Full Length Research Paper

Students attitudes and teachers towards use of computer technology in Geography education

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The ability to display simulated environments through the computer may make it a stimulating instructional tool for illuminating abstract concepts in Geography. In Kenya, there is persistent lack of resources to improve the quality of Geography education, especially those that incorporate new Information and Communication Technologies (ICTs). As well, there exists teacher and learner apprehension towards the use of computers, hence poor performance in certain abstract concepts in Geography. The purpose of the study was to establish the attitudes of students and teachers towards the use of computer technology in Geography education. The survey was conducted in Kisumu District of Nyanza Province, Kenya. The study sample was 80 teachers and 1165 form three high school students representing 30% of the population. The Loyd Gressard Computer Attitude Scale was administered to establish Geography teachers' and students' attitudes Attitude was determined by mean while differences in attitude between teachers and students was established by use of the non- parametric Mann – Whitney U – Wilcoxon Test at a confidence level of 0.05. The study established that the majority of Geography teachers (mean of 4.89) and students (mean of 4.81) had a positive attitude towards the use of computer technology in teaching and learning and hence favoured the integration of computer simulations into the Geography curriculum.

Keywords: Geography education, attitude, computer simulation.

INTRODUCTION

Although Computer Assisted Learning (C.A.L.) may still be evolving at all educational levels, there is no subject better suited to the many uses of computers than geography (Bachenko and Fitzpatrick, 1990).The assertion that Geography is a natural discipline for making use of computers is based on arguments such as the Geography teacher having to deal with vast libraries of textual information, numerical data, and graphic displays, all of which need to be constantly updated and experienced from a range of perspectives. Geography provides a rich and varied context for the use of computer technology to enhance both learning in the subject and to reinforce ICT skills. Commonly, desktop publishing, word-processing and spreadsheets are used to enhance presentation and to organize geographical data, particularly for examination coursework, and the Internet

is used to research information. There is limited use of specific software such as digital mapping programs. Where teachers are confident with the computer technology, these applications can be combined to provide students with the tools for research, drafting and presentation (U.K., 2004).

As a result of low achievement in the subject (U.K., 2004), most of the students are technically out of the race for places in higher institutions of learning and careers. More specifically, they have little stake in professional courses such as climatology, remote sensing, Geographic Information Systems (GIS), environmental studies, earth science, urbanization which promise better economic rewards. This has come about as a result of persistent lack of knowledge and understanding of concepts such as the hydrological cycle, tectonic plate movements, glaciation, vulcanicity, the earth and the solar system, mass wasting, and their relationship to overall academic performance in Geography that might lead to persistent low achievement among Geography students (U.K ., 2004). To overcome this problem, this

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study endeavoured to find out attitudes of students and teachers towards use of computer technology in Geography in order to address conceptual problems in the Geography curriculum that relate to perception of teachers and students on use of computer technology in Geography.

The computer is an important resource not only because of its unique control capabilities, but because these attributes are also isomorphic with the representations and processes involved in human learning. With this parallelism and the capability of either learner or instructional control, the computer can be employed for a range of methods that accommodate learner aptitudes. The computer, for instance, can 'short-circuit' learner cognition by taking on a large amount of information processing burden of the learner. It can dynamically model a process, activate or amplify the learners' own processes as well as accommodate a range of tasks (Kozma, 1987). Likewise, the computer can tutor verbal knowledge, model intellectual skills, activate, or amplify cognitive strategies. This last possibility may be more promising, for learners may internalize the processes in which the computer excels and thus become better learners (Saye, 1997; Kozma, 1987).

One of the most deplorable features of the move toward having computers in the classroom has been the lack of understanding on the part of many professional educators as to what this technology could mean to the improvement of learning process (Harper 1987). Majority of teachers do not know how to use computers to promote educational efficiency and are not being adequately trained to use technology. Harper (1987) attributed this to the facts that, training teachers to use computers is complicated, and that many people have a distorted view of what computers can do for education.

Over the last few years, there has been a rapid growth in the range, sophistication, penetration rate and potential implications of computers in Geography teaching and learning within the developing economies. This is partly due to the rapid rise in computing power and fall in micro-computer costs and the rapid emergence and use of the Internet. The World Wide Web became readily accessible only from 1993 after the appearance of Mosaic, the first big browser, followed by the transmission of pictures and the founding of Netscape (Castleford, 1998). There are already a wide range of computer uses in educational endeavours especially in the developed economies such as the United Kingdom (UK) and United States of America (USA), and more uses are being explored. The Internet can be used by staff to support efficient course administration and to assist students to manage their learning. Even though the majority of teachers and students may not be using or even aware of the unique potential capabilities of computer technology in teaching

and learning, they tend to have a positive attitude towards computer use in education. A study carried out to investigate teachers' and administrators' perceptions and experiences towards computer use in Kenyan classrooms revealed that both teachers and administrators viewed the use of computers in Kenyan classrooms as worthwhile. Teachers who used computers were enthusiastic and spoke positively about computer use, whereas non-computer-users felt left behind technologically. Teachers reported feeling unprepared by teacher training colleges to use computers in the classrooms, and expressed the need to provide both practicing and pre-service teachers with professional development opportunities in technology. This resulted from in-depth interviews, participant observations and document analysis The study suggested that teachers' and administrators' perceptions and experiences play a significant role in the use of computers in Kenyan classrooms and hence the need to provide pre-service and in-service training programs to enable them to successfully teach using computers in the classrooms (Wabuyele, 2006).

Using games and simulations in school Geography have been found to encourage fun and interactive teaching and learning of secondary geography by interspersing geography games and activities within curriculum teaching. Simulations encourage enthusiastic participation in the Geography classroom, improve performance using games, which have been proven to be effective teaching and learning tools, contribute to students' social and emotional aspects of learning, developing skills of empathy, decision-making and critical thinking that they can use across the curriculum and throughout their lives, add to the teacher's own range of teaching strategies, particularly those which encourage interaction with students (Wong, 2005; Walford, 1997).

The study focused on Kisumu district since it was realized that the performance of Geography in the national examinations for the last two years was relapsing as indicated in Table 1 below.

From Table 1, it is instructive that even though the number of student enrollment increased from 1184 students in the year 2008 to 1272 students in the year 2009, performance in Geography in the national examinations declined. This necessitated a close scrutiny in the subject in order to suggest solutions to the dwindling performance. It was therefore crucial to undertake this study so that remedial actions could be taken to improve the standards of education.

The objectives of the study were:
1. To find out the attitudes of teachers and students towards the use of computers in Geography education.
2. To establish the difference in attitudes between teachers and students towards use of computers in Geography education.

Table 1. Performance in Geography KCSE in Kisumu District (Source: Kisumu Town East District Education Office)

Year	Enrollment	Mean score
2009	1272	5.019
2008	1184	5.530

Table 2. Attitudes of students (n=1165) and teachers (n=80) towards use of computer technology in Geography education

Respondents	Mean	Attitude
Students	4.81	Positive
Teachers	4.89	Positive

RESEARCH METHODOLOGY

Venue and Sample

The study was carried out in Kisumu District in Kenya. The total number of form three students was 3500 out of which 1165 (30%) was selected by simple random sampling technique. The total number of Geography teachers was 240 out of which 80 (30%) was selected by simple random sampling technique.

Instruments

Data collection instrument was questionnaire. To investigate the attitudes of teachers and students towards computer use in Geography education, an adaptation of the Loyd Gressard Computer Attitude Scale (CAS) on five measurement points was used (Loyd and Gressard, 1984, 1985). CAS is an instrument used to measure different aspects of computer attitude. The teachers were supposed to indicate whether or not they had computers for teaching Geography and in case computers were used at all or effectively in order to enhance comprehension of concepts. They were also to indicate whether or not computer simulations were necessary in aiding instruction in topics they taught, and, if computer simulations were likely to improve performance in the difficult topics. Likewise, the students were expected to state whether or not they had computers for learning Geography and in case computers were used at all or effectively in order to enhance comprehension of concepts. The students were also to indicate whether or not computer simulations were necessary in aiding comprehension of difficult topics they learned. Information was also sought from the students if computer simulations were likely to improve performance in the difficult topics.

Validity and reliability of the instruments

Three experts in the field of study at Maseno University, Kenya were requested to examine the instrument in order to ascertain its validity. The questionnaire was discussed with the authorities in the content areas and their expert opinions were used to determine and ascertain validity of the instruments. The experts' comments and suggestions were incorporated in the revised instrument to enhance its efficacy. In order to ascertain accuracy and consistency of the instrument with regard to reliability, the *test-retest* reliability procedure was performed (Suter, 1998). A limited research project with a few subjects (24 teachers and 350 students randomly sampled) that follow the research plan in every respect was carried out as a pilot study. The purpose of this was to be able to consider information about necessary modification to the instrument that would result from analyses of the pilot study results.

Data collection

The researcher made appointments with and visited the respondents in their schools and administered the questionnaire (Appendix 1). All the 80 teachers and 1165 students responded to the questionnaire.

Data analysis procedure

Frequency counts were computed for the data collected by use of the questionnaire on a five point Likert scale, based on the Loyd Gressard Computer Attitude Scale. Mean scores of the respondents on each item of Likert scale were then calculated. The statements on the Likert scale were scored as follows: 'Strongly Agree'=5 points, 'Agree'=4 points, 'Undecided'=3 points, 'Disagree'=2 points, 'Strongly Disagree'=1 point. A mean score of above 3 was interpreted to denote a positive attitude, a mean score of 3 denoted a neutral attitude and a mean score of below 3 denoted a negative attitude. The results were compared in relation to the learners' and teachers' responses regarding their attitudes on the use of computer simulations using cross-tabulations and the Mann-Whitney U – Wilcoxon Test to determine statistical differences at a confidence level of 0.05.

RESULTS AND DISCUSSION

Attitudes of students and teachers towards the use of computer technology in Geography education

Results on students' attitudes regarding the use of computer technology in Geography education revealed that a mean rate of 4.81 of them were convinced that computer technology in education would have a positive effect on their performance as indicated in Table 2.

The study indicated that despite the fact that many schools did not have computers and consequently many students did not use computer technology for Geography

Table 3. Table of Mann – Whitney U – Wilcoxon Test

Respondents	P value	Attitude	Percent
Teachers	0.0029	Positive	82.0
	0.6637	Negative	18.0
Students	0.0031	Positive	69.1
	0.6711	Negative	30.9

education, the students had a positive attitude towards the use of computer technology. As contended by Wong (2005) and Walford (1997), this implied the students were able to appreciate the robustness of the computer and showed willingness and readiness to optimize its use in education. The main impediment was access to computers (Kinuthia, 2009; Wabuyele, 2006), and given a chance, they would recommend and enthusiastically make effective use of the technology in Geography education. Consequently, they would improve their performance in Geography.

Attitudes of Geography teachers were also sought regarding the use of computers in teaching and learning. A mean rate of 4.89 respondents said computers were likely to have a positive effect. That is, 82% of the teachers had a favourable attitude towards use of computers in Geography education and would therefore support their inclusion in the Geography curriculum. As such, a super majority of teachers in Kisumu district had a positive attitude towards use of computer technology in Geography education.

As indicated in Table 2, the majority of teachers showed willingness to embrace computer technology, regardless of having used the technology or not. This positive perception, in accord with Sang et al. (2010) and Teyfur (2009), implies that given the chance, the teachers would not hesitate to make use of computers in an effort to illuminate abstract concepts in the Geography curriculum. As a result, educational standards would be raised since comprehension of difficult topics would be enhanced.

Difference in attitude between students and teachers towards the use of computer technology in Geography education

The non parametric Mann – Whitney U – Wilcoxon Test using the Statistical Package for the Social Sciences (SPSS) at a confidence level of 0.05 was used to determine the statistical differences between the attitudes of teachers and students regarding the use of computer simulations in Geography as indicated in Table 3.

Analysis based on teachers' and students' attitudes regarding the use of computer simulations in teaching and learning Geography indicated that more teachers (p=0.0029) and students (0.0031) had a favourable attitude towards use of simulations in education as opposed to the few teachers (p =0.6637) and students

(0.6711) whose attitude was negative. Even though the majority of teachers and students in Kisumu district had a positive attitude towards the use of computers in Geography education, the majority had never used the technology for Geography education, or for any other purposes of teaching and learning. This fact is attributable to factors such as teacher and learner apprehension, unwillingness for role change, fear of change, lack of exposure, unavailability of requisite hardware and software components due to high poverty levels. The few students and teachers who had used computers had superficial knowledge on the technology and merely used it to manage text and manipulate figures. A number of studies carried out by researchers established that computers could positively influence student motivation, their attitudes towards technology, instruction or in the subject (Wagner, 2005). In concurrence with the researchers, it may therefore be concluded that if the myriad of problems facing the teachers such as apprehension, fear of the technology and its unavailability could be addressed, several teachers would make more optimal use of computers in Geography education thereby heralding the performance of students.

Conclusions and implications

Geography students and teachers' attitudes, experiences and convictions regarding the use and effectiveness of computer based simulations in Geography education were sought. This was done through use of questionnaires. The study established that a mean of 4.81 (69.1%) of the students and 4.89 (82%) of the teachers had a positive attitude towards computer use in Geography education and would therefore recommend and support its integration in the Geography curriculum. It could therefore be concluded that teachers and students of Kisumu district favoured the integration of computer simulations in to the Geography curriculum for the purpose of assisting teachers to teach difficult topics and learners to learn difficult topics in an effort to elevate educational standards.

Regarding the difference in attitudes between teachers and students towards use of computers in geography education, it is concluded that there is no significant difference in their attitudes. It was established that both the teachers and students perceived the use of computer technology positively. This implies that the positive attitudes would consequently lead to positive actions in the endeavour to optimize computer use in education to enhance comprehension of cognitively difficult topics.

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APPENDIX: Computer Attitude Scale (CAS) for Geography teachers and students (Adapted from Loyd and Gressard, 1984, 1985)

The objective of this study is to find out attitudes of teachers and students toward use of computer technology in Geography education. This questionnaire seeks to obtain information and insights from secondary school Geography teachers and students on their attitudes towards use of computer technology in Geography teaching. The ultimate goal is to address conceptual problems in Geography that relate to perception of computer technology use in Geography education. This questionnaire would take about 20 minutes. Please note that strict confidentiality shall be observed and anonymity provided, if so desired, when reporting findings. Your involvement in this study is invaluable and will take the researchers a long way in realizing this goal.

Thank you in advance.

Below are a series of statements that have no correct answers. They are designed to permit you to indicate the extent to which you agree or disagree with the ideas expressed. Place a checkmark in the space under the label which is closest to your agreement or disagreement with the statements.

	Strongly Agree	Agree	Undecided	Disagree	Strongly disagree
1. Computers do not scare me at all	……………	………	……………	…………..	
2. I'm no good with computers.	……………	……	…………….………..		
3. I would like working with computers	……………	…..	……………	…………	
4. I will use computers many ways in my life.	……………	…..	……………	…………	
5. Working with a computer would make me very Nervous	……………	…..	……………	…………..	
6. Generally, I would feel OK about trying a new problem on the computer	……………	…….	……………………		
7. The challenge of solving problems with computers does not appeal to me	………..	……..	……………	…………	
8. Learning about computers is a waste of time	………….	…….	……………	…………	
9. I do not feel threatened when others talk about computers.	………….	……	……………	…………..	
10. I don't think I would do advanced computer work.	……………	………	……………	……………	
11. I think working with computers would be enjoyable and stimulating	……………	…………	……………	……….	
12. Learning about computers is worthwhile.	……………	…………	……………	……………	
13. I feel aggressive and hostile toward computers.	……………	………	…………	……………	
14. I am sure I could do work with computers	……………	…………	…………	…………..	
15. Figuring out computer problems does not appeal to me.	………..	………..	……………	……………	
16. I'll need a firm mastery of computers for my future work.	………	…………	……………	……………	
17. It wouldn't bother me at all to take computer					

courses ....

18. I'm not the type to do well with computers ....

Appendix cont.

19. When there is a problem with a computer run
that I can't immediately solve, I would stick
with it until I have the answer ....

20. I expect to have little use for computers
in my daily life. ....

21. Computers make me feel uncomfortable. ....

22. I am sure I could learn a computer language. ....

23. I don't understand how some people can
spend so much time working with computers
and seem to enjoy it. ....

24. I can't think of any way that I will use computers
in my career ....

25. I would feel at ease in a computer class. ....

26. I think using a computer would be very hard
for me. ....

27. Once I start to work with the computer, I would find it
hard to stop. ....

28. Knowing how to work with computers will increase
my job possibilities. ....

29. I get a sinking feeling when I think of trying to use a
computer ....

30. I could get good grades in computer courses ....

31. I will do as little work with computers as possible ....

32. Anything that a computer can be used for,

.
I can do just as well some other way ....

33. I would feel comfortable working with a computer ....

34. I do not think I could handle a computer course. ....

35. If a problem is left unsolved in a computer class, I would continue to think about it afterward ....

36. It is important to me to do well in computer classes. ....

37. Computers make me feel uneasy and confused. ....

38. I have a lot of self-confidence when it comes to working with computers. ....
.. ..

39. I do not enjoy talking with others about computers. ....

40 Working with computers will not be important to me in my life's work. ....

42. Are computer simulations/technology necessary to aid instruction in topics you learn? ....

43. The incorporation of computer simulations likely to improve performance in the difficult topics and address the misconceptions. ....
.. ..