EFFECT OF INTERACTIVE COMPUTER SOFTWARE AND QWERTY INSTRUCTION ON STUDENTS PERFORMANCE IN KEYBOARDING IN COLLEGES OF EDUCATION IN NORTH-EAST NIGERIA

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Abstract
The study investigates the effect of interactive computer software and QWERTY instruction on students' performance keyboarding in Colleges of Education in North-East Nigeria. The study had four objectives, four research questions and four null hypotheses. The pretest posttest comparison group design was used. The population of the study was 1686 students that offered keyboarding in colleges of education in north east Nigeria in 2017/2018 academic session. Two intact classes of 163 students were used for the study. The instrument used for data collection were keyboarding pre-diagnostic performance test (KPPT) and keyboarding diagnostic performance test (KDPT) design by the researcher and validated by three experts. The data obtained from pilot study were subjected to statistical analysis using Cronbach alpha. The instrument had reliability coefficient of 0.85 while that of posttest was 0.89. The KDPT were administered to student before the treatment while KDPP were administered after the treatment. Data collected from the two instruments were marked by the researcher using drawn marking scheme. The results of the data were coded in to Statistical Package of Social Sciences. The SPSS was used analysis descriptive statistics of mean, standard deviation and mean difference to answer the research question while t-test was employed in testing the null hypotheses at 0.05 level of significance. The result revealed among others that those taught using Interactive Computer Software. Based on the findings, the researcher concluded that the use of QWERTY method would help students to have proficiency in mastering the keyboard which will facilitate the typing skills. It was recommended among others that school should charge all the keyboarding lecturers to use QWERTY method in teaching the students keyboarding.

Keywords: Interactive, Computer, Software, Qwerty, institution, Performance, Keyboarding

Introduction

Keyboarding refers to the input of data using the touch method on a standard alphanumeric keyboard. According to Bailey (2008), Keyboarding is a technology literacy skill necessary for students to become productive citizens in an increasingly global and digital world. Bailey stress that keyboarding is one of the technology competencies students need to demonstrate mastery of Common Core Standards in Arts and effectively manage the on-line requirements. Keyboarding is one of the core subjects in Business Education programme in Colleges of Education in Nigeria. The role of keyboarding as contain in the guideline of National Commission for Colleges of Education (NCCE) is to equip the students with the right skills that will enable them to engage in a life of work as well as for self-employment. Keyboarding is core subject course to all Business Education students in Colleges of Education in Nigeria. In the modern society, keyboarding skills have become very essential for manipulation and operation of modern technological tools being used in schools. According to OECD (2013), keyboarding skills is an important part of the portfolio of skills that the future workforce should possess in technology rich environments. It therefore means that individuals who fail to develop these skills may face significant disadvantages in labour market.

Research on typing instruction has yielded consistent results, for instance, Roger (2009) noted that students will knowledge of keyboarding have increase legibility and clarity of presentation, increased speed of input, reduces the physical pressure and concentration of handwriting, editing work is easier. It worth saying that pressing a key can be much easier. It worthy saying pressing a key can be much easier than manipulating a pen or pencil. Using keyboard promotes thought and its integration of keyboarding with all subject areas improves students' motivation. Nicols (2012) suggested that the goal of keyboarding instruction is to develop a touch skill that will enable the students to enter alphanumeric information at a speed and accuracy that is faster than handwriting. Pisha (2013) opined that Keyboarding skills offer the same advantages for the computer user as the pocket calculator does for the mathematician and prevent the overloading of the short-term memory during the keying-in of data. Keyboard skills can therefore be regarded as an essential skill to business education students.

QWERTY keyboarding refers to the method having the arrangement of alphabetical and numeric keys found on the traditional typewriter. The first six keys in the upper left hand part of the keyboard spell out QWERTY (Roger, 2009). This arrangement of keyboard was made to reduce the jamming of type bars in typewriters as they move to strike the paper. This version has provided the finger-base keys called the 'home keys (asdf;lkj) in the alphabets' mid row of the English keyboard with the 'Qwerty' keys at the first alphabets keys row. David (2009) states that each finger rest on a particular key in the home row of the keyboard when not typing, in order to keep grounded, the left hand is responsible for all the keys to the left of its home column, the right hand is a real workhorse covering to the right of its home column and thumbs are used for space bar. This keyboard is presently the most popularly used in all English typewriters, word processors and computers (Fleeming, 2012), however some scholars are agitating n the use of Computer Instructional Software for teaching keyboarding.

According to Collier (2013) Computer Instructional Software (CIS) is package enables students to acquire keyboarding skills through games and animations. The software allows students to demonstrate skills, concepts, do simulations. Essien (2008) reported that a good typing software program will allow the students to develop their skills with the keyboard quickly without losing motivation to use the computer. The best software should include the following features: Ergonomic and safe keyboarding guide or section, Provide a multi-sensory approach, where both sound and images are used to re-enforce instructions and allow repetition of instructions if possible, A large, clear on-screen keyboard which shows the position of both keys and your fingers is very helpful, the use of real words rather than nonsense letter patterns as soon as possible within practice exercises can be very helpful to the students, be able to change font size and style, background and text color, the use of sound, speed and accuracy targets to be achieve are all very helpful to students learning the appropriate key-reaching techniques to build speed and accuracy, that it does not try to teach too much too quickly. The focus should initially be on accuracy and not on speed and should allow the user to practice for short periods of time, rather than relying on longer sessions to allow progress. The emphasis is on students but with regular practice progress can be tracked and recorded.

Academic performance in the context of this study is referred to what students achieved in their studies and how they cope with or accomplish different learning experiences given to them by their teacher. It includes measuring the learners' ability using formative and summative types of evaluation after systematic procedure of instructional delivery by the teacher. Young, Klemz, and Murphy (2003) described academic achievement as scores and

grades obtained in the subject. Nwakocha (2018) defined academic achievement as extent to which students gain from a class, test or examination. The indicators of academic achievement according to Nwakocha (2018) include marks scored and grades obtained by candidates with respect to the examination standard board of a country or educational institution.

Mode of learning keyboarding using computer software is the strategy that involve drilling and practice programs intelligent tutoring systems, simulations, and educational games. The four components of computer software instruction are prevalent in 21st century classrooms. Learning keyboarding through drill and practice software programs helps in increasing fluency, speed and accuracy of students in keyboarding. Skinner and Daly (2010) maintain that automaticity includes speed, accuracy, and utilizing little effort or cognitive processes. Keyboarding game according to Schrader and Bastiaens (2012) allows user to engage in higher order thinking skills rather than games comprised of drill and practice situations. However, there are conflicting research studies on the effectiveness of computer software learning on academic achievement. A research conducted by Tsai, Yu, and Hsaio (2012) revealed that that previous research supports that digital game based learning positively influences student motivation to learn, but does not fully reveal the power to increase student knowledge acquisition.

Learning keyboarding using QWERTY method has its own set of inherent difficulties that students must grapple with in order to complete their work successfully. Research by Cassingham (1986) shows that QWERTY being the most widespread keyboard format, there are a number of problems inherent in the keyboard that can create difficulty and discomfort for users. The researcher emphasized that there is overstretch of the left hand while most of the users are right-handed. The author criticized that many of the most common letter keys on the QWERTY keyboard are inconveniently located for fast and easy typing. According to Awalu (2018), about 16% of typing is done in the lower row while 52% is done in the top row. These design issues mean that the QWERTY keyboard is not user friendly for comfortable or fast typing. This probably explained why persistent failure in keyboarding has been reported from examination over the period of years. Shin (2006) and McDonald and Foss (2007) reported that poor keyboarding skills affects students' ability to complete course-related tasks, projects and assignments correctly. In addition, it limits the ability of students to participate in keyboarding mediated communications activities, such as live online chats. As a result of poor performance of students in keyboarding, scholars such as Roblyer and Doering (2010), Sam (2014) emphasized on shifting from QWERTY instruction to computer interactive instruction. The scholars reported that computer keyboarding instructions help in developing the interest of students, it is user friendly, learners' centred and it is a private tutor that enables learner to overcome their keyboarding problems. Based on these accessions, the research empirically determine: ascertain the difference between pretest and posttest achievement score of students taught keyboarding using Interactive Computer Software Instruction (ICS) in Colleges of Education in North East, Nigeria; establish the difference between pretest and posttest achievement score of students taught keyboarding using QWERTY Instruction (QI) in Colleges of Education in North East, Nigeria; and assess the difference between posttest achievement score of students taught keyboarding using Interactive Computer software instruction (ICS) and those taught using QWERTY instruction (QI) in Colleges of Education in North East Nigeria.

Research Questions

The following are considered as research question of the study:

(i) What is the difference between pretest and posttest achievement score of students taught keyboarding using Interactive Computer Software Instruction (ICS) in Colleges of Education in North East, Nigeria?

(ii) What is the difference between pretest and posttest mean achievement score of students taught keyboarding using QWERTY Instruction (QI) in Colleges of Education in North East, Nigeria?

(iii) What is the difference between posttest mean performance of students taught keyboarding using Interactive Computer software (ICS) and those taught using QWERTY instruction (QI) in Colleges of Education in North East Nigeria?

Research Hypotheses

The following null hypotheses were postulated and tested at 0.05 level of significance:

(i) There is no significant difference between pretest and posttest achievement score of students taught keyboarding using Computer Software Instruction in Colleges of Education in North East, Nigeria.

(ii) There is no significant difference between pretest and posttest achievement score of students taught keyboarding using QWERTY Instruction (QI) in Colleges of Education in North East, Nigeria.

(iii) There is no significant difference between posttest achievement score of students taught keyboarding using Computer software instruction and those taught using QWERTY in Colleges of Education in North East Nigeria.

Methodology

The research design adopted for the study was quasi experimental design. According to Essien *(2008),* pretest-posttest design is often used to determine the effect of treatment where baseline (pretest) information is collected for all selected units before they are randomly assigned to treatment.

The target population comprised of all the 1686 NCE I Business Education Students in Eight Colleges of Education Admitted in 20017/2018 academic Session in North East Nigeria. The sample size of the study was 163 students that offered Keyboarding from two Colleges of Education in 2017/2018 Academic Session in North East, Nigeria. In order to facilitate the selection of institutions used for the study, the names of the eight colleges of education offering business education in the zone were written separately on plain paper, rolled and placed on table, an independent person was asked to select two from the groups. Intact two classes (81 and 82) of NCE I business education students in the institutions were used for the study.

The instruments used for data collection are Keyboarding Pre-Diagnostic Performance Test (KPPT) otherwise known as pretest and Keyboarding Diagnostic Performance Test (KDPT) which was known as posttest The KPPT was used to determine the entry level of the students while the KDPT was used to determine the effect of treatment on the performance of the keyboarding students. The KDPT contained one exercise while KPPT contained two exercises. Each of the instrument was allocated 50 marks. For the validity of the instrument, three experts in business education were given the instruments to ascertain content and face validity of the instruments together with the marking schemes. Based on this, their contributions were incorporated in to final copy. The instrument is valid when it is validated by the experts and measures what is supposed to be measured (Sambo, 2008).

To determine the reliability of the instruments, a pilot study was conducted on 100 NCE students of Federal College of Education Bichi, Kano state. The institution had common characteristics with sample colleges. The data obtained by using split-half method were subjected to statistical analysis using Cronbach alpha. The KPPT instrument had reliability coefficient of 0.85 while that of KDPT was 0.89. The instruments were found reliable. This is in line with Sambo (2008) who opined that an average value of correlation co-efficient should not be less than 0.65.

To determine the entry skills of students in keyboarding, the researcher administered the pretest. The scripts of the exercise which lasted for 30 minutes were retrieved by the researcher and research assistants. In the second stage, the researcher provided treatment to the two groups of the students independently using three hours for the period of four weeks using the drawn lesson plan. This was done through with the support of the research assistants in each of the institution. After the treatment, posttest was administered to the students. The scripts of the pretest and posttest were marked by the researcher personally using drawn marking scheme. To avoid examination malpractice, the service of research assistants was employed who assist in monitory and supervising the students during the test. The exercise lasted for six weeks.

Data were analyzed in two stages using Statistical Package of Social Science (V 21). In answering research questions, descriptive statistics of mean score, standard deviation and mean difference were used to answer the research questions. Independent t-test was used to test null hypotheses one and paired t-test was used to test null hypotheses two and three. The three null hypotheses are tested at significant level of 0.05.

Results

Results of the Research Questions

The result of research Questions are presented in Table 1 to Table 3

Research Question One: What is the difference between pretest and posttest achievement score of students taught keyboarding using Interactive Computer Software Instruction (ICS) in Colleges of Education in North East, Nigeria?

Table 1: Difference between pretest and posttest mean achievement of students taught keyboarding using ICS

ICS Instruction	N	Mean	Std. Deviation	Mean difference
Pretest	81	23.57	5.39	2.05
Posttest	81	25.62	10.15	

The pretest mean performance of students taught keyboarding using ICS stood at 23.57 while the posttest was 25.62 with standard deviations of 5.39 and 10.15 respectively. The mean difference of 2.05 obtained shows that there is slight difference exists between the pretest and posttest mean performance of students taught keyboarding using ICS in favour of posttest.

Research Question Two: What is the difference between pretest and posttest mean achievement score of students taught keyboarding using QWERTY Instruction (QI) in Colleges of Education in North East, Nigeria?

Table 2: Difference between pretest and posttest mean achievement of students taught keyboarding using QI

QI	N	Mean	Std. Deviation	Mean difference
Pretest	82	22.89	6.32	22.78
Posttest	82	45.67	15.87	

The result of research question three revealed the pretest mean performance of 22.89 with standard deviation of 6.32 while that of posttest mean performance was 45.67 with standard deviation of 15.87. The mean difference (22.78) between the mean performances of students was large. The result, therefore, shows that difference exists between pretest and posttest mean performance of students taught keyboarding using QI in favour posttest.

Research Question Three: What is the difference between posttest mean performance of students taught keyboarding using Interactive Computer software (ICS) and those taught using QWERTY instruction (QI) in Colleges of Education in North East Nigeria?

Table 3: Difference between posttest mean achievement of students taught keyboarding using QI and those taught using QI

Instructional strategy	N	Mean	Std. Deviation	Mean difference
QI	82	45.67	15.87	20.05
ICS	81	25.62	10.17	

The posttest mean performance of students taught keyboarding using QWERTY instruction was 45.67 against 25.62 for those taught using Interactive Computer software instruction. The standard deviations were 15.87 and 10.166 respectively. The mean difference obtained (20.05) was large, hence it was concluded that there was great difference between the mean performance of the two groups of students in keyboarding in favour of QI.

Results of Null Hypotheses

The results of the test of hypotheses are presented in Table 4 to 6.

Hypothesis One: There is no significant difference between pretest and posttest mean achievement score of students taught keyboarding using Computer Software Instruction in Colleges of Education in North East, Nigeria.

Table 4: t-test analysis on difference between pretest and posttest mean achievement of students taught keyboarding using ICS

ICS Instruction	N	Mean	Std. Dev	Std. Error Mean	df	t-value	p-value
Pretest	81	23.57	5.39	.5994	80	39.32	.000
Posttest	81	25.62	10.17	1.12831	80		

The result of test of null hypothesis two revealed the pretest mean performance of 23.57 while the posttest was 25.62 with standard deviation of 5.39 and 10.15 respectively. The t-value was 39.32 while the p-value was .000. The p-value obtained was less than 0.05 level of significance, hence, it was concluded that there was significant difference between the pretest and posttest mean achievement of students taught keyboarding using ICS in favour of posttest. The hypothesis is rejected.

Hypothesis Two: There is no significant difference between pretest and posttest mean achievement score of students taught keyboarding using QWERTY Instruction (QI) in Colleges of Education in North East, Nigeria.

Table 5: t-test analysis on difference between pretest and posttest mean achievement of students taught keyboarding using QI

QI Instruction	N	Mean	Std. Dev	Std. Error Mean	df	t-value	p-value
Pretest	82	22.89	6.32	.697	81	31.78	.000
Posttest	82	45.67	15.87	1.752	81		

The t-test analysis used for null hypothesis three revealed pretest mean performance of 22.89 with standard deviation of 6.32 against 45.67 and 15.87 for posttest respectively. The t-value obtained was 31.78 while the p-value (.000) was less than the alpha value (0.05). The result therefore shows that there was significant difference between the pretest and posttest mean achievement of students taught keyboarding using QI in favour of posttest. The null hypothesis was rejected.

Hypothesis Three: There is no significant difference between posttest mean achievement score of students taught keyboarding using Computer software instruction and those taught using QWERTY in Colleges of Education in North East Nigeria.

Table 6: t-test analysis on difference between posttest mean achievement of students taught keyboarding using QI and those taught using ICS

Instructional strategy	N	Mean	Std. Dev	Std. Error Mean	df	t-value	p-value
QI	82	45.67	15.87	1.128	81	26.08	.000
ICS	81	25.62	10.17	1.752	80		

The test difference between posttest mean performance of students taught keyboarding using QI and those taught using CIS revealed the mean performance of 45.67 and 38.74. The standard deviation was 15.87 and 10.17 respectively. The t-value was 26.08 while the p-value was .000. The probability value was less than the level of significance (.000<0.05). The result therefore shows that significant difference exists between the posttest mean performance of students taught keyboarding using different approach which was in favour of QI. The null hypothesis was therefore rejected.

Discussion

The result of research question one and the test of its corresponding null hypothesis shows that there was significant difference between the pretest and posttest mean performance of students taught keyboarding using Computer Software Instruction in Colleges of Education in North East, Nigeria. The result of the study agreed with that Mbaeze (1998) who found that development in keyboarding skills is general low acquired through learning and practicing without looking at the keys. Similarly, the study was in line with the previous study conducted by Sholes (2008) whose result shows that a good typewriting teacher is that teacher that teaches keyboarding skills using proper keyboarding teaching techniques, Sholes added the using Computer Instructional Software is likely to result in a low typing speed. Accordingly, the study also agreed with that of Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur and Sendurur (2012) whose study revealed that computer instructional software has affected the general performance of keyboarding students. In the same lane, the study also agreed with that of Snyder and Dillow (2013) who reported that although access to technology has increase proficiency of students in keyboarding but it is found to be a barrier

to touch typing instruction. The authors added the use of technology has negative effect on general proficiency of students in keyboarding. Access to technology was cited as a barrier to keyboarding.

Research question two and test of its corresponding null hypothesis shows that there was significant difference between the pretest and posttest mean performance of students taught keyboarding using QWERTY Instruction. The outcome of the study further affirmed the report of Christensen (2004) who found a positive relationship between keyboarding fluency of keyboarding students improve when students have the ability to efficiently touch typed typing without looking at the keyboard. The author maintained that the use of standard QWERTY would help to improve students' performance in Keyboarding. Grabowski (2008) reported that it is possible for writers to input text without formal touch typing instruction and even develop a system that results in keyboard efficiency, however the author added that, a systematic instructional process through QWERTY would help students arrive at adequate transcription speeds early enough in their educational careers to benefit from automaticity. The result of the study also agrees with that of Oyeyiola (2006) whose result revealed that touch method of teaching keyboarding skills promotes the performance of students in keyboarding. Furthermore, study also was in line with that of Sam (2014) who reported that associative phase in keyboarding through the use of traditional QWERTY method provide better skills in both speed and accuracy of students. The result study conducted by also agreed with that of Posnick-Goodwin (2016) whose result shows that Touch typing such as QWERTY which involves cognitive, affective, and psychomotor skills, a combination of skills much more enhance the performance of students in keyboarding

The result of research question three which was further explained by test of corresponding null hypothesis shows that significant difference exists between mean performance of students taught keyboarding using Computer software instruction and thought using QWERTY in Colleges of Education in North East Nigeria. The mean score obtained indicated that students taught using QWERTY performed better. The result agrees with the report of Achilike (2002) who stated that touch method of teaching keyboarding skills if extensively supervised by the teacher led to greater acquisition of speed and accuracy in keyboarding. Speed and accuracy skill can be acquired when students learn keyboarding without looking at the keys. It also agrees with the result of Snyder and Dillow (2013) who reported that QWERTY instructional strategy is the best way of students acquisition of keyboarding skills. This is also in line with Oyeyiola (2006) who found 58.6% failure in control groups post-test where the touch method of teaching keyboarding skills was not used. Rieger (2007) also opined that in acquisition of many skills, touch-typing requires explicit instruction through adoption of QWERTY instruction. So also the result agrees with the report of Weigelt and Weintraub (2015) who maintained that associative phase in keyboarding through the use of traditional QWERTY method provide better skills in both speed and accuracy of students. Similarly, the study agrees with the study of Chassie (2015) whose results shows that when it comes to efficiency and accuracy, touch-screen manipulation of text and gets slower when computer interactive software is used. The author added that any student that learn keyboarding using a standard QWERTY keyboard, reducing errors and increasing speed and proficiency.

Conclusion

The results of the study revealed that students' performance in keyboarding improves with the use of QWERTY instructional strategy which emphasized on touch typing. Based on the outcome, it was concluded that the use of the traditional QWERTY method would enable students to be skillful (Speed, accuracy and mastering of keys) in keyboarding class. By implication, it therefore means that the use of modern technology (Computer Interactive

Software) in keyboarding class will hinder students from developing appropriate keyboarding skills which will affect them in their further educational career and workplace. Although the result shows that Computer Interactive Software enhance students' skills in keyboarding but the long time disadvantage would be that students cannot meet up with the requirements of the labour market that emphasized on 45 words P/M for employability skills expected from secretaries. The shortcoming is as a result of usage of two fingers for learning keyboarding use computer software instead of 10 fingers has emphasized by QWERTY technique.

Recommendations

Based on the outcome of the study, the following recommendations were put forward:

(i) School management through Head of Business Education Department should encourage lecturers to use standard QWERTY guide to teach students keyboarding in their colleges. This will help students to develop good skills (speed and accuracy) in the keyboarding.

(ii) Lecturers in Colleges of Education in North-eastern Nigeria should use QWERTY instructional strategy in teaching keyboarding to business education students in colleges of education in North-eastern Nigeria.

(iii) Keyboarding lecturers should enlighten students on the advantage of QWERTY instruction over ICS on skill development, speed and accuracy, this will enable them to develop positive attitude on adoption of QWERTY method in learning keyboarding.

(iv) School management through the Head of Business education should as matter of urgency discourage lecturers from using Interactive Computer Software (ICS) to teaching keyboarding to business education students in colleges of education in North-eastern Nigeria.

(v) School management should provide business education department with needed support, facilities and materials needed for learning keyboarding through QWERTY should be provided

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