IMPROVING SECONDARY SCHOOL GEOGRAPHY STUDENTS' POSITIVE ATTITUDE TOWARDS MAP READING THROUGH COMPUTER SIMULATION INSTRUCTIONAL PACKAGE IN BIDA, NIGER STATE, NIGERIA

O. C. FALODE, H. USMAN, S. C. ILOBENEKE,
H. A. MOHAMMED, A. J. GODWIN, M. A. JIMOH
Federal University of Technology, Minna, NIGERIA

Abstract. This study investigated effectiveness of computer simulation instruction on the attitude of geography students towards map reading in Bida, Nigeria. It also examined the influence of gender on students' attitude. The research was a quazi-experimental design. Intact classes of 160 senior secondary school class two students were drawn from two purposively selected secondary schools within Bida and were randomly assigned to experimental and control groups. The experimental group (82 students) was exposed to computer simulation instructional package (CSIP) while their counterparts in the control group (78 students) was taught the same concept of map reading using lecture method. Attitude questionnaire named QGSAMR was used for data collection. The releaibility coefficient of 0.83 was obtained using Cronbach alpha's formula. The QGSAMR was administered to students as pre-test and post-test. The students' pretest and post-test attitude scores were analyzed using t-test statistics. The results indicated that there was significant difference between the attitude scores of the two groups in favour of students exposed to computer simulation instructional package. The result however

indicated that there was no significant difference between the attitude of male and female students exposed to the package. It was therefore recommended among others, that, computer simulation instructional package should be adopted in teaching and learning of geography as the package would help to improve students' attitude towards geography and in turn leads to improved performance.

Keywords: attitude, computer simulation instruction, Geography, map reading

---

Introduction

Information and Communication Technology (ICT) occupies a predominant position in the contemporary world today and it has brought revolution and growth in all fields of human endeavors (Adegbija & Falode, 2014; Mangal & Mangal, 2013). Specifically, ICT has affected teaching, learning and research in education sector. It helps to accelerate, enrich, motivate and engage students during teaching and learning processes thereby improving students' understanding of concepts (Falode, 2014).

As a result of the prominent role played by ICT in teaching and learning process, Nigerian government gave priority to science and technology with policies that are favourably disposed to science and technology education and this is reflected in the National Policy on Education by Federal Republic of Nigeria (FRN, 2009). In furtherance to government support for science and technology education, ICT, an integral aspect of science and technology is adopted by the policy to apply to all levels of education in the country (Falode, 2014). Some important applications of ICT in education involves the use of animations and simulations.

Simulation is one important tool of ICT that is useful in teaching and learning process. Michael (2000) observed that technologies resulting from

computer simulation offer learners several advantages. It can provide students with the opportunity to engage in activities that may not be possible ordinarily in a classroom setting, it can enhance academic performance and the learning achievement levels of students, and it can equally provide close to real-life hands-on laboratory experiences.

Studies carried out by Strauss & Kinzie (1994); Sadler et al. (1999); Stieff & Wilensky (2003); Garcia-Lugue et al. (2004); and Gimba et al. (2015) revealed that well-developed computer simulation instructional packages are usually effective in teaching and learning of varieties of school subjects including geography.

Geography as a subject in Nigerian secondary school curriculum is portrayed as diverse and dynamic in nature (Atere, 2006). Obondo Gaudence et al. (2013) opined that geography is seen as a subject that develops learners' critical thinking ability and that helps to comprehend spatial relationship among various features of the earth surface. One important aspect of physical geography which is compulsory for all secondary school geography students is map reading. Map is a representation of earth's surface on a 2-dimensional surface. Different types of maps useful in teaching and learning of geography include topographical map, atlas map, plan map, sketch map among others. The ability of students to recognize conventional signs on a map and interpret what those signs represent is known as map reading (Iwena, 2008).

In spite of the efforts put by teachers to effectively teach geography in Nigerian secondary schools, students' performance in the subject is not satisfactory. Obondo et al. (2013) revealed that poor performance in geography is as a result of negative attitude of students towards the subject. They suggested that inorder to improve students' performance in secondary school geography examinations, the conventional approach of teaching should be complemented with technological innovations which would help students to develop positive attitude towards it.

Attitude can be described as settled behaviour or manner of acting, as representation of feeling or opinion. It refers to certain predisposition to act or react in a positive or negative way towards certain situations and ideas (Issa et al., 2010). Attitudes in teaching and learning process are enduring systems of positive or negative assessments, enthusiastic feeling and tendencies with respect to social objects. Zacharias (2003) described human attitude as a mental concept that depicts favourable or unfavourable feelings toward an object. While students with positive attitude towards a school subject have greater achievements, their counterparts with negative achievement achieved lesser (Zacharia, 2003). Tunçok (2010) and Tella & Bashorun (2012) investigated students' attitudes towards school subjects when computer is used as medium of instruction. Their findings revealed that computer assisted instructions resulted to students' positive attitude towards the subjects and content taught.

Gender has been acknowledged as one of the attribute that affects student's attitude towards practical-based subjects at senior secondary school level. Some research findings have shown contradictory views in this respect. While, the result of the finding by Tabassum (2004); Onasanya et al. (2006); and Gambari & Mogbo (2005) revealed that gender does not influence students' attitude and academic performance, some revealed that gender does as revealed by Ifamuyiwa (2004) and Iwendi (2009) in favour of male students while some also go in favour of female students as revealed by Jacobs & Osgood (2002), Anagbogu & Ezeliora (2007) and Iwendi (2009).

Ho (2009) and Falode (2014) therefore suggested that one important way of bringing about positive change in students' attitude towards school subjects is by employing student-centered approach through the integration of computer assisted instructions like simulations into teaching and learning process. It is against this background that this study investigated the effectiveness of Computer Simulation Instructional Package on secondary school geography students' achievement in Map reading in Bida, Niger State, Nigeria.

Aim and objectives

The aim of this study was to determine whether Computer Simulation Instructional Package would improve secondary school geography students' attitude towards map reading. Specifically, the study sought to: (1) determine whether difference exist in the attitude of geography students towards map reading after being taught using Computer Simulation Instructional Package and lecture method; (2) determine whether difference exist between the attitude of male and female geography students towards map reading after being taught using Computer Simulation Instructional Package.

Research questions

The following research questions were raised for the study: (1) is there any difference in the mean attitude score of geography students towards map reading after being taught using Computer Simulation Instructional Package and lecture method; (2) is there any difference in the mean attitude scores of male and female geography students towards map reading after being taught using Computer Simulation Instructional Package.

Research hypotheses

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

HO_1: There is no significant difference in the mean attitude scores of geography students towards map reading after being taught using Computer Simulation Instructional Package and lecture method.

HO_2: There is no significant difference in the mean attitude scores of male and female geography students towards map reading after being taught using Computer Simulation Instructional Package.

Methodology

The study adopted a quasi-experimental research design, in which a pre-test, post-test non-equivalent group design was specifically used. This was because it was not possible to randomize the subjects of the study without disrupting the school programmes, therefore two separate intact classes were used as experimental and control groups.

The population of the study was made up of all the 6,209 geography students in all the senior secondary schools (of 2014/2015 academic session) in Bida metropolis of Niger State, Nigeria. The target population was 2,478 class two (SSII) geography students in the study area. The choice of SSII students was based on the fact that the concept of map reading, an important aspect of geography selected falls under their syllabus and scheme of work of the class.

The sample of this study was made up of 160 students from two co-educational senior secondary schools in Bida Metropolis. The two schools were purposively selected from the 11 senior secondary schools in Bida based on availability of computer laboratory schools and because of equivalence in terms of manpower, gender composition, exposure to the use of computer, enrolment of students for SSCE Geography examinations for a minimum of ten years andpublic schools. The two purposively selected schools were randomly assigned to experimental group and control group. Students in the experimental group were exposed to computer simulation instructional package while their counterparts in the control group were taught the same concept of map reading using lecture method. The experimental group was made up of 82 (58 male & 24 female) students while the control group consists of 78 (50 male & 28 female) students.

Two research instruments were employed for the study. They are: the treatment instrument (Computer Simulation Instructional Package, CSIP) and the attitudinal questionnaire (Questionnaire on Geography Students' Attitude

towards Map Reading, QGSAMR). CSIP was developed by the researchers using Simulation software, Microsoft Word, Adobe Flash professional, .NET Framework and Speech synthesis. Four lessons on map reading: map enlargement, map reduction, measurement of distance between two places and measurement of regular area of a map were captured in the package and meant for students' manipulation, measurement and interpretation. The menu of the package majorly consists of Log in interface, list of embedded lessons, behavioural objectives, practical interface, simulation tools, calculator, evaluation questions and other features that would aid students' navigation and interaction with the content. The package was validated by three educational technology experts, two computer experts and two geography experts.

The QGSAMR consists of 25 items on students' attitude towards map reading. A four point scale was used in which Strongly Agreed was rated 4-points, Agreed rated 3-points, Disagree rated 2-points while Strongly Disagree was rated 1-point. The total points scored by each student in the 25 items were converted to percentage and a decision rule was set in which cumulative point of 50 and above was ajudged positive attitude while cumulative point below 50 was ajudged negative attitude. The questionnaire was validated by two geography experts and two educational psychology experts. Their comments and suggestions were used to modify the items.

Trial testing of the package was carried out in one of the non-selected senior secondary schools within the study area. Also, to determine the internal consistency of the questionnaire, it was administered in a single administration on intact class of 55 SS II students of the school. A reliability coefficient of 0.83 which was obtained was considered adequate for the study.

The package was installed on stand alone laptops in the computer laboratory of the school used as experimental group for students' use while the students in the control group were taught by their geography teacher in their classroom. Map reading questionnaire was administered before and after the students'

exposure to the package and lecture method. The data collected were analyzed using percentages, mean, Standard deviation and t-test statistics in Statistical Package for Social Sciences (SPSS, Version 20) and the significance of the statistical analyses was ascertained at 0.05 alpha level.

Results

Table 1. t-test analysis of the attitude scores of geography students taught map reading after being exposed to CSIP and lecture method

Group	N	Mean	SD	df	t	p
Experimental (CSIP)	82	74.10	13.22	158	9.860*	0.000
Control (Lecture)	78	48.84	10.45			

*: Significant at 0.05 level

Table 1 shows the t-test comparison of the attitude scores of geography students towards map reading after being exposed to Computer Simulation Instructional Package (CSIP) and lecture method. The table reveals that the t-value ($t = 9.860$, $df = 158$, $p < 0.05$) was significant at 0.05 alpha level. Hence, hypothesis one was rejected. This implies that the attitude of geography students towards map reading differs after they were exposed to CSIP and lecture method.

Table 2 shows the mean attitude gain scores of geography students towards map reading before and after being exposed to Computer Simulation Instructional package and Lecture method. The table revelas that the mean attitude scores of geography students towards map rerading increased from 39.13 to 74.10 after being exposed to CSIP, thereby recording mean gain scores of 34.97 while the mean attitude scores of geography students taught using Lecture method also increased from 37.68 to 48.84, thereby recording just 11.16 mean gain scores. The implications of the analyses in Table 1 and Table 2 is that Computer Simulation Instructional Package improves the attitude of geography students towards map reading than lecture method.

Table 2. Mean attitude gain scores of geography students towards map reading

Group	Mean Attitude Score at Pretest	Mean Attitude Score at Posttest	Mean Gain Score
CSIP	39.13	74.10	34.97
Lecture Method	37.68	48.84	11.16

Table 3. t-test analysis of the attitude scores of male and female geography students towards map reading after being exposed to CSIP

Group	**N**	**Mean**	**SD**	**df**	**t**	**p**
Male	58	76.05	14.43			
				80	0.218^{ns}	0.805
Female	24	72.17	12.66			

NS: Not Significant at 0.05 level

Table 3 shows the t-test comparison of the attitude scores of male and female geography students towards map reading after being exposed to Computer Simulation Instructional Package (CSIP). The table reveals that the t-value ($t = 9.860$, $df = 80$, $p > 0.05$) was not significant at 0.05 alpha level. Hence, hypothesis one was retained. This implies that Computer Simulation Instructional Package improves the attitude of both male and female geography students towards map reading.

Discussion

The finding of this study on attitude of geography students towards map reading after being exposed to Computer Simulation Instructional Package and lecture method revealed that computer simulation instructional package improves geography students' attitude towards map reading better than lecture method. This finding is in agreement with the earlier findings of Tunçok (2010), Zacharia (2003) and Tella & Bashorun (2012 who in different studies found that students have positive attitude towards computer assisted learning. The improvement observed in the attitude of geography students to-

wards map reading after being exposed to Computer Simulation Instructional Package could be as a result of the fact that children and youth general have positive interest towards working and performing series of activities on computer.

The finding of this study on attitude of male and female geography students towards map reading revealed that the attitude of both male and female geography students were improved when they were exposed to Computer Simulation Instructional Package. This finding is in agreement with the earlier findings of Tabassum (2004); Onasanya, Daramola and Asuquo (2006); and Gambari and Mogbo (2006) who in different studies found and reported that gender has no influence on the attitude of students in computer based learning. However, this finding contradicts the earlier finding of Mitra & Steffeensmeier (2000) who found and reported that female students have less positive attitude towards computer instructional package compared to their male counterparts.

Conclusions

Based on the findings that emanated from the study, it can be deduced that computer simulation instructiuonal package is an effective tool for fostering students' positive attitude towards geography irrespective of gender. Positive attitude towards geography could lead to improvement in students' achievement in the subject if computer simulation instructional package is adopted and utilized in teaching and learning processs.

Recommendations

Based on these findings, these recommendations were made: (i) Computer simulation instructional package should be adopted in teaching and learning of geography. This would help to improve students' attitude towards the subject and in turn leads to improved performance in geography; (ii) Students should

utilize the opportunity offered by gender-friendly computer simulation instructional package to engage in independent study and for remedial activities with a view to foster their positive attitude towards geography and encourage them to choose a geography related career later in life; (iii) More of learning packages similar to computer simulation instructional packages should be developed and utilized in teaching and learning of geography. This would help to foster students positive attitude towards the subject, thereby having improved performance in it in senior secondary school geography examinations.

NOTES

1. http://encyclopedia.jrank.org/articles/pages/6821/Multimedia-in-Education.html

REFERENCES

Adegbija, M.V. & Falode C.O. (2014). Effects of animation-base camstudio physics instruction on secondary school student's performance in Minna. *Eur. Sci. J., 10*, 594-604.

Anagbogu, M.A. & Ezeliora, B. (2007). Sex differences and scientific performance and competitive teaching method in the teaching of biology at the senior secondary level. *Ilorin J. Educ., 11*, 1-13.

Atere, P. (2006). *Geography methods.* Lagos: National Open University of Nigeria.

Falode, O. C. (2014). *A Bates' "ACTIONS" evaluation of virtual laboratory package on selected physics concepts for nigerian secondary schools – PhD thesis.* Ilorin: University of Ilorin.

Federal Republic of Nigeria [FRN]. (2009). *National policy on education*. Lagos: Federal Government Press.

Gambari, A.I. & Mogbo, I.N. (2005). The effect of computer assisted instruction software for individualized physics instruction in secondary

schools: Implication for counselling. *Proceed. 1st Ann. School of Science & Science Education, Federal University of Technology, Minna, 20th – 23rd November*, pp. 155-164.

Garcia-Luque, E., Ortega, T., Forja, J. M. & Gómez-Parra, A. (2004). Using a laboratory simulator in the teaching and study of chemical processes in estuarine system. *Computer Educ., 43*, 81-90.

Gimba, R .W., Falode, O.C. & Bashir, A.U. (2015). Effect of computer simulation instructional package on senior secondary school mathematics students' retention in arithmetic progression in Lavun local government area of Niger State, Nigeria. *African Symposium*, *15*(1), 20-24.

Ho, W.-C. (2009). The role of multimedia technology in a Hong Kong higher education music program visions of research in music education. *Visions Res. Music. Educ.*, 1-37.

Ifamuyiwa, A.S. (2004). The predictive validity of junior secondary mathematics on senior secondary mathematics, further mathematics and physics. *Science Teacher Association of Nigeria 45th Annual Conference*.

Issa, A. O., Bashorun, M. T., M'bashir, L. & Adewusi, E.T. (2010). Attitudes of undergraduate students of the University of Ibadan towards computerized services at the Kenneth Dike library. *J. Libr. & Inf. Sci., 7,* 18-33.

Iwena, O.A. (2008). *Essential geography for senior secondary schools*. Lagos: Tonad Publishers.

Iwendi, B.C. (2009). *The influence of gender and age on the mathematics achievement of secondary school students in Minna metropolis, Niger State.*Unpublished - *MTech. thesis*. Minna: Federal University of Technology.

Jacobs, J.E. & Osgood, D.W. (2002). The use of multi-level modeling to study individual change and context effects in achievement motivation (pp.

277-318). In: Pintrich, P.R.& Maehr, M.L. (Eds.). *New directions in measures and methods.* Amsterdam: Elsevier.

Mangal, S.K. & Mangal, U. (2013). *Essentials of educational technology*. Delhi: PHI Learning.

Michael, K.Y. (2000). *Comparison of students' product creativity using a computer simulation activity versus a hands-on activity in technology education – PhD thesis.* Blacksburg: Virginia Polytechnic Institute and State University.

Mitra, A. & Steffensmeier, T. (2000). Changes in student attitudes and student computer use in a computer-enriched environment. *J. Res. Computing Educ.*, *32*, 417-433.

Obondo Gaudence, Too, J.K.. & Nabwire, V.K. (2013). Enhancing learning of geography: a focus on video use. *Int. J. Educ. & Soc. Sci., 4,* 277-288.

Onasanya, S.A., Daramola F.O. & Asuquo, E.N. (2006). Effect of computer-assisted instructional package on secondary school students' performance in introductory technology in Ilorin, Nigeria. *Nigeria J. Educ. Media & Technology, 12,* 98-107.

Sadler, P.M, Whitney, C.A. Shore, L. Deutsch, F. (1999). Visualization and representation of physical systems: wavemaker as an aid to conceptualizing wave phenomena. *J. Sci. Educ. Technol., 8,* 197-209.

Stieff, M. & Wilensky, U. (2003). Connected chemistry-incorporating interactive simulations into the chemistry classroom. *J. Sci. Educ. Technol., 12,* 280-302.

Strauss, R. & Kinzie, M.B. (1994). Student achievement and attitudes in a pilot study comparing an interactive videodisc simulation to conventional dissection. *Amer. Biol. Teacher, 56,* 398-402.

Tabassum, R. (2004). *Effect of computer assisted instruction (CAI) on the secondary school students' achievement in science – PhD thesis.* Rawalpindi: University of Arid Agriculture.

Tella, A. & Bashorun, M. T. (2012). Attitude of undergraduate students towards computer-based test (CBT): a case study of the University of Ilorin, Nigeria. *Int. J. Inf. & Comm. Technol. Educ.*, *8*(2), 33-45.

Tunçok, B. (2010). *A case study: students' attitudes towards computer assisted learning, computer assisted language learning and foreign language learning –MA thesis.* Ankara: Middle East Technical University.

Zacharia, Z. (2003). Beliefs, attitudes, and intentions of science teachers regarding the educational use of computer simulations and inquiry-based experiments in physics. *J. Res. Sci. Teaching*, *40*, 792–823.

✉ Dr. O. C. Falode (corresponding author)
Department of Science Education
Federal University of Technology
Minna, Nigeria
E-Mail: oluwole.falode@futminna.edu.ng