INSTRUCTIONAL MATERIALS FOR TEACHING AND LEARNING OF DATA PROCESSING IN SELECTED SECONDARY SCHOOLS IN OYO STATE

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Abstract

The effect of instructional materials for teaching and learning of data processing in selected secondary schools in Oyo State was examined. The study investigated National Examination Council (NECO) results and West African Examination Council (WAEC) results of 2020/2023 of candidates that sit for data processing at Senior Secondary School Examination (SSCE) level which recorded some form of undesirable results. Be that as it may, data processing is seen as an important subject that to prepare students for further engagement in national development and social engineering. Thus, the marginal average in the 2020-23 NECO and WAEC needs to be examined with a view of understanding the circumstances that led to the outcome. Therefore, this study is an attempt to attempt to ascertain the possible causes of the failure and proffer solutions to tackle the undesirable outcome and enhance the teaching and learning of data processing. Research design used for the study is ex-post fact design because already enlisted data was used (students' results in WAEC and NECO). Sample for the study comprised all students that registered for data processing in selected five (5) sampled schools for the study using purposive sampling techniques in all two hundred and forty five (245) students participated in the study. Two instruments were used in the data collection; validated questionnaire on the causes of poor performance of students in data processing using cronbach alpha (instrument's reliability yielded a coefficient of 0.78 Cronbach alpha) and profoma for 2020 to 2023 WAEC and NECO results. Simple percentage was used in data analyses. Based on the results, it was recommended that using instructional material for students would enhance better performance in the data processing as a subject.

Introduction

Looking at the whole world today data processing system machine has become a useful "tool in different sectors of the economy. In fact, there is no discipline presently where data processing system is not being used for one operation or the other. Data processing system is being used in the airports to control flight. It is being used in the hospital to diagnose, treat and manage diseases. In the field of communication – networking and internet connectivity has turn the while world into a global village. Marketing Robot is being developed to take care of sales in big marketing organizations. Data processing system has become so useful and popular to the extent that all countries are training and developing her citizens to be at least data processing system literate.

Meanwhile, government in Nigeria in her educational system has introduced data processing system science as a subject in all schools including nursery, primary, secondary and tertiary institutions. But despite all the government efforts the performance of students in Senior Secondary School Examination in Data processing system Science is nothing to write home about (Alimi et al., 2020; Ogunsola et al., 2021). This research work is to find out the possible effects of using instructional material to teach

this important subject at Senior secondary school level. Data were collected from 5 different schools - the analysis was carried out with student t-test. It was therefore established that the use of instructional materials has positive effect on teaching and learning of Data processing system Science at Senior Secondary School level.

Statement of the Research Problem

Data processing system as a machine has become a very useful tool virtually in all disciplines. Teaching and learning of Data processing system Science as a subject in schools should therefore be taken seriously. The recent results released by NECO and WAEC for Senior Secondary Schools in Oyo town in respect of the Data Processing System Science as a subject seem to be on the marginal average. Thus, the aim of this paper is to ascertain the perceived cause(s) of the average outcome.

The Concept of Education

According (Bukola Anike, 2019), education is any act or experience that has a formative effect on the mind, character or physical ability of an individual. (Quinn et al., 2019) says that in its technical sense, education is the process by which society deliberately transmits its accumulated knowledge, skills and values from one generation to another. From Wikipedia, the true encyclopedia, etymologically, the word education is derived from Educare (Latin) "bring up" which is related to Educere "bring out", bring forth what is within, "bring out potential" and encere "to lead".(Aspin & Chapman, 2007) states three important parts that make education to include: "the extension to foster learning, a concern with environment and certain values". Education is about future orientation, it is about development and growth even when we are studying the past (Kolb et al., 2014).

There are basically 2-types of education. These are formal and informal education. In formal education, teachers in educational institutions direct the education of the students and might draw on many subjects, including reading, writing, mathematics, science and history. According to (Education & 2010, 1011), formal education, informal education do not involve schooling but acquired without going to school from museums, libraries, internet, life experience, etc.

Education System in Nigeria

Basically there are 3 levels of education in Nigeria. These are: Nursery and Primary, Secondary and Tertiary. Nigeria adopts the 6-3-3-4 system of education. Under this system of education, the student is expected to spend 6 years in primary school, 3 years in Senior Secondary School, 3 years in Senior Secondary School and 4 years in the University. Primary education consists of six or eight years of schooling starting at the age of five or six. Although, this varies from one country to but in Nigeria, some students start from pre-primary school (nursery - 3 -4 years) where they spend the first 2 years before proceeding to primary school and spend a period of 6 years. Also, some students start directly from the primary school (5 to 7 years) and spend six years. According to(Akinwumi, 2002), about 89% of children enrolled in primary education and this proportion seems to be on the increase. Under the education for all programs driven by UNESCO, most countries have committed to achieving universal enrollment in primary education by 2015, and in many countries, it is compulsory for children to receive primary education. In view of this, The Federal Government of Nigeria makes it compulsory for children within the age bracket to register for primary education under Universal Basic Education (UBE).

In most contemporary educational system of the world, secondary education means formal education that occurs at adolescence. It is characterized by transition from the typically compulsory, comprehensive primary education for minors, to the optional, selective tertiary, "post-secondary", or "higher education e.g. University. The Nigeria secondary school education is divided into junior senior and senior secondary. After the successful completion of primary school program, students are admitted into Senior Secondary school were they are to

spend another three years. Successful students at the JSS level proceed to SSS to complete their secondary school education.

Furthermore, higher education is also called tertiary, the third stage or post-secondary education. Students gain admission into a tertiary institution after successful completion of the secondary school education. Colleges, Polytechnics, Mono-technics and Universities are some of the tertiary institutions in Nigeria. It is important to note that higher education awards certificates such as the Nigeria Certificate of Education (NCE), National Diploma(ND), Higher National Diploma (HND) and Degrees.

Teaching

Teachers need to understand a subject enough to covey its essence to students while traditionally this has involved teaching lecturing on the part of the teacher, new instructional strategies put the teacher more into the role of course designer, discussion facilitator, and coach and the student more into the role of active learner, discovering the subject of the course. In any case, the goal is to establish a second knowledge base and skill set on which students will be able to build as they are exposed to different life experiences. (Chen et al., 2012) explain that a good teacher can translate information, good judgment, experience and wisdom into relevant knowledge that a student can understand, retain and pass to others.

Instructional Materials

Instructional materials refer to those alternative channels of communication, which a classroom teacher can use to concretize a concept during teaching and learning process.(Amadioha W, 2019) Traditionally, classroom teachers have relied heavily on the 'talk-chalk' method during their teaching. But recently, instructional materials help to provide variations in the ways in which messages are sent across. In using instructional materials teachers and students do not only extend the range of sense organs we use but also extend the range of materials used for convening the same message through the same *organ*. For

instance, in teaching a topic a teacher can manipulate real objects or use their stimulators. Instructional materials therefore constitute the media of exchange through which a message transaction is facilitated between a source and a receiver. In addition to extending the range of materials that can be used to convey the same instructional message to learners instructional materials also facilitate the 'process' nature of communication. In this passage, the process nature of communication implies that both the source and the receiver of a message are actively involved in a communication encounter. As cited by (Hırça et al., 2012), instructional materials are items that are designed to serve as major tool for assisting in the passing of instruction in a subject or course. These items may be available in bound, unbound, kit or package form and may consist of hard backed or soft backed textbooks, consumables, learning laboratories, slides, films and filmstrips, recordings, manipulative, electronics media (instructional data processing system programming), on-line services, laser discs, CD. ROM, etc and other commonly accepted instructional tools.

Types of Instructional Materials

The first type of instructional materials includes Graphic materials: This represent these charts, graphic, posters and diagrams, cartoons, comics, maps and globes which we draw on a cardboard paper or on a piece of cloth and present to learners in a visualize manner. Graphic materials belong to two- dimensional material and proportional relationships that may exist among variables in a phenomenon. Graphic materials are used to compress information, to focus and captivate attention, to vary stimuli presented and as an aid to recall. Graphic materials when properly produced can help in attaining all processes in the information processing model of learning as well as serve as avenue for applying principles from other learning theories.

Another type of instructional material is the representation of actual objects and phenomena including audio-visual materials: This is a class name for tape recordings and

discs. A disc or record as it is popularly called here is a round and flat acetate containing grooves, which produces sound vibrations through the action of a needled. Discs usually come in different sizes and play at different speeds. The clarity of sound production from *a* disc rests on the quality of needle, the speed and state of the grooves. Obviously, in oversea countries records exist for almost all subjects. People in music department appreciate the importance of records in their studies. Special effects such as the sound of thunder the cry of owl at night, the noise produced in a factory during work can all be recorded in disc and synchronized with other events to create special effects during production. To use a record, a teacher has to specify his objectives thoroughly. Hence, students can listen to a record as a group or individually. Another group of instructional materials is that written description which includes scientific scholarly reference, methodology of problems and exercises, books, manual for training, etc.

The Concept of Data Processing

The Data Processing System is a technological innovation under the control of stored programme that can perform some of the intellectual roles of man even beyond human capability. It is a power-driven machine equipped with keyboards, electronic circuits, storage compartments, and recording devices for the high speed performance of mathematical operations. A Data Processing System is an electronic machine that takes input from the user, processes the given input and generates output in the form of useful information. A data processing system accepts input in different forms such as data, programs and user reply. Data refer to the raw details that need to be processed to generate some useful information. Programs refer to the set of instructions that can be executed by the data processing system in sequential or non-sequential manner. User reply is the input provided by the user in response to a question asked by the data processing system. The main task of a data processing system is to process the given input of any type in an efficient manner. Therefore, data processing system is also known by various other names such as data processing unit, data processor and data processing system (Balagurusamy & Misra, 2014). Basically, data processing system performs three major operations which include: accepting data, process data and produced information

Relevance of Data processing System in National Development

The world is now going data processing system. There is virtually no branch of the economy where data processing system is not being used as a "tool" in one form or the other. Talking about data processing system, it has brought a lot of development to the whole world to the extent that some will say "without data processing system", the world will seize to exist. Data processing education is the effort or the ability to make the generality of the people computer literate. Computer literacy means ability to tell the data processing system what you want it to do and understand what the computer says. To be computer literate amounts to be able to read, write and speak the language of the computer (Ajibade, 2006).

Data processing education encapsulates computer literacy, Computer Assisted Instruction (CAI), and Computer Appreciation. Among the terms used to describe computer in a learning environment are Computer-Based Education (CBE), Computer Managed Instruction (CMI), Computer Supported Learning (CSL), Computer Assisted Learning (CAL), Computerized Instruction (CI), Computer Assisted Teacher (CAI) and the like. In addition, the need for computer education in Nigerian secondary schools lies in the potentials of computer instructional purposes and its utility value. Data processing system is a tireless, relentless, evaluating teacher which has several modes of instruction at its disposal such as sound, sight and tough. As referenced by Albarkati, A. M. (2016) in Language, a data processing system can present words to be spelled, sound to be made, instructions to be followed, images and symbols to be responded to by touching. Data processing system can be used to evaluate student's performance and direct student backward, forward and sideways for

appropriate learning activities. Its patience, memory and endless capacity for details are assets that defy competition from ordinary teacher. The data processing system can present diagnostic test, provide branched progrmames to accommodate individual needs, and furnish prescriptive assignments that might refer the student to a textbook, a laboratory experiment or a consultation with the instructor. (Abdulkareem & Lennon, 2023) assets that the data processing system is diligent and consistent in its mode of operation, as it does not suffer from tiredness or lack of concentration like human beings. Computer performs multi-functional roles in teaching and learning processes at all levels. At the primary and secondary levels of education students can explore and generate learning through computer programme. At the tertiary level, computer can be used to store the daily or weekly observation of experiments in science. It can be used to mix colour, separate colours, scan and make drawings. It can also be used to design various objects, create charts and graphs for instructional purposes (Ajibade, 2006).

Data processing system helps students to learn at their own pace. It produces significant time saving over conventional classroom instruction. It allows students' the opportunity to control learning. It gives appropriate feedback. It promotes individualized instruction through personalized responses to learner's action to yield a high rate of reinforcement. It provides a more positive affective climate especially for slower learners. It provides appropriate record-keeping and thereby monitors students' progress. It puts more information in the hands of teachers. Novelty of working with a computer raised students' motivation. Furthermore, it provides reliable instruction from learner to learner regardless of the teacher/learner at any time of the day and location. It directs instruction to learners. It provides instruction at comparable expenses to other media.

Methodology

Research design used for the study is ex-post fact design because already enlisted data was used (students' results in

WAEC and NECO). Sample for the study comprised all students that registered for data processing in selected five (5) sampled schools for the study using purposive sampling techniques in all two hundred and forty five (245) students participated in the study. Two instruments were used in the data collection: validated questionnaire on the causes of poor performance of students in data processing using cronbach alpha (r= 0.78) and profoma for 2020 to 2023 WAEC and NECO results. Simple percentage was used in data analyses.

Table 1: Performance of selected schools in data Processing system science in 2022/23 WAEC/NECO

s/n	Schools	Grades				Total Number of Students
		A	B	C	F	
1.	Olivet Baptist High School	0	3	41	5	49
2.	Ladigbolu Grammar School	2	4	41	3	50
3.	St. Bernard Girl School	0	2	44	4	50
4.	Awe High School	0	4	38	7	49
5.	Fiditi Grammar School	1	4	32	10	47
	Total					245

Source: Field Survey, 2023

Table 1 shows the performance of selected secondary schools in data processing during the 2022/2023 WAEC/NECO Examinations. Five secondary schools in Oyo town were selected for the study. All the schools had students with the range of 38-41 scoring "c" in data processing. It could be inferred that performance is on the average. This could also mean that with a boost in teaching and other factors, performance could increase relatively.

Table 2: Causes of poor performance in data processing in 2022/23 WAEC/NECO

S/no	Features	Degree of Agreement				Total (%)	Mean	St. Deviation
		Strongly Agree (%)	Agree (%)	Disagree (%)	Strongly Disagree (%)			
1	Inappropriate instructional material used in teaching students	105 42.7	72 29.3	33 13.4	35 14.2	245 (100.0)	3.0082	1.06737
2	Poorly trained teachers	70 28.5	46 18.7	67 27.2	62 25.2	245 (100.0)	2.5061	1.15454
3.	Students' unfamiliarity with the use of computers	77 31.3	83 33.7	43 17.5	42 17.1	245 (100.0)	2.7959	1.06701
4.	Poor state of ICT in Secondary schools in Oyo town	89 36.2	20 8.1	62 25.2	74 30.1	245 (100.0)	2.5061	1.25978
5.	Data Processing is not an appealing subject to students	68 27.6	106 43.1	33 13.4	38 15.4	245 (100.0)	2.8327	1.00437

Source: Field Survey, 2023

Table 2 shows reasons why students' poor performance in data processing in 2022/23 WAEC/NECO. The table shows that all the variables had mean criterion above 2.0, which clearly shows that they are all valid causes for the average performance of secondary students in data processing in Oyo town.

Discussion of Findings

The study examined the perceived cause(s) of the marginal average performance of students in data processing system science in 5 selected secondary schools in Oyo town. the following cause were discovered: Inappropriate instructional material used in teaching students, poorly trained teachers, students' unfamiliarity with the use of computers and the poor state of ICT in Secondary schools in Oyo town and that data processing system science as a subject seems to be unappealing to students in the selected secondary schools. This study supports the findings of (Haliru Jega et al., 2018) that insufficient number of qualified teachers in various subjects can cause poor performance and thus create negative interest in such subjects. Majority of respondents believe that insufficient number of qualified data processing system science teachers causes many students to have negative interest and thus affecting their performance. Furthermore, this paper is in agreement with (Sa'ad et al., 2014) which observed that inadequate qualified teachers, poor teaching methods and inadequate teaching materials are some of the causes of poor performance in many subjects.

Conclusion

Performance of students in any subject is determined by several factors. That is the essence for study performance and culture to tease out issues in this direction. The paper examined the perceive causes of marginal average in the performance of students in data processing system science in five secondary schools in Oyo town. Findings of the study show that quality of teachers matters in achieving sound performance of students. Also, it was clearly shown that students need to be familiar with the use of computers if they must have optimal performance since the subject is computer based. In addition, it was indicated that ICT facilities in secondary schools in Oyo town are rather inadequate and require upgrade. In view of this, the study seems relevant and has contributed to knowledge.

Recommendations

Based on the findings above, it is imperative to recommend that:

1. inappropriate instructional material should be provided to aid effective teaching of data processing system science in secondary schools in Oyo town

2. to address the issue of poorly trained teachers in the subject in secondary schools in Oyo town, teachers should be made to undergo regular trainings to give them the necessary experience to be able to handle the subject effectively. This would also go a long way in endearing students to the subject.

3. there should be adequate ICT facilities in Secondary schools in Oyo town in order to make the subject appealing to students in the selected secondary schools.

References

Abdulkareem, Z., & Lennon, M. (2023). Impact of digital divide on students' performance in computerised UTME in Nigeria. *Information Development*. https://doi.org/10.1177/02666669231191734

Albarkati, A. M. (2016). The application of computer in education system and its significance to teaching and learning. *International Journal of Computer Applications*, 975, 8887.

Akinwumi, F. (2023). Trends in School Enrolment of Primary School Education in Nigeria between 1984 and 2002. *Researchgate.NetFS Akinwumiresearchgate.Net*. Retrieved September 1, 2023, fromhttps://www.researchgate.net/profile/Femi-Akinwumi 2/publication/343350272_Trends_in_School_En rolment_of_Primary_School_Education_in_Nig eria_between_1984_and_2002/links/5f246e5729 9bf13404976f2c/Trends-in-School-Enrolment-of-Primary-School-Education-in-Nigeria-between-1984-and-2002.pdf

Alimi, B., Galadima, K., Garba, A., of, H. S.-I. J., & 2020, undefined. (2020). Drugs abuse among youth in

Maiduguri, Borno State, Nigeria. *Ijisrt.ComBG Alimi, K Galadima, A Garba, H SuleimanInternational Journal of Innovative Science and Research Technology, 2020•ijisrt.Com*, *5*(4). https://ijisrt.com/assets/upload/files/IJISRT20APR1002.pdf

Amadioha W, S. (2019). The importance of instructional materials in our schools an overview. *Researchgate*, *2*(3&4), 61–63. https://www.researchgate.net/profile/Amadioha-Samuel/publication/322368912_the_importance_of_instructional_materials_in_our_schools_an_overview/links/5a5658c30f7e9bf2a536c302/the-importance-of-instructional-materials-in-our-schools-an-overview.pdf

Ajibade A (2006). Effects of Interactive Instructional Compact Disc Package on the Performance of English Language Learners in Schools of Science in Osun State. *Unpublished Ph.D. Dissertation*, Faculty of Education, Obafemi Awolowo University, Ile-Ife.

Aspin, D., & Chapman, J. (2007). *Values education and lifelong learning: Principles, policies, programmes.* https://link.springer.com/content/pdf/10.1007/978-1-4020-6184-4.pdf

Balagurusamy, E., & Misra, K. B. (2014). *Fundamentals of data processing systems*. PHI Learning Pvt. Ltd..

Bukola Anike, B. (2019). Effects of fantasy and role-play instructional strategies on primary two pupils'acquisition of expressive and social skills in. Https://pgsds.ictp.it/xmlui/handle/123456789/751

Chen, W., Mason, S., Staniszewski, C., Upton, A., & Valley, M. (2012). Assessing the quality of teachers' teaching practices. *Educational Assessment, Evaluation and Accountability*, *24*(1), 25–41. https://doi.org/10.1007/S11092-011-9134-2

Hassan, S. (2010). Developing staff for the implementation of problem-based learning: Experiences from Botswana. *Journals.Co.ZaS HassanSouth African Journal of Higher Education, 2010•journals.Co.Za*.

https://journals.co.za/doi/abs/10.10520/EJC37590

Haliru Jega, S., Muhammad, S., & Lawal Gwandu, Z. (2018). Causes of Students Mass Failure in Mathematics at Senior Secondary Schools Certificate Examination (SSCE) in Some Selected Secondary Schools in Kebbi. *Iiardjournals.Org*, *4*(4). https://www.iiardjournals.org/get/IJEE/VOL. 4 NO. 4 2018/Causes of Students.pdf

Hırça, N., Seven, S., Science, A. A. T. E., & 2012, undefined. (2012). A computer-supported instructional material design based on 5E learning model: a case of "work, power and energy" unit. *Dergipark.Org.TrN Hırça, S Seven, A AzarJournal of Theoretical Educational Science, 2012•dergipark.Org.Tr*, *5*(3), 278–291. https://dergipark.org.tr/en/pub/akukeg/issue/29346/314036

Kolb, D. A., Boyatzis, R. E., & Mainemelis, C. (2014). Experiential learning theory: Previous research and new directions. *Perspectives on Thinking, Learning, and Cognitive Styles*, 227–247. https://doi.org/10.4324/9781410605986-9

Ogunsola, O., … O. A.-J. of S. and, & 2021, undefined. (2021). Effect of Problem-Based Learning Approach on Students' Academic Performance in Senior Secondary Mathematics. *Ojs.Upsi.Edu.MyOA Ogunsola, OP Adelana, KA AdewaleJournal of Science and Mathematics Letters, 2021•ojs.Upsi.Edu.My*, *9*(2), 75. https://doi.org/10.37134/jsml.vol9.2.8.2021

Quinn, A., Lemay, G., Larsen, P., & Johnson, D. M. (2009). Service quality in higher education. *Total Quality Management and Business Excellence*, *20*(2), 139–152. https://doi.org/10.1080/14783360802622805

Sa'ad, T. U., Adamu, A. & Abdullahi, M. & Sadiq, A. S. (2014). The causes of poor performance in mathematics among public senior secondary school students in Azare metropolis of Bauchi State, Nigeria. *Researchgate.NetTU Sa'ad, A Adamu, AM SadiqJournal of Research & Method in Education, 2014•researchgate.Net*, *4*(6), 32–40. https://doi.org/10.9790/7388-04633240