EFFECTS OF COMPUTER UTILIZATION ON INSTRUCTIONAL DELIVERY OF ANIMAL HUSBANDRY IN SECONDARY SCHOOLS IN KATSINA STATE, NIGERIA

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Abstract

The study was carried out to determine the effects of computer utilization on instructional delivery of animal husbandry in secondary schools in Katsina State, Nigeria. The specific objectives of the study were to assess the available learner –to – computer ratio, teachers and students' skills to use computers, level at which computers are used and effects of using computers on academic performance of students. The study had four (4) specific objectives, four (4) research questions and four (4) null hypotheses as guide. Descriptive survey and pre-test, post-test quasi- experimental designs were adopted for the study. Three hundred and seventy nine respondents formed the sample for the study which comprised of 37 teachers and 341 students of animal husbandry. 30 students from Government College Katsina (Day Wing) were randomly selected for experimental study. The 30 students were divided into two equal groups of 15 each as experimental and control groups. Questionnaire was delivered using face to face method of distribution, and for the experiment, pre-test was given before exposing the students to the treatment variable and control variable. Simple frequency and percentages, mean and standard deviation were used to answer all the research questions, while regression analysis was used to test null hypotheses 1, 2 and 3 and t-test statistics was used to test null hypothesis 4 at 5% levels of significance (p= 0.05). The available computers for teaching and learning in Katsina State secondary schools were grossly inadequate.Standard learner –to – computer ratio had significant influence on teaching and learning of animal husbandry and teachers and students skills to operate computer had significant influence on teaching and learning of animal husbandry in Katsina State secondary schools.It was concluded that, as long as the available computers cannot meet the learner – to – computer ratio standard and low usage of the available ones persist, teaching and learning of animal husbandry will not improve to expected standard. It was recommended among others that, computers and power supply sources should be made adequately available by the government.

Theoretical Framework

Skinner (1950), an American psychologist suggested that learning is a series of experience, each of which influences behavior in the same way that conditioning (the process by which conditioned responses are learned or acquired) does. In his view, each learning experience is a stimulus that produces a behavior response. To Skinner, Thorndike's law of effect is so obvious in behavior that it does not represent a theory at all. In skinner's theory, operant conditioning is reflected in the establishment of a response through reinforcement. In operant conditioning behavior must occur before it can be reinforced (Oladele, 2005).

Oladele (2005) added that Skinner carried out an experiment associated with conditioning. He constructed a box called Skinner's box. This is a box containing a lever that releases a pellet of food into tray and at the same time automatically registers the responses in a time chart. To produce operant conditioning he placed a hungry rat in the box. The inside of the box is plain except for the protruding bar with the food dish beneath it. A small light bulb above the bar can be lighted at the experimenter's discretion.

Left alone in the box, the rat moves about restlessly and occasionally presses the bar again. The pressing response is instrumental in producing reinforce(food) which then acts as a stimulus for response (bar pressing).

Following the above description the terms "instrumental learning" and "operant conditioning" can be considered to be synonymous with both referring to the strengthening and weakening of behavior by the stimulus consequences by these behaviors.

In another experiment, Skinner's demonstrated how the behavior of a hungry pigeon was shaped to learn a particular instrumental response by pecking at a disc in the Skinner's box. When the pigeon was receiving its food rewards, a green light was switched on and this remained on for some time. After several trials, it was only the green light that was switched on without food reinforces given to the pigeon, yet it went on pecking. Green light, by association and by being contingent upon the pecking behavior of the pigeon had acquired this time some reinforcement.

Implications of Skinner's Theory for Education

Learning is likely to occur if we make the reward contiguous (close in time) upon the behavior that we want the subject to learn. The teacher would be well advised to reinforce the behaviors in his pupils which he wished to be repeated. Adult can reinforce desired behavior in a child by showing approval when the behavior is exhibited or performed by the child. For

instance, mere telling a child to go to school may not work because as soon as he/she is sent to school, he/she begins to cry. To shape his/her behavior toward going to school the child may not be given sweet whenever he/she refuse to go to school. It would be observed that the child starts gradually to like going to school. In this case, Sweet as a reinforcer may prevent crying of refusing to go to school (Oladele, 2005).The theory is related to the research work as computer can be used as stimulus to reinforce the behavior of learner to learning. Similarly, computer can be used in learning such as in games, puzzle, objective questions and answers, as well as serve as rewarding to the learner. Hence, learning is likely to occur if we make the reward contiguous (close in time) upon the behavior that we want the subject to learn (Oladele, 2005).

Computer and its historical development

Computer is one of the products of science that has been variously used by man and assisted him in diverse ways. The world has now become a global village via the use of computer, indeed man has been able to put the world in his pocket and can reach out to any part of the world even from the remote settlement so long he is connected to the satellite via the computer. Nuradeen (2008) defined computer as an electronic machine that can accept data as input, process it and produce result (output) as information at a fantastic speed.

Adeyemi and Landu (2002) defined computer as an incredibly flexible piece of electronic device that can be modified to do a lot of very diverse task. Adeyemi (2002), stated that computer can be viewed as a tool that can be used to enhance various technologies of instructions. Computer is a machine for manipulating data according to a list of instructions. Computer takes numerous physical forms, early electronic computer were the size of a large room, consuming as much power as possible, but present computer can be made small enough to fit into wrist watch and can be powered from a watch battery.

The word computer is taken from the French 'computeur' which literally means one who can compute. These day when we say computer, we often mean a type of processor, programmable device that can store and process information of all kinds. Most computers have four separate components. A central processing unit, a memory devise, input and output devise, mouse, keyboard, and printer are all devices which can be used to operate a computer, Quite amazingly, computer work entirely using binary system storing and operating everything through the combination of pattern of 1 and 0, off and on.

The computer is a technological innovation under the control of stored program 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. Reith (1993) in Nuradeen, (2008) defined computer as an electronic device which stores information on disc or magnetic tape; analyses it and produces information as required from the data on the tape. Sharing the same view with Reith (1993), in Nuradeen (2008) Kingsley (1995) saw computer as a device that accepts data in one form and processes it to produce data in another form. Kingsley (1995) added that computer as a combination of related devices capable of solving problems by accepting data, performing described operations on the data, and supplying the results of these operations.

Hence, computer could be said to be a man-made machine made up of electronic components that operates information at a very high speed to produce results that are meaningful to the user. It is basically a processor of information. Nuradeen(2008) added that computer is a machine designed to make life easier due to its speed, accuracy, ability to store large quantity of information and to carry out long and complex operation without human intervention. Computers, irrespective of type and size have five basic parts namely, Input Unit, Memory Units, Control Units (CU), Arithmetic and Logic Units (ALU) and Output Units. Both ALU and CU are joined into one piece of hardware known as the Central Processing Unit (CPU) which is the brain of the computer. According to Adeyemi and Landu (2002), the primary functions of computers are to:

-Input and store information.

-Process information.

-Output information.

Computer has specially designed languages for operations. These are FORTRAN, COBOL, BASIC, ALGOL, PL/I and PASCAL.

The computer accepts data through its input devices such as the screen, mouse, light pen, scanner, microphone, joystick and the like. It processes data, stores it and outputs it through the output devices which include the printer, loud speaker, computer output, microfilm and others. The basic types of computer are the analog, the digital and the hybrid. The analog computers are used for measuring changes in continuous physical or electrical states. These include speed, pressure, voltage, length, volume and temperature. The digital computers perform calculation by counting number precisely while data are represented by discrete states of the computer electronic circuitry. Digital computers convert data to binary form. The hybrid computers represent a combination of digital and analog computers and known to have found much application in control and feedback processes (Audu, 2010).

Innovations appearing today indicate that the word is dependent on computer technology (Ajibade, 2006). The computer is not only a game or word processing and accounting alone, it is a great learning tool for adults and little ones, nursery school pupils and secondary school students, graduates and post graduate students. Historically, computer passed through some stages called as generations, to arrive at its present state. The first generation lasted between 1951 – 1958 was developed by Ecket Manchy and was based on EDSAC and UNIVAC – 1 – design. The second generation computer existed from 1959-1964 it was an improvement over the UNIVAC – 1 – computer since it was better able to accommodate easier and faster operation. It was based on the transistor technology founded by TRANSAC -5-200 in 1957. The third generation computer existed between 1965 – 1970 was the first minicomputer married with integrated circuit used less power, costless though much reliable. It had internal components and brought about the introduction of IBM compatibility. It's the emergence of software industries(Nuradeen, 2008).

The fourth generation computer contained more sophisticated micro electronic device and employed large scale integrated circuitry internal memory with metal-oxide, semi-conductor used microprocessor and the micro-computer as well as super computer. The fifth generation computer can be said to be the generation of computer that has greater impact in this century. These computers are capable of communicating with themselves like man; they can mimic human sense, manual skills and intelligence with appropriate program. These computers have the ability to take decision in various circumstances through the extensive data banks which make software the determining factors as opposed to hardware which later has been the case with the earlier generation of computers(Nuradeen, 2008).

The role of the teachers in using computer for instruction

According to Kersh (2009) the classroom teacher will never be replaced by program of self-instruction. Rather, he will be free to guide the learning of his students in ways that only a human being can. In using computer for instruction, the teacher's role is hypothesized has changed basically from that of informer to learning facilitator. The duty of delivering lectures changes to that of guide and problem solver. In the words of Johnson (1992), the instructor is freed from time-consuming chores as compiling, administering and marking tests, has time to work individually with the subjects. At the schools, the instructor is the manager of the learning process. The instructor decides when the students use the terminal, read the textbook, or work with laboratory equipment. This is to say that the teacher is

relieved from pure informative tasks. He could dedicate himself to the processing of this information.

The teacher's roles in using computer for instruction are further conceptualized as spending his time in leading group discussions and in working with students individually and in small groups using laboratory work where applicable. The teacher is not a spectator of incomprehension but guides the students in the multitude of diversified documents to make relevant choices. He is a guarantor of assimilation as well as facilitator to help learner use and access knowledge in computer education. Hence, the teacher's attitudes, beliefs and preferences will be changed and be adapted.Jenks (1996), in Baba, Adewole, and Olalekan, (2009) said that the objectives of computer education are not determined by student's needs, interests or hope alone. The goals are agreed upon in consultation with the teacher.

The students and the teacher together decide what the student should learn and ascertain how the students' goal can best be achieved. Computer as an entity is not totally independent. In order to achieve the set objectives of using computer for instruction, the teacher should check what each student is doing, and equally reconsider with the student the goals, methods, content, level and pace. Where a student with low ability tries a difficult material, it is imperative for the teacher to decide the possibilities of doing so. The teacher should discuss the method and content of such difficult material with the students to enable such students understand the content of the material. Benmaman (1992) in Baba, Adewole, and Olalekan, (2009) asserted that teachers and their assistants have the responsibility to help each student find the best way to learn, to help them with their work, to check their work and to guide them to more effective learning.

Sharing the same view with Benmaman (1992), Wynn (1999) in Baba, Adewole, and Olalekan, (2009) said that the teacher cannot be removed from effective instructional positions he occupies irrespective of the level of the technology because of the paramount role he plays in teaching and learning processes. The scope and quality of teacher's contribution to teaching and learning process should be considered in introducing a new technology to instruction. The teacher is a significant figure in education advancement. No educational system can rise above the level of its teacher.

Related Studies

Michael, (2001) conducted a study titled "Computer Technology used by California Agricultural Teachers" The purpose of the study was to determine the level of access teachers have to computer and Internet, how teachers were using common software tools in support of their teaching, what level of access agricultural students have to computer technology in

classroom and what computer tools students are using as part of the agricultural curriculum. The population of the study was all the 661 Californian secondary agricultural teachers. The survey instrument was mailed to all secondary agricultural teachers with a return envelope and a follow-up reminder post card was sent three weeks later. The survey was anonymous and no attempt was made to code the survey forms, 303 surveys were returned (40% of the population). The instrument was created as a single page form with 37 items, 4 items were open-ended, 24 items used a 5-point likert scale, and the remaining questions had specific answers (yes/no, male/female) The instruments was tested for face and content validity by a review panel consisting of State Department of Education staff and teacher educators Chi-square analysis, correlation and means were used in testing various instruments of the study. Finally, the study had following findings:

The total of 98% of teachers had access to a computer at home or schools, also 85% reported regular use of word processing software, 33% reported regular use of spreadsheet software, 18% for presentation software and 47% reported using the world wide web as a regular resources, furthermore, about 74% of the teachers indicated that they had access to a computer laboratory and of those 87% (64% of the total) indicated the laboratory was connected to the Internet.

According to the study most California secondary teachers had requirements of integration of computer technology into the agricultural curriculum. Also teachers used technology as part of their instructions; these include not only the ability to demonstrate the use of computer technology, but also the ability to have students use it in a classroom setting

The present research is quite related with past study as both researches have almost similar objectives hence they aimed at using computer in teaching and learning, also the instrument for data collection were the same as the past research used questionnaire so also the present research will use questionnaire, also nature of data analysis are similar, in contrast the two research are quite different as past research was conducted in California, while the present study will be carried out in Nigeria to be precise at Katsina State. The past research did not indicate users – to –computer ratio standard but the present study did which formed the major gap to be filled.

The interviews was conducted in 12 schools across Canada, which was selected from 60 initially nominated by a national panel of educators, educational technology experts (SITES, 2000)in Granger, et al (2002) and deemed to be engaging in innovative pedagogical practices using technology (IPPUTS). This analysis focused on four schools that were chosen for the overall discursive and conceptual richness of their data. Interviews were conducted

with teachers, principals, school board administrators, teacher-librarians, technical support personnel and students. The tape-recorded interviews were transcribed and the transcription coded using atlas. Software analysis was undertaken using the constant comparative method (Glaser & Strauss 1967). The codes, situated in three overarching categories-way of learning individual characteristics and environmental factors were revised as patterns emerged. Those patterns were subsequently examined for consistency and contradictions between interviews across the four schools.

The present research and that of Granger et al (2002) are similar due to the fact that they all dealt with using computer in teaching and learning situation. The methods of collecting data are different, as the past researcher used oral interview only but the present researcher will involve the use of questionnaire. The gap filled by the present research is the standard of learner to computer ratio.

The researcher utilized a non-experimental quantitative research design for this descriptive correlation study and the target population included secondary animal husbandry teachers in Texas for the year 2000-2001 school years. Equally a systematic random sample was selected, also questionnaire was used as an instrument for data collection, while descriptive statistics were used to and analyze the data.

Finally the researcher concluded that animal husbandry teachers who participated in the study had a positive attitude toward computers for professional productivity, computers for classroom use electronic mail and the Internet. Also teachers were aware and beginning to fully adopt ICTsetc.

The present study is related to the past research due to fact that both have similar objective of the study, also the methods of collecting data are similar, The two research studies are different because of variation in their location as past research was conducted in Texas while present research will be conducted at Katsina State.

They highlighted ICTs teaching learning process as it offers several opportunities in education. First, they can be used as a means of preparing the current generation of students for future workplace, also ICTs can make the school more efficient or more productive, engendering variety of tools to support and facilitate teacher's professional activities. Finally ICTs are seen as means to reform and innovate teaching that is, to stimulate learners to learn actively and independently in a self-directed way and/or in collaboration with others (Kirschner and Woperies, 2003).

Gilbert, (2007) conducted a study on implementation of computers in schools. In the thesis, the objective was to explain the implementation of ICT in primary schools,

specifically mentioning the integration of computers into the curriculum. Gilbert, (2007) thesis aimed at determining what ICT strategies, recommended by government and local schools could inform the formulation of an ICT policy for schools. Also the research looked at how schools with computers or a computer laboratory in the Makana and Somerset East districts (Both in South Africa) implemented ICT in their schools curriculum.

This was followed by a comparison of the number of computers in the five different schools. The researcher then analyzed how those schools utilized the computers, explaining the reasons for their utilization or non-utilization. The importance of a computer coordinator, computer committee and ICT policy were then considered with specific focus on the roles or importance of these committees and coordinators at each school, furthermore the research discussed on how computer were maintained in these schools. These followed by pointing out the significance of teachers' use of computers at these schools. Finally the research considered the importance of Internet connectivity as well as community and private sector involvement in these schools.

In contrast both research works are centered toward computers to be used in teaching and learning processes, furthermore the researches are all conducted in Katsina State. Instruments used for data collection for the two researches are the same that is questionnaire.

Statement of the Problem

In June 2003, at the African Summit of the World Economic Forum held in Durban, South Africa, the New Partnership for African Development (NEPAD) launched the e-Schools Initiative, intended to equip all African schools with ICT equipment including computers, radio and television sets, phones and fax machines, communication equipment, scanners, digital cameras, and copiers, among other things. It is also meant to connect African students to the Internet. The NEPAD capacity-building initiative was executed over a ten-year period, with the high school component being completed in the first five years. Three phases were envisaged, with fifteen to twenty countries in each phase. The phases were to be staggered, and an estimated 600,100 schools were expected to benefit. The aim of the initiative was to impart ICT skills to young Africans in primary and secondary schools, and to harness ICT to improve, enrich, and expand education in African countries, Nigeria was to benefit in the first phase(Federal Republic of Nigeria, 2006)

The Federal Ministry of Education had also launched an ICT-driven project known as School Net which was intended to equip all schools in Nigeria with computers and communications technologies (Federal Republic of Nigeria, 2006). The National Commission for Communication equally provided computer equipped with learning software in some

selected secondary schools in Katsina state. The UNESCO International standard of Learner-to – Computer ratio (LCR) is 1:1, that is, every learner to a computer for teaching and learning in schools. But the New Partnership for African Development (NEPAD, 2003)set its standard at4 to 5 students per computer. This is the ratio that many experts considered to represent a reasonable level for the effective use of computers within the schools. It is based on this that, the researcher wanted to establish whether the available computers in Katsina State secondary schools are up to the aforementioned standards and to ascertain the level at which teachers and learners make use of these computers for teaching and learning.

Objectives of the Study

The major objective of the study was to determine the effects of computer utilization on instructional delivery of animal husbandry in secondary schools in Katsina State. The specific objectives were to:-

1.   ascertain the availability of computers in Katsina State government secondary schools

2.   ascertain the standard of learner – to – computer ratio (LCR) for teaching and learning.

3.   Ascertain the extent to which teachers and students have skills to operate computers for teaching and learning of animal husbandry.

4.   Determine the effects of using computer on students' academic performance.

Research Questions

The following research questions were raised and answered.

1.What were the available computers in Katsina State government secondary schools?

2.What is the standard of learner – to – computer ratio (LCR) for teaching and learning?

3. What is the extent to which teachers and students have skills to operate computers for teaching and learning of animal husbandry?

 4.   What is the effect of using computer on students' academic performance?

Research Hypotheses

The following four null hypotheses were formulated and tested at 0.05 levels of significance.

  1. Standard learner – to – computer ratio has no significant influence on teaching and learning of animal husbandry in Katsina State government secondary schools.

  2. Teachers and students' skills to operate computers have no significant influence on teaching and learning of animal husbandry in government secondary schools in Katsina State.

3. Using computer in teaching and learning has no significant effects on students' academic performance.

RESEARCH METHODOLOGY

Research Design

This study employed both descriptive survey and quasi-experimental designs. This was because the study involved getting respondents' opinion (survey design) on availability and usage of computer for teaching and learning and determining the effects of computer usage on students' academic performance (quasi-experimental).

Population of the Study

The total population of the study was 48241 comprised of 130 agric teachers and 48111 SS II students that offer agriculture in government secondary schools in Katsina state. This population was obtained from the 234 government secondary schools across the 3 educational zones in Katsina state.

Table 3.1: Population for the study

S/n	Name of Educational Zone	No. of Schools	No. of Teachers	No. of Students
1	Katsina Educational zone	80	63	21213
2	Funtua Educational zone	77	28	12542
3	Daura Educational zone	77	39	14356
	Total	234	130	48111

Source: Department of Planning Research and Statistics Ministry of Education,

 Katsina, Katsina State (2010)

Sampling Procedure

The sample size for the study was 378 based on the sample determination table of educational and psychological measurement by Paul, (2006) as seen in appendix iii. The Table suggested that, in every population of 25,000 and above and less than 50,000, three hundred and seventy eight is enough to represent the entire population. Fifteen (15) government secondary schools was selected using cluster sampling technique to determine the number of participating respondents for the study. All animal husbandry teachers in the selected schools was used. And simple randomization using 'hat drawn' method was employed to select341 students that offer animal husbandry science in the selected schools. Thirty (30) students from Govt. College Katsina (Day Wing) was randomly selected for experimental and control groups. Miles (2001), Ekeh (2003) and Abiola (2007)observed that, random sampling technique gives every member of the population equal and independent

chance of being selected or included in the sample and used only when the population is easily accessible and homogeneous.

Table 3.2:1 Sample size for the Questionnaire Respondents

S/n	Name of Educational Zone	No. of Schools	No. of Teachers	No. of Students
1	Katsina Educational zone	7	19	154
2	Funtua Educational zone	4	8	94
3	Daura Educational zone	4	10	97
	Total	15	37	345

Table 3.2:2 Sample size for the Experiment

Name of School	Experimental Group	Control Group	Total
Govt. College Katsina (Day Wing)	15	15	30

Instrument for Data Collection

Two instruments were used to collect data for the study. The first instrument was questionnaire developed by the researcher based on the research objectives and research questions which was tagged availability and usage of computer for teaching and learning (AUCTL). The questionnaire was divided into two sections; 'A' and 'B'. Section 'A' collect bio-data of the respondents. Section 'B' contained check list and other items meant to collect data on respondents' opinion on the availability and usage of computers in schools for teaching and learning. The second instrument used for data collection was a multiple-choice test consisting of a 30-item achievement test in animal husbandry (ATAH) which was developed by the researcher. The test item was selected from livestock management system (sheep and goat). Each of the items had five (5) options, A-E. All instruments was pilot tested and was adjusted before administration.

Validation of Research Instruments.

The two instruments (questionnaire and achievement test) were validated experts in Vocational and Technical Education Department and by a statistical analyst. The instruments were given to them for corrections and possible suggestions. After vetting, the researcher incorporated the corrections and suggestions to improve the instruments.

Reliability of the Instrument

The split-half method was employed using Pearson product moment correlation to determine the internal consistency of the instrument from the data collected from the pilot study. A reliability coefficient of 0.76 was realized for the questionnaire instrument while 0.83 was obtained for the agricultural achievement test. Reliability of this nature is

considered ok for the study as observed by Malim and Birtch, (1998) who stated that a reliable test should have a correlation coefficient of more than0.50.

Procedure for Data Collection

The researcher obtained a letter of introduction from the Head of Department of Vocational and Technical Education, in the Faculty of Education of Ahmadu Bello University Zaria to the various secondary schools covered during the study. Face to face delivery method of questionnaire distribution was adopted with the help of three trained research assistants. For the second instrument, first week was used for introduction, familiarization and administration of pre-test. The thirty students were given pre-test in a combined class to measure initial equivalent ability. Thereafter, the students were divided into two equal parts, one part for experimental group and another for control group. The control group was taught using the conventional teaching method (direct method) while the experimental group was taught with computer installed with livestock management software. The learner - to - computer ratio at which students were seated for the experiment was 5: 1. The survey lasted for one week while the experimental teaching lasted for two weeks.

PRESENTATION AND ANALYSIS OF DATA

Analyses of Data used for Answering Research Questions

Results of data used are as presented in Table 4. 1to 4.4

Research Question One: What are the available computers in Katsina state government secondary schools?

Table 4.1 Availability of Computer

	Available computers	Freq.	%
1	1 –50	4	26.7
2	50–100	6	40
3	100– 200	4	26.7
4	200–500	1	6.6
5	500 & above	-	-
	Total	15	100

The analysis of data to answer research question one in table 4.1 revealed that, 4 schools representing 26.7% had 1 – 50 computers, 6 schools representing 40% had 50 –100 computers,4 schools representing 26.7% had 100 – 200 computers and 1 school representing 6.6% had 200 – 500 computers. The results of the analysis therefore indicated that, the

available computers for teaching and learning in Katsina state secondary schools are grossly inadequate.

Research question two: What is the standard of learner – to – computer ratio (LCR) for teaching and learning?

Table 4.2: Available Learner – to – Computer ration (LCR) for teaching and learning in Katsina state secondary schools

	Learner – to – computer ratio	Freq.	%
1	One learner to one computer (1:1 ratio)	-	-
2	Two to three learners to one computer (2-3:1 ratio)	6	1.6
3	Four to five learners to one computer (4-5:1 ratio)	26	6.8
4	Six to ten learners to one computer (6-10:1 ratio)	32	8.5
5	Eleven to twenty learners to one computer (11-20:1 ratio)	189	50
6	Twenty one to thirty learners to one computer (21-30:1 ratio)	67	17.7
7	Thirty one to forty learners to one computer (31-40:1 ratio)	41	10.8
8	Forty one and above learners to one computer (41 & above:1 ratio)	17	4.5
	Total	378	100

Learner – to – computer ratio standard

UNESCO Standard -   -   -   -   1:1 ratio

Partnership for African Development (NEPAD) Standard   4-5:1ratio

The analysis of data to answer research one in table 4.2 revealed that, none of the schools in Katsina state has UNESCO standard of learner – to –computer ratio. The respondent who opined that, 11-20:1 of learner –to – computer ratio was what was obtainable in the secondary schools scored 50% which was the highest. Some schools met the NEPAD standard as 6.8% of the respondents said 4-5 learners are seated to a computer during teaching and learning in their schools. The learner – to – computer ratio of 6-10, 21-30, 31-40 and 41 and above scored 8.5%, 17.7%, 10.8% and 4.5% respectively. The results of the analysis therefore indicated that, the available computers for teaching and learning in Katsina state secondary schools are grossly inadequate.

Research question three: What is the extent at which teachers and students have skills to operate computers for teaching and learning of Animal Husbandry in government secondary schools in Katsina State?

Data collected in respect to this question was summarized in table 4.2

Table 4.3 Extent at which teachers and students have computer skills

Variable	Opinion	Score	Mean	St. Dev.	Criteria	Decision
Computer skills for teaching and learning	High	5292	1.4	1.108		
					2.6>2.5	Low
	Low	9828	2.6	1.345		
	Total	15120	4.0			

Source: fieldwork 2014/2015

The analysis of data in table 4.3 indicated that, the calculated mean and standard deviation of respondents who said that the extent at which teachers and students have computer skills is low were 2.6 and 1.345 respectively. While the mean and standard deviation for those who said their computer skills is high stood at 1.4 and 1.108. Since the calculated mean of low (2.6) were greater than 2.5 benchmarks for acceptance, it therefore means that, the extent at which teachers and students have skills to operate computer for teaching and learning was very low in secondary schools in Katsina State.

Research question Four: What is the effect of using computers on students' academic performance?

Data collected in respect of this are summarized in Table 4.4
Table 4.4

	Experimental Group			Control Group		
S/No.	Score	Grade	Remark	Score	Grade	Remark
1	48	B	Passed	36	C	Passed
2	56	A	Passed	39	C	Passed
3	28	E	Passed	45	B	Passed
4	32	C	Passed	26	E	Passed
5	42	B	Passed	50	A	Passed
6	52	A	Passed	18	C	Passed
7	36	C	Passed	40	B	Passed
8	37	C	Passed	34	C	Passed
9	45	B	Passed	19	F	Fail
10	33	C	Passed	33	C	Passed
11	48	B	Passed	39	C	Passed
12	30	C	Passed	21	E	Passed
13	55	A	Passed	30	C	Passed
14	46	B	Passed	34	C	Passed

15	35	C	Passed	41	B	Passed
Total	623			505		
Mean	41.5			33.8		
Std .Dev	3.98			3.22		

The analysis of results in table 4.4 reveals that, the academic performance of students taught with computer (experimental group) was41.5 mean with3.98 standard deviation while control group scored 33.8 mean with 3.22 standard deviation. The grades of experimental group were higher than that of control group as compared. This means that, using computer to teach and learn has more positive effects than the direct teaching methods.

4.2   Test of Null Hypotheses.

In this section, the null hypotheses were tested using regression analysis and the results are contained in Tables 4.5 to 4.9.

Null Hypothesis 1: Standard Learner – to -computer ratio has no significant influence on teaching and learning of animal husbandry in Katsina state government secondary schools.

The test of null Hypothesis 1 was as summarized in Table 4.5

Table 4.5: Testing of Null Hypothesis (H_{o1})

Model	Std. Err	B	T	r –cal	r^2	Adjusted r^2	r-crit.	Sig.
SLCR	.669	13.137	19.647					
				0.210	.044	.042	.088	.000
TLAS	.047	.203	4.348					

Source: Field Work 2015

The analysis of data in Table 4.5 indicated that, the calculated r-value of 0.210 was greater than the 0.088 r-critical values even at 0.05 levels of significance. This implies that, standard learner –to – computer ration has significant influence on teaching and learning of animal husbandry in Katsina state secondary schools. Hence, the null hypothesis was rejected.

Null Hypothesis 2:Teachers and students' skills to operate computers have no significant influence on teaching and learning of animal husbandry in government secondary schools in Katsina State.

The test of null Hypothesis was as summarized in Table 4.6

Table 4.6: Testing of Null Hypothesis (H_{o2})

Model	Std. Err	B	T	r –cal	r^2	Adjusted r^2	r-crit.	Sig.

TSCS	.600	15.741	26.22					
				0.432	.186	.184	.088	.000
TLAS	.041	.401	9.664					

Source: Field Work 2015

The results of data in table 4.6 showed that r-critical value of 0.432 was more than r-table value of 0.088 at 0.05 levels of significance. This means that, teachers and students skills to operate computer has significant influence on teaching and learning of animal husbandry in Katsina state secondary schools. Thus, the null hypothesis two was not retained.

Null Hypothesis 4: Using computer in teaching and learning has no significant effects on students' academic performance.

The test of null Hypothesis ii can be seen as summarized in table 4.8

Table 4.7: Testing of Null Hypothesis (H_{o4})

Model	Std. Err	B	t	r –cal	r^2	Adjusted r^2	r-crit	Sig.
UCTL	.669	18.966	28.647					
				0.563	.317	.315	.088	.000
TLAH	.045	.618	13.766					

Source: Field Work 2015

The results of data in table 4.7 showed that r-critical value of 0.088 at 0.05 level of significant was less than the r-calculated value of 0.563. This means that, using computer by teachers and students has significant effects on teaching and learning of animal husbandry in Katsina state. Hence, the null hypothesis was rejected.

Summary

The study revealed the following findings:-

The major objective of this study was to determine the effects of computer utilization on instructional delivery of animal husbandry in secondary schools in Katsina State. The study formulated for specific objectives, answered four research questions and tested four null hypotheses at 0.05 levels of significance. The study adopted descriptive survey and quasi experimental designs. Questionnaire and achievement test in animal husbandry was used as instruments for data collection. Simple frequency and percentages, mean and standard deviation was used to answer research questions while regression and t-test were employed to analyze the null hypotheses. Based on the data collected and analyzed, one of the results of the findings indicated that, computer availability for teaching and learning of animal husbandry was grossly inadequate.

The results from the data generated for the study showed that, respondents lack basic skills on the use of computer for teaching and learning of agricultural science. Result of the research question four revealed that, the performance of students taught with computer was better than those taught with conventional teaching method. It means that computer has positive effect on teaching and learning.

Conclusion

Based on the findings of this study, the researcher concluded that, as long as the available computers cannot meet the learner – to – computer ratio standard and low usage of the available ones persist, teaching and learning of animal husbandry in the study area will not improve to expected standard.

Recommendations

This study assessed effects of computer utilization on instructional delivery of animal husbandry in secondary schools in Katsina State, Nigeria. Based on the findings of the study, the following recommendations were made:-

i.   Computers and power supply sources should be made adequately available by the government. The federal and state government should make more efforts to provide more computers and other necessary ICT facilities in Katsina state secondary schools in particular and Nigerian institutions in general bearing in mind the required standard of learner – to –computer ratio of either 1:1 or 4:5. Where the government cannot provide other stakeholders like organized private sectors, non-governmental organizations, religious bodies can also help in the provision of these ICT facilities.

ii   Both government and school authorities should organize training and retraining, seminars and workshop for staff and students to acquire ICT skill and build their Internet capacity required for using ICT for effective and efficient teaching and learning.

iii.   The importance and benefits of using computer in teaching and learning should be disseminated to all teachers and students through seminar and symposium by the schools. Government and other stakeholders in education should also embark on awareness campaign on need of using ICT in the field of learning because it serves as a catalyst for educational advancement.

Suggestion for Further Studies

a) This study was conducted in Katsina state of Nigeria. The study could be replicated in other states in the country.

b) As this research was based on agricultural science, this kind of research could be conducted in other areas of specialization.

REFERENCES

Abimbade A.(1999) *Principles and Practice of Educational Technology*: International Publishers Limited Ibadan. Pp. 34-40

Abiola O.O.(2007) *Procedures in Educational Research Kaduna*: Hani Jam Publications. Pp. 51-53

Adeyemi, A. D. and Landu, V. B. (2002) *Computer appreciation for N C E Students.* A published mimeograph, Pp. 88-92

Ahmed, M. (2008) *An introduction to Teacher Education.* New creation publishing House LTD Kaduna. Pp. 121-123

Ajibade, R. O. (2006) *Instructional Material for teaching*. N. T. I. Kaduna, Nigeria. Pp. 33-37

Akinyemi K.(1988) "Computer in Education" Agun I. Imogies (eds) foundamentals of educational technology Ibadan Y. book. Pp. 46-49

Amoor, S. S. (2010). Integrating the Internet with curriculum of office education programme in tertiary institutions in Nigeria; The Information Manager, 8(2), 56-57

Anderson, R.E. (2002) Guest Editional: International Studies of Innovative uses of ICT in Schools, *Journal of Computer Assisted Learning*.4(3), 61-64

Andural, S. I. & Ikyumen, M. I. (2006). The use of information technology in the teaching and learning of vocational and technical education in Nigeria. *Benue state Journal of Education, (7),*53-59.

Anglin, G.J.(1995) *Instructional Technology; Past, Present and Future.* Englewood, Co. Libraries Unlimited. Pp. 12-15.

Aremu A.(2002) *Enriching the Language Curriculum of the Pre-Primary/Primary School through the use of the Computer. Pp. 20-24*

Audu U. F. and Agbo J. A. (2010) *Educational Technology in practice,*New creation publishing House LTD Kaduna. Pp. 27-30/

Baba, E. L (2009). Assessment of Adequacy Functionality and Utilization of Office Technology for Teaching in Tertiary Institutions in Kogi State.*Business Education Journal 7(1), 74-79*

Baba, T., Adewole, A. andOlalekun, O. (2009) *Uses of computer and its relevance to teaching and learning in Nigerian educational system.* Ile-Ife, Nigeria. 46-48

Becker, H.J. (1998) *Running to Catch a Moving Train: Schools and Information Technologies Theory Into Practices*. (In Devid Lawyer).102-108

Becker H.J (2000) *Finding From The Teaching, Learning and Computing Survey: Is Larry Cuban Right? School Technology Leadership Conference Council of Chief State School Officers.* Washington. 93-105

Browne D. L. and Ritchie W. (1996), Kids, computer and constructivism. *Journal of instructional psychology*.4(2), 58-62

Chapman, G. (1998). *Digital Nation: Push to Trade Class Textbooks for Laptop PCS is a Misuse of Technology*. Pp. 34-41

Cloke, C. and Sharif, S. (2001) Why Use Information and Communication Technology? Some Theoretical and Practical Issues, *Journal of Information Technology for Teacher Education.*7(3), 83-90

Cohen, L., Manion, L., and Morrison, K. (2002) *Research Method in Education London*: Routledge 5th Edition. 58-60

Cook, D. and Firilayson, H. (1999) *Interactive Children, Communicative Teaching ICT and Classroom Teaching* Duckingham, Open University Press. 68-72

Cord (1999) *The ABCs of Technology Preparation,* Waco TX the Cornerstone of Technology Preparation.106-121

Cuban L. (2001) *Oversold and Underused: Computers in the Classroom*. Combridge Harvard University Press. 89-92

David Lawver (2001) *Attitudes toward and stages of adoption of information technology by agri-science teachers in Texas.* Texas university. 51-57

Department of Education, Research, Statistics and Planning (2010), Ministry of Education Katsina, Katsina State. 13-17

Ekeh, F.I. (2003). *Research Methodology and Statistics in Education.* Abuja: Madol Press Ltd. 23-26

Ezeoba, K.O. (2007). Instructional media. an assessment of the availability, utilization and production bynursery school teachers. *Journal of Applied Literacy and Reading.* 3 (Special Edition) 6(3), 33-38

Florance Y O (2010) *Computer Education policy and its implementation in Kenyan Secondary Schools*, Bondo University College Kenya. 33-36

Fraze, S., Fraze, D., Baker, M., and Kieth, L, (2002) *Attitudes Toward and Stages of Adoption of Information Technology by Agric-Science Teachers in Taxes.* Proceeding From the Southern Association of Agriculture Education Research Conference. 21-27

Galbreath, J. (2000)*, Knowledge management technology in education.* An overview education technology. 64-72

Gilber Leslie Prince (2008) *Implementation of computer in schools at makana Distric* South Africa 89-95

Glaser, B. and Strauss, A. (1967) *The Discovery of Grounded Theory. Strategies for Qualitative Research.* Aldine New York. 121-126

Granger, C.A., Morbey, M.L, Lotherington, H. Owston, R.D, and Wideman H.H. (2002). Factors Contributing to Teacher's Successful Implementation of I.T, *Journal of Computer Assisted Learning.*3(1), 36-41

Hassini E. (2004) *Student Instructor Communication the Role of e-mail. Computer and Education (2006).*65-68

Hawkridge, D., Jaworski, J., and McMahon, H (1990) *Computers in Third-World Countries; Examples, Experience and Issues.* Hound Mills the Macmillan Press LTD. 80-84

Heaviside S. (1992) *Public Secondary School Teacher Survey on Vocational Education*.9-12

Hokanson, B. and Hooper, S. (2003). *Computer as Cognitive Media, Examining the Potential of Computers in Education Computers in Human Behaviour* (2000). 72-73

Howell, C and Lundall, P. (2000) *Computers in Schools. A National Survey of Information Communication Technology in South African Schools*. Cape Town. 32-37

Hughes C. and Tight M. (2000) *Research methodology*, Open University Press. 21-27

Idoko, J. A. & Ademu, A. (2010). The challenges of information technology for teaching –learning as perceived by animal husbandryteachers in secondary schools in Kogi State.*Journal of Educational Innovators.* 3(2),43-49.

Joseph N.(1990) *The computer: How is it changing our lives.* Washington D. C. 42-47

Kennewell S. (2004). *Meeting the Standards in Using ICT for Secondary Teaching; a Guide to the ITT NC*, London Rountledge Falmer. 30-36

Kirschner P. A. and Woperies N. E. (2003)*pedagogical benchmarks for Information and Communication Technology in teacher education*(electronic version) Technology.101-112

Klopfer, E. (2005) *Playing to Learn, State of-the era Computer Games go to School.* Access Learning. 65-67

Krejcie, R.V.and Morgan, D.W. (1970), *Determining Sample size for Research Activities education and psychological measurement*. Copyright (2006). The research Advisors (http;/research advisory.com). retrieved on 23/04/2010

Kulik C., Kulik J. A. and Bangert-Drown R. L., (1990) *Effectiveness of mastery learning program of : Ameta analysis*, review of educational research.67-71

Label, B. I. & Hime, E. A. (2006). Practical barriers to the use of digital information technologies in the nigerian classroom. *Benue State University Journal of Education,* 7(2), *201-207*

Lamb, A. & Smith, W. (1999). *Virtual Sandcastles; Teaching and Learning of a distance. Emporia,* Kansas vision to Action. 35 37

Laudon K. S., Laudon J.(2010) *Management information system*: managingthe digital firm eleventh edition, New jersey, Prentice Hall. 37-43

Leask, M. and Meadows, J. (2000). Why Use ICT? In Leask M. and Meadows J. (Eds) *Teaching and Learning with ICT in the Primary School*. London, Routledge. 50-53

Leask, M. and Meadows, J. (2000)*Why use ICT? Teaching and Learning with ICT in the Primary School*. London. Routledge.*71-74*

Macaulay O. A. (1993) *Computer: A Tool to help Children with specific learning difficulties in Mathematics.* J. issues spec Education. 84-86

Malim and Birch (1998)*, Introductory Psychology.* Spain: Macmillan press Ltd.

McFarlane, M. (1997) *Information Technology & Authentic Learning; Realising the Potential of Computer in the Primary Classroom.* London Routledge. 19-25

Micheal spies (2001) *computer technology use by California agricultural teachers*. California state university Fresno. 75-79

Miles, J. (2001) *Research Methods and Statistics Success in your Psychology Degree*. Glasgow Bell and Brain Ltd. 54-58

Milken Exchange on Education Technology. (1998) *The State of the States:* North calorine.edu week on the web. 61-67

Miller C. and Kotriik (J) (1987) Micro Computer Use in VOC Agric Programme in the United State. *Journal of American Association of Teacher Education in Agric*.6(4), 56-57

Morrison, G., Lowther, D., and De Meulle, L. (1999): *Integrating Computer Technology into the Classroom*. Upper Saddle River, New Jersey Merrill.154-160

National Future Farmers of America Organization (1999) *Reinventing Agriculture Education for the Year 2020.*

National Research Council (1988) *Understanding Agriculture:* New Directions for education. Washington DC. National Academy Press.

Nuradden, S. (2008) *The Use of Computer In The Teaching of Biology in Katsina State Secondary School in the 21st Country*. (unpublished)

Oladeji, J. O., Oyesola, O. B., Ikwuakam, O. T. (2008) *Principles and practice of teaching agricultural education in Ngeria.* Published by versatile publishers, Umuahia.

Oladele, J. O. (2005) Fundamentals of educational psychology, fifth edition by Johns lad publishers limited Lagos.17-20

Pedro, H. K. Enrique. E, Ernesto. H. & Lucio, R. F. (2004) Technology in schools; education, IT and the knowledge society. Retrieved from http://www.iie.ufro.cl/ 5th Oct. 2014

Pelgrum W.J. (2001) Obstacles to the Integration of ICT in Education. Result from World Wide Educational Assessment. Computers and Education.12 17