean of 3.75 is greater than the benchmark mean of 2.50. From the above, the computer and telecommunication experts considered IMIP to be satisfactory in terms of structure, organisation, screen designs, interactivity, Instructionability and adaptability.

Research Question Three: *What are the students' attitude towards the effectiveness of the Interactive Multimedia Instructional Package (IMIP)?*

Table 4:
Analysis of students' attitude towards the effectiveness of IMIP

	Mean
1. IMIP modular topic contents are relevant to the objectives stated	3.40
2. The modular lectures in the package are easy to understand	3.30
3. Navigating through the package is easy	3.30
4. The modular lectures are relevant to the selected Educational Technology concepts	3.70
5. The assessment questions are appropriate and enhance memory of the acquired knowledge	3.25
6. Getting immediate result and feedback reinforces learning	3.75
7. The multimedia approach of IMIP motivates me to learn	3.45
8. I enjoy using IMIP and prefer taking other courses with it	3.25
9. The Package is adequate for self-paced learning; it enables me to accomplish tasks more quickly	3.60
10. I prefer taking instruction with interactive multimedia instructional package to normal class lecture.	3.45
Grand Mean	3.45

The responses of thirty 300-level educational technology students offering computer education course on attitude towards the effectiveness of the package based on 10 criteria were analysed with each of their attitude towards mean score greater than the benchmark mean of 2.50. 'Getting immediate result and feedback reinforces learning' had the highest mean score of 3.75 while criteria 5 and 8 had the least mean score of 3.25 each. The grand mean of 3.45 is greater than the benchmark mean of 2.50.

Generally they considered the package to be very effective for instructional delivery purpose.

Summary of Major Findings

Based on the analyses and interpretation of the data collected from the respondents in this study, the following summaries were obtained:

1. ADDIE model could guide the design and development of interactive multimedia instructional package for instructional delivery

2. The experts rated the interactive multimedia instructional package(IMIP) high for instructional delivery of selected educational technology concepts in terms of structure, organisation, screen design, instructionability, adaptability and interactivity. Grand mean of 3.53 > benchmark mean score of 2.50; and

3. Undergraduate students considered IMIP to be highly effective as a learning tool, with grand mean of 3.73 > benchmark mean score of 2.50

Conclusions

The study concluded that; ADDIE model is found suitable for the design and development of instructional packages; IMIP is very suitable for instructional delivery of selected educational technology concepts in terms of structure, organisation, screen design, instructionability, adaptability and interactivity; and interactive multimedia instructional package (IMIP) can enhance student learning.

Recommendations

Based on the findings of this study, the following recommendations were made:

1. instructional models should be used to guide the design and development of instructional packages;
2. interactive multimedia instructional package should be adopted as instructional tool for course delivery in universities; and
3. students should make use of instructional packages to enhance their learning.

References

- Atureta, A. (2011). Reviewing the benefits of ICTs in the Nigerian educational system.
- Guoyuan, S., Martin, V., Johan, V.B., & Jo, T. (2009). Factors Supporting or Preventing Teachers from Integrating Information and Communication Technology into Classroom Teaching: A Chinese Perspective. Proceedings of the 17th International Conference on Computers in Education Hong Kong. Asia-Pacific Society for Computers in Education.
- Hema Pant, (2005) "ATTITUDE OF DISTANCE LEARNERS TOWARDS MULTIMEDIA APPROACH TO INSTRUCTION", Asian Association of Open Universities Journal, Vol. 1 Issue: 1, pp.65-72
- Iwanski, G. (2000). Undergraduate student attitude and acceptance of computer enhanced instruction in a college nutrition course. *Stout: University of Wisconsin*.
- Katz, Y. J. (2002). Attitudes affecting college students' preferences for distance learning. *Journal of computer assisted learning*, 18(1), 2-9.
- NEO, M., & NEO, T. (2000). MULTIMEDIA LEARNING: USING MULTIMEDIA AS A PLATFORM FOR INSTRUCTION AND LEARNING IN HIGHER EDUCATION. PAPER PRESENTED AT THE MULTIMEDIA UNIVERSITY INTERNATIONAL SYMPOSIUM ON INFORMATION AND COMMUNICATION TECHNOLOGIES 2000 (M2USIC'2000), OCTOBER 5-6, 2000, PETALING JAYA, MALAYSIA.
- Netfestoon. (2014). <https://netfestoon.wordpress.com/2014/12/10/interactive-media/>. Retrieved May 13, 2016, from <https://netfestoon.wordpress.com>.
- OGUNBOTE, K., & ADESOYE, A. (2006). QUALITY ASSURANCE IN NIGERIAN ACADEMIC LIBRARIES NETWORKED MULTIMEDIASERVICES. *JOURNAL OF LIBRARY AND INFORMATION SCIENCE*, 3(1 & 2). 100-111.
- Okoli, C.O. (2000). Educational and Psychological Measurement. Behenu Press Printer, Shomolu-Lagos.
- Oladosu, K. (2012). Basic technology teachers' awareness and attitude towards the use of information and communication technology for sustainable development in Lagos State Education Districts: I, IV and VI. *Journal of Education and Practice*, 3(13).46-50.
- Turcsányi-Szabó, M. (2013). <http://matchsz.inf.elte.hu/IntMedia/index.html>. Retrieved May 2016, 13, from <http://matchsz.inf.elte.hu>.

CHAPTER 9

INSTRUCTIONAL MATERIALS SELECTION AND UTILIZATION

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1.0 Learning Outcomes

At the end of this chapter, you should be able to:

- i. Define instructional materials
- ii. Classify instructional materials
- iii. List the various elements of the ASSURE model
- iv. Explain the elements of the ASSURE model

2.0 Introduction

The aims of schooling are to educate for meaning and understanding. The primary purpose of schooling is to define who we want to be and an understanding of the things we need to do to be who we want to be. It transcends into how students develop cognitively, psychomotor and affective. Central to these aims and students developments are the teachers, saddled with the responsibility to assist students through the process of teaching. Teaching can be viewed from two broad perspectives: as an act and also an art.

Teaching as an act can be expressed as the presence of a teacher in the classroom who delivers the instruction and leaves. Teaching as an art are the creative means or ways a teacher employs to make the teaching-learning process interesting, captivating and above all assist students' understanding, retention and retrieval. The creative art of teaching is a tasking process beginning from the identification learners, assessment and evaluation of the teaching-learning process. Qualitative teaching will start from instructional objectives and instructional materials that will be used to reinforce the achievement of the stated objectives. Instructional materials are those things such as but not limited to charts, realia, mock-ups, globe, field trip, animations, video, audio, pictures that a teacher employ to make teaching easy and to reinforce learning.

3.0 The Concept of Instructional Materials

Instructional materials are used to provide required environment to improve student knowledge, abilities and skills, monitor assimilation of information and to contribute to their overall development and upbringing. Instructional materials play important roles in making the instructional process interesting, captivating, aid understanding, retention and retrieval. Instructional materials can be defined as those items such as books and other printed materials, video and audio recordings, computer software and digital content which are used as part of the instructional process, Timothy, Donald, James and James (2006).

It can also be viewed as the object or device that conveys the essential information and skills required of the subject matter through a medium or combination of media for effective teaching and learning of the curriculum content.

The success of any instructional experience depends on the type of instructional material used. Instructional materials are those items a teacher introduces to the learner during classroom interaction to influence learning. Instructional materials are used to boost students' comprehension and understanding of the concept taught and it is an integral component of instructional plan. The design and utilization of instructional materials is important because, it is the interaction of students with these materials that generates and reinforces actual learning. Instructional materials can be used as a compliment or supplement to instruction. As a compliment is to boost intended learning and as a supplement is to take the place of the teacher. For an effective learning experience, instructional materials, media and methods work together in a selected and coordinated manner.

The use of instructional materials influence the way we learn in these percentages; 10% of

- 10% what is read
- 20% of what is heard
- 30% of what is seen
- 50% of what is seen and heard
- 70% of what is seen and talked about
- 90% of what is talked about and done (Dike, 2002)

In retrospect, learners in the traditional teacher-centered classroom will learn about 20%, with the use of instructional material learning should increase to about 70% - 90%. This will arise as a result of other senses activation, attention, and motivation. It also prompts discussion between the teacher-learner and learner-learner.

Instructional materials are tools that are used to explain the curriculum content, therefore, it must be properly designed and developed and should address the total needs of the students; cognitive, physical and aesthetic developments. The use of instructional materials contain fixed information which last for a period time due to changes in curriculum, education policy, new information and understandings. It is expected at such instances that, the instructional material will be upgraded and updated to suit the immediate learning needs.

Selection and Utilization of Instructional Material

Ordinarily, to select means to choose from a variety of options. The choice of the car an individual buys is based on certain factors; financial capacity, fuel consumption, spares parts, durability. This kind of thoughtful process is also employed in the teaching-learning process. A teacher will consider his learners, lesson objectives, the kind of instructional methods to employ, materials to facilitate learning. Thus, selection of instructional material is the systematic process of designing, developing and or adapting and adopting an instructional material for the purpose of facilitating effective teaching-learning process. The selection and adoption of instructional material is a complex process because of the class of stakeholders involved. The teacher to use the instructional material, the students for whom the material is produced, the environment where the material will be used and the instructional material itself are germane issues to be considered. The teacher has to consider his competency during the selection, design, production and utilization stages of the instructional material. It is equally important to consider the environment where the instructional material will be used in terms of electricity, technicians needed, back-up materials required. The students for whom the instructional is produced are also important. They have to be considered along their ethno-religious believes, age, socio-economic background. In order to assist teachers in selecting appropriate instructional materials for

teaching, there are conceptual models that can be employed. Conceptual models are made of human constructs or concepts used to help people know, identify and understand connections that exist between systems and processes. Conceptual models provides insight into how things can be done in a more efficient and effective manner to achieve the desired results. Amongst other models employed for instructional material selection is the Heinich, Rusell and Smaldino ASSURE model, Tony Bates SECTION'S model, Dick and Carey model. The Heinich, Rusell and Smaldino ASSURE model will be discussed.

The ASSURE Model

This unit of study shall employ the ASSURE model as proposed by Heinich, Rusell and Smaldino (1999). This model gives a roadmap of what to do in the process of selection and utilization of instructional material. The ASSURE model is an instructional guide for planning and conducting lessons that aim to integrate media and technology into the instructional process and also focus on the learners need. This model is based on six classroom procedure:

- Analyze Learners
- State Objectives
- Select Media and Materials
- Utilize Materials
- Required Learners Response
- Evaluate and Revise

Analyze Learners

This focuses on the general characteristics of the learners with respect to their age, grade level, physical needs, economic status, knowledge and skills. Also considered are the contents of the syllabus, the activities that are required of the learning experiences and materials and resources are available.

State Objectives

That is what the learners should be able to do or perform at the end of the lesson. Behavioral objectives contain:

- I. Identification of learners.
- II. Behavior to be demonstrated; should the learners demonstrate a concept, draw an image or define a concept
- III. Conditions under which the behavior will be observed
- IV. Degree to which the learned skills are to be mastered

Select Methods, Media and Materials

Once the characteristics of the audience has been determined and instructional objectives stated, the next step is to determine the best instructional methods, media and materials to foster learning. An instructional process can incorporate two or more teaching methods before the learning objectives can be achieved. The selection process has the following steps to be followed:

- I. Decide on the appropriate instructional methods for the stated objectives
- II. Choose media format that is suitable for the method
- III. Select, modify or design specific materials within the media format selected

Things to consider when Selecting Media and Materials include

- I. Available resources
- II. What combination media are available
- III. Time and budget allocation
- IV. Classroom size
- V. Technical expertise
- VI. Determine the currency and accuracy of information in the case of modifying an existing media
- VII. Determine its motivational level. Does the material selected have enough captivative captions to motivate the learners to learn?

Utilize Material Decision has been made about the methods and combination of media to use. The next step is to utilize the material. This is the classroom presentation of instruction using the instructional material that has been selected.

Guidelines for utilization instructional materials include

- I. Preview materials. This step should be taken to ensure the accuracy and appropriateness of the material. This is done to erase technical difficulties that could arise
- II. Prepare materials: gather up all the media and support materials, practice using the media and determine the sequencing of the instruction
- III. Prepare the environment: this is the movement of material and people to aid utilization. This includes the setting-up of facilities where the instruction will take place, rearranging classroom seating, and lighting.
- IV. Present the Instruction

Require Learners' Response and Participation

Students learn best when they are actively involved in the learning experience. Incorporate questions and answers, discussion, group work, class work and other activities to engage the students in the instructional process. This helps to clarify areas and concepts that are not well understood.

Evaluate and Revise

After instruction, evaluation is of paramount importance. Evaluate the entire instructional process starting from the stated objectives, instructional strategies employed, media and materials used to aid instruction. Determine whether these elements of the instruction were effective or need for modification. Also evaluate the learners to detect and correct learning problems and difficulties that may interfere with the accomplishment of the lesson objectives.

Classification of Instructional Materials

This is the breakdown of instructional materials into varying categories as they appeal to the learning sensory; auditory, visual and audio-visual.

Audio instructional materials; they are learning materials that appeals only to our hearing senses. It has no direct or indirect relationship with the other senses. Audiotapes, telephones and instructional radio are audio materials.

Visual instructional materials; these are materials that only appeal to our eyes. This includes pictures, charts, and globes.

Audio-visual materials; they are instructional material that appeal to both hearing and visual senses. It presents a simultaneous learning experience, Akinpelu (2011)

Types of Instructional Materials

1. Non-projected visuals
 - a. Still pictures
 - b. Graphics
 - c. Models and realia
 - d. Charts
 - e. Cartoons
 - f. Maps and globes
2. Projected visuals
 - a. Projected still pictures
 - b. Motion pictures
 - c. Translucent materials
 - d. Opaque materials
 - e. Film projector

There are different types of visual projectors at the level of classification. There is the Overhead projector (OHP) for projecting materials that will allow light to pass through. Closely related to the OHP is the slide projector which uses transparencies cut into specific sizes. There is also the Opaque projector; it is used to project pictures and materials that will not allow light to pass through it.

3. Print media
 - a. Textbooks
 - b. Newspapers
 - c. Journals
 - d. Bulletins
 - e. Handbill

Summary of Chapter

Instructional materials can be viewed as the object or device that conveys the essential information and skills required of the subject matter through a medium or combination of media for effective teaching and learning of the curriculum content.

Selection of instructional material is the systematic process of designing, developing and or adapting and adopting an instructional material for the purpose of facilitating effective teaching-learning process. The ASSURE model is an instructional guide for planning and conducting lessons that aim to integrate media and technology into the instructional process and also focus on the learners need. The acronym ASSURE stands for; Analyze Learners, State Objectives, Select Media and Materials, Required Learners Response, Evaluate and Revise. Classification of instructional materials is the breakdown of instructional materials into varying categories as they appeal to the learning sensory; auditory, visual and audio-visual.

Revision Questions

- I. In your own words, define instructional materials.
- II. How can you define instructional material selection?
- III. Describe the relevance of ASSURE model to the preparation of instructional materials

REFERENCES

- Akinpelu, B. (2011). *Educational media evaluation. A systematic approach*. Lagos: ATLASS Standard Publishers
- Carroll County Public School (2012). *Selection, evaluation and adoption of instructional materials*. Retrieved on 9th May, 2014, from <http://www.carrollk12.org/Assets/file/LibraryMedia/Selection%20Document.pdf>
- Dike, H. I. (2002). Introduction to educational technology In J.M. Kosemani, (Eds.), *Introduction to education* (pp. 109 -). Port Harcourt: University of Port Harcourt Press.
- Hala, H. A. (2014). *The ASSURE model lesson plan*. Retrieved on 12th May, 2014, from www.edu.uofk.edu/multisite/uofk_edu/images/News/ASSURE.pdf
- Ibe-Bassey, G. (1988). *Instructional system. Fundamentals of educational technology*. Town and publisher
- Megaw, A. E. (nd). *Deconstructing the Heinich, Molenda, Russell and Smaldino instructional design model*. Retrieved on 12th May, 2014, from www.Ipislam.edu.my/kplir/Bacann/ASSURE/idm-angela.pdf
- Petrina, S. (nd). *Instructional methods and learning styles*. Retrieved on 12th May, 2014, from www.uwplatt.edu/.../chapter%204.pdf
- Thomas, K. (2005). *What is a model*. Retrieved on 12th May, 2014, from <http://drops.dagstuhl.de/opus/volltexte/2005/23>
- Timothy, J. N., Donald, A. S., James, D. L. & James, R.D. (2006). *Educational technology for teaching and learning*. Upper Saddle River, New Jersey: Pearson Education, Inc.
- Heinich, R., Molenda, M., Russell, J. D., & Smaldino, S. E. (1999). *Instructional media and technologies for learning*. Upper Saddle River, NJ: Prentice-Hall