

Assessment of Computer Based Instructional (CBI) techniques in the Teaching of Computer Studies in Rivers State Senior Secondary Schools

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ABSTRACT

This research work assesses Computer Based Instructional (CBI) techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools. The research focuses on adequacy, usability and utilization, effectiveness of CBI techniques, CBI facilities, factors affecting effective use of CBI techniques. The research was carried out in Obio/Akpor Local Government Area of Rivers State. The research design adopted was descriptive survey design. The result of this research shows that CBI facilities were not adequate, CBI facilities available in schools were under utilized by teachers, CBI techniques is effective techniques, and the effective use of CBI techniques was marred by numerous factors, it was observed that CBI techniques in the teaching of Computer Studies in Rivers State Secondary Schools was an effective techniques. Recommendation were made based on the findings.

Keywords: Assessment, Computer, Computer Based Instruction(CBI) Technique

Introduction

Instructional techniques involve the teaching techniques adopted by an instructor or teacher in course of presenting a lesson. It also entails the techniques used by a teacher in the process of teaching a subject in a formal or informal education system. The instructional techniques of teaching computer studies in schools can be categorized as: Non-Computer Based Instructional (NCBI) techniques, Computer Based Instructional (CBI) techniques, and Computer Assisted Instruction (CAI).

The Non-Computer Based Instructional technique is also called the conventional method of teaching in the classroom. The NCBI techniques include: lecture, demonstration, laboratory, heuristic, assignment, and problem solving method.

Computer Based Instructional (CBI) techniques refers to virtually any kind of computer usage in educational settings, including drill and practice, tutorials, simulations, games, instructional management, instructional programme and other areas of applications. Tosun,

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Sucsuz, Yigit (2006). CBI is also considered as learning activities or computer activities which reinforce materials introduced and taught by teachers.

There exist numerous problems facing curriculum implementation in Nigeria. Michael (2014) computer studies curriculum is one of the educational document used in our senior secondary schools for the teaching and learning of computer studies as a subject.

It is imperative to note that, since the introduction of the Computer Based Instructional (CBI) techniques in our school, no formal investigation or assessment have been carried out to ascertain the effectiveness of this techniques in the teaching and learning process.

Some of the observed problem facing the effective use of instructional techniques in Rivers State schools includes: inadequacy of instructional facilities in schools. Specifically, Computer Based Instructional facilities, issues of usability and effectiveness of the techniques adopted in aiding the set objectives problem of instructional competences of the teacher in the use of modern educational facilities and factors that generally affects the Nigeria educational system.

It is based on these observed challenges that the researcher wishes to investigate the computer based instructional techniques in the teaching of computer studies in Rivers State.

Statement of the Problem

Since the innovation in our educational system, regarding the integration of the use of modern technological devices in the instructional process, the teachers are faced with numerous challenges ranging on the use and adaptation of such technology.

Considering the introduction and use of computer as a means of instructional process in our schools, the researcher is not aware of any research work has been conducted to ascertain the effectiveness of this techniques in the research area.

Some scholars, also questioned the effectiveness of the CBI techniques in teaching in our schools, as well to what situation will CBI techniques be more effective in teaching as well aid in achievement of the stated objectives.

In various researches on CBI techniques it was considered needful to assess the instructional techniques adopted by teachers in the instructional process if objective must be achieved. It was based on this that the researcher set out to assess the Computer Based Instructional (CBI) techniques in the teaching of computer studies in Rivers State Senior Secondary Schools.

Purpose of the Research

The purpose of this research was to assess the Computer Based Instructional (CBI) techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools. Basically, this research sort to achieve the following objectives:

- Determine the adequacy of computer based instructional facilities in the teaching of computer studies in Rivers State Senior Secondary Schools.

- Determine the usability and effective utilization of CBI techniques in the teaching of computer studies in Rivers State Senior Secondary Schools.
- Find out the effectiveness of the Computer Based Instructional techniques adopted by teachers in teaching of computer studies in Rivers State Senior Secondary Schools.
- Find out the factors affecting the effective use of CBI techniques in the teaching of computer studies in Rivers State Senior Secondary Schools.

RESEARCH QUESTIONS

1. How adequate are the CBI facilities in the teaching of computer studies in Rivers State Senior Secondary Schools?
2. What are the extent of usability and utilization of CBI techniques in the teaching of computer studies in Rivers State Senior Secondary Schools?
3. How effective is the CBI techniques in the teaching of computer studies in Rivers State Senior Secondary Schools?

Review of Related Literatures

INSTRUCIONAL TECHNIQUES OF TECAHING COMPUTER STUDIES

Instructional techniques entail the teaching methods adopted by an instructor or teacher in course of presenting a lesson. It is also the process of teaching a subject. The instructional techniques of teaching computer studies are categorized as follows:

- Non-Computer Based Instructional (NCBI) techniques of teaching computer studies.
- Computer Based Instructional (CBI) techniques of teaching computer studies.
- Computer Assisted Instruction (CAI) techniques of teaching Computer Studiees

NON-COMPUTER BASED INSTRUCTIONAL (NCBI) TECHNIQUES

The NCBI techniques of teaching computer studies are also known as the conventional method of teaching in the classroom. These methods of teaching are determined after useful analysis of the experiences gained over the years.

The NCBI techniques of teaching computer studies, as it is present today in our schools may be detailed as stated below:Lecture method,Demonstration method,Laboratory method,Heuristic method,Assignment method,Problem solving method, Singh &Nath (2008)

COMPUTER BASED INSTRUCTIONAL(CBI) TEACHNIQUES OF TEACHING COMPUTER STUDIES

Scientific and technological developments started a new era known as “Information Age”. In this era information processing has gained significantly compared to goods and services by using information technologies profoundly.

In the last quarter of the 20th Century, important developments seen in data processing, rapid changes that can be called as computer revolution have caused education systems to undergo a complete transformation taking but traditional forms, Yigit, Sucsuz and Tosun (2006).

Education has the leading role among social institutions will be most affected by increasingly changing process of information society (Yogit, 2003). Computer which are an important part of our daily life and which are very essential for many people, institutions and establishments and also which are made use of in education considerably, are important tools for schools. Computers have become the basis of data processing technologies used in realizing information production, manipulating, storing, sharing and distributing processes. Since they address to more senses compared to other technological tools and make abstract and complicated concepts concrete digitally because of their extensive multimedia properties. They are one of the most important technological tools which are used in educational and instructional process, Yigit, Sucsuz and Tosun (2006).

According to Yigit, Sucsuz and Tosun (2006) varied teaching method is required in order to transfer knowledge to the learner in view of the new technological developments is necessary in a classroom environment. There are two main teaching techniques which are carried out by computers today; namely: Computer Based Teaching (CBT) method and Computer Assisted Instruction (CAI) method. The both are known as Computer Based Instructional Techniques.

COMPUTER BASED TEACHING (CBT) TECHNIQUES

Computer Based Teaching (CBT) means using computer to control some activities of computer system such as planning teaching, measuring learning, recording data related to the students, making statistical analysis on learning data, Yaliu (1999) in Yigit, Sucsuz and Tosun (2006).

In a Computer Based Teaching technique, computer execute all of educational and instructional activities. In this form of teaching, computers are the main teacher that teaches the subject and determined objectives and attitudes. The instructional processes are carried out with the use of computer.

In an automated computer based teaching every instructional activity are performed by computer programs prepared. The teacher manages organizational activities by being of secondary importance. (Isman, 2001).

Computer Based Teaching is a system which is personally focused, follows an order, adjusts its own speed, supports looping and uses animation effects extensively. Friend and Cole (1999) in Yigit, Sucsuz and Tosun (2006). There is an interaction between the students and instructional system (computer) and the students learn following the subject in a supplied guided order.

Computer Based Instruction (CBI) refers to virtually any kind of computer use in educational settings, including drill and practice, tutorials, simulations, games, instructional management, supplementary exercises, instructional programming, and other areas of application. This is also considered as learning activities or computer activities which reinforce materials introduced and taught by

teachers. The Computer Based Instruction is considered as programs designed to tutor and drill students, diagnose learning difficulties, prescribed remedies for problems, keep records of students' progress, and presents materials in print and diagram form.

BENEFITS OF CBI TECHNIQUES OF TEACHING

- The benefits of CBI techniques to the teachers were to include less drudgery and repetition, greater ease in updating instruction and materials, more accurate appraisal and documentation of learner's progress and availability of adequate time for meaningful contact with the learner's. it is an effective method for raising student achievement, especially when it is used to supplement regular instruction in schools.
- CBI appears to have an important positive effect on students' attitudes toward computers. Students attitudes toward the subject (computer science) being learned and student ratings of the quality instruction are more favourable with CBI.
- CBI improve student learning and motivates students interest in learning. CBI has a broad potential for improving motivational and instructional design.
- CBI techniques is flexible, adjusting personal speed, easy recording, and decreasing the instructional activities.

COMPUTER ASSISTED INSTRUCTIONAL (CAI) TECHNIQUES OF TEACHING COMPUTER SCIENCE

CAI in teaching and learning involves the use of computer system to deliver instructions to students, by allowing them to interact with programmed lesson.

Muriana, Adeleke and Rahman (2011) viewed CAI as an instructional process that involves the use and application of computer system, including hardware, software, network and telecommunication efforts for the purpose of teaching and learning. However, the computer is able to keep record and analyses of instructional outcome of the learners, provide immediate knowledge of results and enable teachers to maintain quality control of lesson.

CAI is an instructional medium to facilitate teaching and learning process. Thus, the learner can manipulate the computer to suit his convenience in learning which entails the use and application of computer in an instructional process. The teacher as an instructional manager, has the knowledge, expertise to provide instruction for learner's; hence, this authority in his packaging of material he/she thinks is suitable for the learner.

In adoption of CAI, every learner is at individual workstation within a network, those requiring assistance with an assignment, can send mail to the instructor, or to other learners, without disturbing others in the group, specifically, with the aid of electronically scanning and display screen of a particular class number or of the entire class in turns. The teacher can monitor learners progress or performance and respond immediately, quietly and privately without disturbing the class.

In a CAI method of teaching and learning the sequence of instruction and amount of time spent on learning tasks are determined by the performance of learner's themselves. Achievement of each learner is assessed against a given performance standard rather than against the performance of the other learners. Various method of CAI to be considered in this study are:Drills and practice,Tutorial,Simulations or modelling

Drills and Practice (DP)

Drills and practice is defined as a method of instruction characterised by systematic repetition of concepts and practiced problems. Drill and practice is a disciplined repetition exercise, used as a means of teaching and perfecting a skill or process.

DP as an instructional strategy, it promotes the acquisition of knowledge or skills through systematic training by multiple repetitions, rehearse, practice and engages in a rehearsal in order to learn or become proficient. DP is a CAI technique in which a series of structured problems or exercises with immediate feedback to student's responses is provided. It is a structured, repetitive review of previously learned concepts to a predetermined level of mastery. DP instructional techniques promotes the acquisition of knowledge or skill through a repetitive practice or process of learning.

Drill and practice instructional techniques is a good method of teaching and learning computer science due its ability to identify mastery of skills for both the teacher and the learner.

Advantages of DP instructional techniques

- it motivates the teacher in the learning process
- it provides immediate result or feedback
- it enhances and promote individualized practice and learning as well enable students to learn or practice at own pace.
- It increases acquisition and fluency of basic skill in the individual process.

Disadvantages of DP instructional technique

- It has limited uses and application in instruction process.
- It does not promote critical thinking.
- Its design affects the learning process, due to the facts that some of the software are poorly designed.

Computer Based Tutorial Learning

Tutorial is a self-paced instructional program that provides step to step information in presenting a concept or instructional process. Computer based tutorial uses interactive methods such as hyperlinks, audio visual, multimedia presentation of the subject matter and provide feedback through questions and answer exercises.

Application of computer based tutorial models involve the use of computer in an instructional process. In computer based education, a tutorial is a computer program whose activity includes both the presentation of information and its extension into different form of work, including drill and practice, games and simulations.

Simulation and modelling

In simulation mode, the learner works with a simulation of the real world. Simulation is used where it is not practical or feasible to provide the learning in real-life, for instance a pilot train. In simulation and games modes of teaching, the learner tends to find learning more entertaining and challenging.

Simulation software can provide an approximation of reality that does not require the expense of real life.

Benefits of CAI techniques of teaching

- CAI enables self-paced learning: learning can move slowly or quickly as they like through a program. If they want to repeat some task or review some material again, it can be repeated without tiredness or complain. Learners can skip over a topic or lesson, if information is already known, making the instructional process more efficient.
- CAI enables self-directed learning: learners can decide what they want to learn and in what manner.
- It enhances the human senses: learners are easier to be retained and remembered if it appeals to more senses. The fact that computer can exercise various senses and present information in a variety of media can enhanced the learning process.
- CAI encourages learning as they provide a simulating environment and promote enthusiasm. Computer may help the efficient learner who is afraid to make mistake in a classroom situation.

Kosakowski (1998) summarises the observed benefits of CAI as follows:

- It is effective for educational technology for drill and practice of basic skills.
- Students learn more rapidly in CAI courses.
- The complexity of the use of multimedia technology available gives learner more control over the learning process.
- Students feel more successful, are more motivated to learn and have increased self-confidence and self-esteem.
- The learner, teacher and administrators can use computers and information technologies to improve their roles in the education process. It increases efficiency in education and instruction, it makes effectiveness easier in classroom.

- It motivates the learners to the lesson,
- It gives the learners courage, ambition and excitement. It helps in the development and growth of the learner academically.

These section deals with the presentation of analyzed data as well as the results and answers to the research questions and hypothesis stated in this study. The data and result of each research question and its corresponding hypotheses are presented on different tables as shown below:

Research Question 1: How adequate are the CBI facilities in the teaching of Computer Studies in Rivers State Senior Secondary Schools?

Table 1: Mean and Standard Deviation Showing Adequacy of CBI Facilities

S/No	Items	N	Mean	Std. Dev	Decision
1.	Projectors	110	1.89	0.74	Not Adequate
2.	Computer System	110	2.27	0.74	Not Adequate
3.	CBI Software	110	2.35	1.00	Not Adequate
4.	Internet Service	110	1.99	0.67	Not Adequate
5.	ICT Centre	110	2.07	1.13	Not Adequate
6.	Computer Laboratories	110	1.67	0.82	Not Adequate
7.	E-Library	110	1.56	0.77	Not Adequate
8.	Basic Input Devices	110	2.32	0.82	Not Adequate
9.	Basic Output Devices	110	2.56	0.82	Not Adequate
10.	Storage Devices	110	2.34	0.81	Not Adequate
11.	E-Board	110	1.56	0.77	Not Adequate
12.	Computer Textbooks	110	3.48	1.18	Adequate
13.	Computer Studies Curriculum	110	3.32	0.82	Adequate
14.	Power Supply	110	2.71	1.20	Not Adequate
15.	Generator Sets	110	2.00	0.88	Not Adequate
16.	Network Service Telephone	110	2.01	0.88	Not Adequate
17.	Computer Based Classroom	110	1.95	1.04	Not Adequate

From the table above the mean score of the 17 items used to answer research question one is 3.00 which is lesser than cut-off point of 3.0 hence, it is not agreed that there are adequate CBI facilities in the teaching of Computer Studies in River State Senior Secondary Schools.

Research Question 2: What are the extent of usability and utilization of CBI facilities in the teaching of Computer Studies in Rivers State Senior Secondary Schools?

Table 2: Mean and Standard Deviation Showing Usability and Utilization of CBI Facilities

S/No	Items	N	Mean	Std. Dev	Decision
1.	I use computer systems in presenting my lesson	110	2.23	1.03	Strongly Disagree
2.	I use projectors in teaching	110	1.95	0.62	Strongly Disagree
3.	I presented my lesson using CBI software	110	1.84	0.76	Strongly Disagree
4.	The classrooms are networked with ICT gadgets	110	3.44	1.02	Agreed

5.	I use CBI input process in teaching	110	2.22	0.78	Strongly Disagree
6.	I use CBI output process in presenting result in teaching	110	1.99	0.67	Strongly Disagree
7.	The lessons are recorded/taped using CBI techniques	110	2.00	0.67	Strongly Disagree
8.	Lessons are presented always in a CB classroom	110	1.95	0.62	Strongly Disagree
9.	Different computer based instruction programs are used in teaching of CS	110	4.00	0.67	Agreed
10.	Lessons are presented using E-board	110	1.56	0.77	Strongly Disagree
11.	I presented my lessons using computer based drill and practice	110	3.51	1.02	Agreed
12.	Lessons are presented using computer based tutorial	110	3.95	0.62	Agreed
13.	Lessons are presented using computer based modelling and simulation	110	3.56	0.82	Agreed

From the table above the mean score of the 13 items used to answer research question two is 3.00 which is lesser than cut-off point of 3.0 hence, it is strongly disagreed that CBI facilities are utilized in the teaching of Computer Studies in Rivers State Senior Secondary Schools.

Research Question 3: How effective is the CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools?

Table 3: Mean and standard Deviation Showing Effectiveness of CBI Techniques

S/No	Items	N	Mean	Std. Dev	Decision
1.	Students find the CBI techniques to be difficult in learning	110	2.00	0.67	Strongly Disagreed
2.	Teachers find the CBI techniques to be difficult process of teaching	110	4.00	0.88	Agreed
3.	CBI techniques is a stressful method of teaching CS	110	3.22	1.19	Disagreed
4.	CBI techniques makes teaching and learning to be real	110	4.00	0.67	Agreed
5.	CBI techniques helps increasing the student academic performance	110	2.82	1.13	Disagreed
6.	CBI techniques motivates the students in the subject	110	2.97	1.34	Disagreed
7.	Teaching/learning are interesting using CBI techniques	110	3.33	1.36	Agreed
8.	CBI techniques makes the teaching of CS to be useful and practicable	110	3.66	1.16	Agreed
9.	The CBI techniques helps in the development of physical and mental ability of the teachers/learners in CS	110	3.40	1.58	Agreed
10.	Evaluation is easily conducted with the use of CBI techniques	110	2.97	1.34	Disagreed
11.	CBI techniques is a suitable method of teaching science courses (Computer Studies)	110	3.52	1.54	Agreed

From the table above the mean score of the 11 items used to answer research question three is 3.00 which is higher than cut-off point of 3.0 hence, it is agreed that CBI techniques is effective in the teaching of Computer Studies in Rivers State Senior Secondary Schools.

Research Question 5: What are the factors affecting the effective use of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools?

Table 5: Mean and Standard Deviation Showing Factors Affecting the Effective use of CBI Techniques

S/No	Items	N	Mean	Std. Dev	Decision
1.	Lack of resource personnel (competent computer studies teacher and other personnel)	110	3.95	0.62	Agreed
2.	Lack of instructional resources are factors affecting effective use of CBI techniques	110	3.37	1.06	Agreed
3.	Change in government and educational policy affects the programme	110	3.87	1.39	Agreed
4.	Poor funding is a factor affecting the programme	110	3.65	1.43	Agreed
5.	Ineffective instructional management in schools is a factor affecting the programme	110	4.21	0.41	Agreed
6.	Lack of teacher’s motivation is a factor affecting the effective use of CBI techniques	110	3.50	1.02	Agreed
7.	Insufficient power supply to schools is a factor affecting the use of CBI techniques	110	3.10	0.74	Agreed
8.	The student/teacher ratio is a factor affecting the use of ICT techniques	110	3.61	1.06	Agreed

From the table above the mean score of 8 items used to answer research question five is 3.65 which is higher than cut-off point of 3.0 hence, it is agreed that all the listed factors are affecting the effective use of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools.

Hypothesis 1

H₀₁: There is no significant difference between the mean response of private and public schools’ computer studies teachers on the adequacy of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools.

School	N	Mean	Std. Dev	Df	t-cal	t-crit	Decision
Private	53	31.71	5.67	108	9.10	1.96	S
Public	57	22.54	4.88				

The result clearly reveals that a significant difference exists in the response of private and public school computer studies teachers on the adequacy of CBI facilities in the teaching of Computer Studies in Rivers State Senior Secondary Schools with (t-cal = 9.10, t-crit = 1.96, df = 108, at 0.05 level), which means hypothesis (H₀₁), is rejected.

Hypothesis 2

H₀₂: There is no significant difference between the mean response of private and public school computer studies teachers on the effectiveness of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools.

School	N	Mean	Std. Dev	Df	t-cal	t-crit	Decision
Private	53	34.41	3.97	108	13.62	1.96	S
Public	57	22.57	5.03				

The result clearly reveals that a significant difference exists in response of private and public school computer studies teachers on the effectiveness of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools with (t-cal = 13.62, t-crit = 1.96, df = 108, at 0.05 level), which means hypothesis (H₀₂), is rejected.

DISCUSSION OF FINDING

The result of the research findings shows that Computer Based Instructional facilities for the teaching of Computer Studies in Rivers State Senior Secondary Schools were inadequate due to numerous factors. The study revealed that the following items are not adequate: instructional projectors, computer system, computer based instructional software, internet service, E-board, power supply, generator sets, network telephone service and computer based classroom.

Considering the extent of usability and utilization of Computer Based Instructional (CBI) facilities in the teaching of Computer Studies in Rivers State Senior Secondary Schools. The study revealed that CBI facilities available in school were under utilized by the teachers in the teaching of computer studies.

On the effectiveness of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools. The result of finding revealed that CBI techniques is effective in the teaching of computer studies.

From the t-test statistical result, the t-crit 1.96, is less than the t.cal 9.10, df(108) at 0.05 level of significance. This result shows that there is a significant difference in the mean response of private and public school computer studies teachers in Rivers State Senior Secondary Schools on the adequacy of CBI facilities in the teaching and learning of Computer Studies.

From the t-test statistical result, the t-crit (1.96) is less than the t-cal (13.62), df(108) at 0.05 level of significance. The result revealed that there is a significant difference between the mean response of private and public school computer studies teacher on the effectiveness of CBI techniques in the teaching of Computer Studies.

Conclusion

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

1. It was concluded that the Computer Based Instructional (CBI) facilities for the teaching of Computer Studies in Rivers State Senior Secondary Schools were inadequate enough in both private and public schools. CBI facilities are more adequate in private schools compare to public government own Senior Secondary Schools.

2. It was concluded that the CBI facilities available in Rivers State Senior Secondary Schools were under utilized by the teachers in course of teaching Computer Studies due to certain factors.
3. It was concluded that the CBI techniques is an effective technique in the teaching of Computer Studies in Rivers State Senior Secondary Schools compare to the conventional teaching method.
4. It was concluded that a significant difference exists in response of private and public school computer studies teachers on the adequacy of CBI facilities in the teaching of Computer Studies in Rivers State Senior Secondary Schools.
5. It was concluded that a significant difference exists in response of private and public school computer studies teachers on the effectiveness of CBI techniques in the teaching of Computer Studies in Rivers State Senior Secondary Schools.

Recommendations

Due to the findings of this research the following recommendations were made:

1. The school management with the support of the Rivers State Government should make provisions for adequate CBI facilities in Senior Secondary Schools.
2. The computer studies teachers should be encouraged towards usability and utilization of CBI facilities available in the schools.
3. The educational agencies and authorities in charge of computer literacy programme ICT and computer education programme in the state should immediately address the challenges identified in this research.
4. The computer studies teachers should be retrained on the use of CBI facilities in their teaching.
5. Government (Public) owned Senior Secondary Schools should be equipped with CBI facilities and personnel to compete favourable with the private schools.

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