A Survey of Physics Students' Perception on the use of New Technologies to Improve on Learning of Physics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria

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Abstract
There are many software packages specifically designed for electronic learning (e-learning), such as blackboard. In an effort to find the relevance of this, this study investigated the Physics Students' Perception on the use of New Technologies to Improve on Learning of Physics in College of Education, Ikere-Ekiti, Ekiti State, Nigeria. Educators today are using distance education and internet based learning as methods for delivering courses. The study adopts descriptive survey of research design. The population for this study consists of all students of College of Education, Ikere-Ekiti and students of the degree program of university of Nigeria in program affiliation with College of education, Ikere-Ekiti, Ekiti State, Nigeria. Questionnaire was used to find out their perceptions. It was administered to eighty (80) respondents. Two hypotheses were tested. Independent t-tests were used in the analysis of the data. A result showed that there were significance differences in students' perception based on level, gender and ICT knowledge. Implications, suggestions and recommendation for students, parents, government, educational stakeholders etc. were discussed. The findings have implications for the teachers of physics that they should try as much as they could to encourage their students to use new technologies for physics learning not only for 2go, WhatsApp or Instagram.
Keywords: Physics Student, Perception, new technologies, learning

Introduction

Effective teachers maximize the potential of technology to develop students' understanding, stimulate their interests, and increase their proficiency in physics. Technology is an essential tool for learning physics and schools must ensure that all their students have access to technology. Calculators and other technological tools, such as computer algebra systems, interactive geometry software, applets, and spreadsheet and interactive presentation devices are vital component of a high-quality Physics education. In a well-articulated physics programme, students can use these tools for computation and construction. It also contributes to physical reflection, problem identification and decision making.

Physics is perceived as a difficult course for student from secondary school to university and also for adults in graduate education. It is well known that both high school and college students find physics difficult. The measurement of student's attitudes towards physics should take into account their attitude towards learning environment (Crawley & Black, 2002). Research has made us known that the attitude towards science change with exposure to science, but the direction of change may be related to the quality of that exposure, the learning environment and teaching method (Craker, 2006).

If students have negative attitudes towards science, they also do not like physics courses and physics teachers. Based on this premise, numerous studies have been conducted to determine the factors that affect the students' attitudes in science. From these studies, some basic factors can be listed, including : teaching –learning approaches, the type of science courses taken, methods of studying, intelligence, gender, motivation, science teachers and their attitudes, students attitudes to science courses, self adequacy, cognitive style of students, career interest, socio economic levels, influence of parents, and so on. Physics is the study of matter and energy and how they affect each other. It is also referred to as the study of natural phenomena in its fundamental state.

However, the perception of both teachers and students in physics classroom learning environment influence the achievement of students in physics education. Physics has always been considered a practical subject, yet physics practical work has rarely been allocated more than 15% marks in an examination. Physics is the basis of technology and for effective living in the modern age of science and technology, it is essential that every child should be given the opportunity to acquire at least basic knowledge and the concept of physics as a science. More over in recognition of this fact, the federal government of Nigeria introduced a new system of education in the country known as the 6-3-3-4 system.

The first six years is the primary school education where the child learns to read/write and adapt to its environment. The junior secondary school education involves three years of training which enable the child to apply creative thinking and the use of materials especially around his/her environment which basically applies to the practical approach of science. The senior secondary, which is also three years of training, involves development of the scientific skills learnt in the JSS (Junior secondary school) level, while the four years of university education relate to the adaptation of the skills learnt.

It is these skills that the individual applies in his daily life to enable him fit into the society. The fact that a lot of factors are responsible for students' underachievement in physics is not new to researchers but amongst those factors could be teachers and students perception of physics classroom learning environment. Recent studies indicate that there is a substantial impact of the classroom learning environment on students' achievement in physics learning. For example, Jegede (2005) and Brown & Palinscar (2001), have strongly argued that teachers and students perception of the learning environment are very important on the achievement of

students in physics and that the knowing the students' perception will help the teacher in shaping their students' class perception and relatively their achievement in physics.

Over the years, a number of research projects on classroom learning environment have been carried out. Examples are the Harvard project and Physics of Walberg project. The interest in the study of learning environment has become more prominent since it has been evident that learning outcomes and students' attitude towards learning were closely linked to the classroom environment. The nature of classroom environment and psycho-social interaction can make a difference in how the students' learning and achieve their goals (Mc Robbie, Roth & Lucus, 2007). On the other hand, perception refers the way one think about something and ones' idea of what it is like, also it is an ability to understand the true nature of a subject especially as it affects our environment.

However, both teachers and students perception physics classroom learning environment in different ways hence, learning is a process which produces series of changes in behaviour or it is more or less a change in behaviour that result from activities, training or observation. It is a change in behaviour that confirms learning. According to Nwabueze (2003) learning is a process which produces progressive series of changes in behaviour or it is more or less a change in behaviour that results from activity. The amount of learning and knowledge imparted such as this, lack proper moral content, and the physical facilities are inconducive to effective learning, being either non-existence or in a deplorable state. However, there has been a wide range of problem with the available class room learning environment in the senior secondary schools in Nigeria which prevents effective learning to take place.

Some of the problems associated with classroom arrangement which include the tall students obstructing the view of the short ones at the back to see the chalk board inadequate chairs and tables which can cause discomfort for students. Another problem is poor classroom with little or no ventilation. Due to the composition of physics education, most physics teachers believe it should be done practically and theoretically to allow for effective understanding of the knowledge by students. From finding of Mitchell, Dejong & Thornton (2004) "good learning requires constant variation in the purposeful intellectual activities of the learner and a wide range of pedagogical stratifies". To them many teachers do not have access to didactic materials and modern educational technologies (laboratory, printer, video, multimedia, software etc), which could have made training learner – centred.

Researches had been conducted on learning environment in different countries like USA, Australia, Netherlands, Nigeria etc. such researches include the research reported by Lim (2003) who did a study in secondary classroom environments, comparing learning environments in different types of schools (good, average and below) and different educational streams. There was also a study on secondary science laboratory environments using the SLEI (Wong, 2010) that assessed the learning environment form the perceptions of students and teachers. It is henceforth imperative to study the teachers' and students' perception of physics classroom learning environment in senior secondary schools since science without physics is incomplete and because there can be no technological advancement without physics. This study will be more effective at this time when the country needs more scientists to advance technology. Hence this study investigates the physics students' perception of the use of new technology to improve the learning of Physics in college of education Ikere-Ekiti local government area of Ekiti state.

Information technologies are becoming a part of the daily culture of almost every student and teacher. Both students and teachers are actively involved in using new technologies for internet browsing, chatting, yahoo-yahoo, 2go, WhatsApp etc. However, the use of technologies can be profitably used to learn physics. In particular using internet devices can enhance physics learning. Other uses of internet devices can transforms the physics classroom and allow the students to work collaboratively by sharing graphs and formulae and solving

problems collectively. The advent of computer system and internet devices has contributed in no small measure to education development in term of teaching and learning process. However, this study intends to answer the following questions, (1) how do students perceive the usage of internet devices in learning? (2) Does this perception differ in term of gender and background? Hence, this study tends to examine College of Education physics students' perception on the use of new technologies to increase the learning of physics.

Research Hypotheses

The following research hypotheses were formulated for the study:

1. There is no significant difference between the male and female students' perception on the use of new technologies in learning Physics.
2. There is no significant difference between students' Information Communication Technology (ICT) knowledge and their perception of physics learning using new technologies.

Mobile Application for Mobile Learning

The contribution of the mobile environment has not only in making dynamic physics application more available, but also in supporting the execution of Physics tasks that are closer to the students experiences and more relevant to them, which has the potential to enhance experimental learning (Lai, 2007).

Model for using and developing mobile application for learning are somewhat lacking (Naismith, 2004). There is a need to formulate appropriate pedagogical models and to develop innovative strategies to integrate mobile application in learning and teaching. The data connectivity and communication aspects of mobile devices support social interaction, collaboration, and may enhance interpersonal communication, Taylor (2005). Being able to exchange work and application through MMS and SMS, student and instructors can create a community in which they can work together, share knowledge, inspire each other and interact socially (Tu, Covy 2003 & Reynolds, 2001).

Mobile devices also offer opportunities to gain access to learning experiences while being immersed in a learning context- the real .Embedding the learner in a realistic context at the same time as offering access to supporting tools can enhance the active construction of personal knowledge (Naismith, 2004). The math mobile environment includes cellular application designed to support physics learning.

Mobile learning can provide good support to micro learning a new and effective way of learning (Habitxel & Mark, 2006) for example, people can learn more effectively if "information" is broken down into smaller, more easy-to-comprehend units. Therefore it is suggested here, that mobile learning is an ideal medium simply because it supports this "new way" of learning via the use of SMS, pre-recorded MP3 fits and so forth.

The consequences of the physics learning in the cellular phone environment were the students connected physics with real life phenomena. The students developed a new approach to physics where they looked at it as an applied science, and the students worked as physicist. The creation of a community of practice through collaborative learning, supporting the cohesive, social constructionist styles in the use of mobile devices, has been addressed by Colley & stead (2004).

General Perception of Using New Technologies Increase Learning in Physics

The full realization of the promise of information technologies for greatly increased Physics, Science and Technology (MST) learning will require a new k-14 curriculum that incorporates interdependent technology-based advantages.

There are various attributes of a learning tool which can contribute to it success, such as being fun, having game, being visually appealing and using animation. The learner's perception of the learning tool is extremely important in the evaluation process and ultimate success of the tool. If the learner does not perceive it a beneficial, this can impact negatively on its success. We will soon have student access to technology that could revolutionize learning in physics, science and technology.

The technologies enhance curriculum strands or TECS should employ learning strategies that best exploit the power of technology to increase the capacity of student to undertake investigations and construct understandings based on their observations and experiences.

Mobile learning in past years has proven to be successful in many different context and with various target groups. Fanx (2006) reported in a study where primary school students showed improvements in literacy after using PDAS. Cook (2007) reported on mobile learning study where 73% of their students thought it was important to learn anytime and anywhere.

Attewell (2005) indicated that learners were excited to use the mobile device, a large percentage of the shared improvement in reading and physics skill and it helped build their self esteem and confidence. Benta, Cremere & Padurean (2004) presented a multimedia mobile learning application that combined the advantages of text, image and audio. They stated that the mobile device captured the student's attention very quickly and they found it useful. Chi & Liu (2007) conducted evaluation that revealed that students thought it was useful to use mobile devices for learning English. Conway Smith (2010) reported on a study using an overall increase in physics scores by 3.36% in 18 weeks.

Sharples (2003) described a system called Handheld learning Resource which attempt to put education at the fingertips of student through their mobile device. The study indicates that the use of the mobile device increases retention and motivation. Valk, Raslud & Elder (2010) conducted a survey of several mobile studies undertaken in developing countries. They reported on one study conducted in Philippines where the results of the experimental group were only marginally higher than the control group. They reported on another study conducted in Mongolia which revealed one 18% increase from pretest to post-test. There was also a study conducted in rural media which resulted in an average increase of 20% from pretest to post test scores.

Shin (2011) investigated the effect of game technology on elementary students learning physics. In this study, students who played technology based arithmetic games out-performed students who played paper-based arithmetic game.

K-Neet (2008) targeted secondary at-risk ninth graders, helping them to focus on increasing their physics skills through mobile smart phones. Mcfarlane, Roche & Triggs (2007) reported on a Beeta Mobile learning project where the student responded enthusiastically and the teachers indicated that student studied without even being asked.

Perry (2003) reported on another Becta ICT project where students were excited and highly motivated when they got PDAs to use for learning. Cook (2007) presented a mobile learning study which required students to gather data using photos and video clip. The results of this study indicate that the students were very task focused and the internet devices motivated them to get high grades.

Attewell (2005) conducted a mobile learning study for learning literacy and numeracy and the learners were excited to use the mobile device. Hartnell-Young & Heym (2008) conducted research to determine if there was a positive side to internet devices in secondary schools. Their findings revealed that students enjoyed the mobile learning and were motivated.

Kadirire (2007) used instant messaging for creating collaborative and interactive learning. The students became engaged in course material outside the classroom which motivated them and improved their self-confidence. Most students valued communication with

peers and they developed a sense of community. Valk, Rashid and Elder (2009) also reported in a study which explored the effects of mobile learning. However, results indicated that there was no improvement in performance and students were concerned about the challenges of the small screen of the mobile device.

This study gives an example of negative responses from some learners. It was suggested that perhaps this method of learning was not suitable for all learners.

Research Method

The study employed a descriptive survey design. The targeted population for the study consisted of all students in College of Education, Ikere –Ekiti, Ekiti State.

A sample of 80 respondents was involved in the study. It comprised students of degree programme and NCE programme in College of Education that are offering physics as major and minor courses. Purposeful sampling technique was used in selecting the levels that constitute the sample.

An Internet Devices Learning Questionnaire (IDLQ) was used to collect all the relevant data for this study. The IDLQ was designed by Kalloo and Mohan (2011) and adopted by the researcher to elicit responses from the respondent on the usage of the internet devices in physics learning.

IDLQ was divided into two sections. Section A was designed to collect information about the students' age, gender, level of education and ICT knowledge. Section B of the IDLQ contained twenty five (25) items, four-point scale (Strongly Agree, Agree, Disagree, Strongly Disagree) items.

The questionnaire was subjected to validity and reliability mechanism. In establishing the reliability of the instrument, the split half reliability method was used in which the responses to the instrument after administering were subjected to a split half reliability co-efficiency analysis, using Pearson product moment co-efficient correlation for the administration was found to be 0.82 which was considered high enough for the reliability.

All the 80 participants were administered the "Internet Devices Learning Questionnaire" (IDLQ).

Class governor in each level helps during the administration of the instrument. The instruction on how to respond to the questionnaire was read to the participants. This ensured its proper filling. Data collection was done immediately after the administration and the response sheets were retired from the respondents.

The likert 4-point rating scale from 1-4 was used for scoring the responses.

Responses in section B were rated in descending order; Strongly Agree (SD), Agree (A), Disagree (D) and Strongly Disagree (SD), were rated 4, 3, 2 and 1 respectively.

The rating scores of each respondent were added for all items in each hypothesis. The total scores of the various groups of the population were also added together and mean perception score and standard deviation of each of the groups per hypothesis were computed.

Also t-test and percentage were used in analyzing the data collected and was done in tabular form. The result and interpretation of which shall be discussed in the next chapter of this research work.

Results and Discussion

Hypothesis 1

There is no significant difference between the male and female students' perception on the use of new technologies in learning Physics.

Table 1: A t-test Analysis comparing male and female students' perception on the use of new technologies in learning Physics.

Group	N	$\overline{X}$	S.D	df	t-cal	t-tab
Male	40	38.56	3.12	78	3.514	1.96
Female	40	36.28	2.67			

Significant at 0.05 probability level

The data in table 1 shows that the calculated t-value of 3.51 is higher than the critical value 1.96 on the basis of this, the difference is statistically significant.

Hence, the null hypothesis which states that there is no significant difference between male and female students respondents in regards to physics learning using internet devices, was rejected (t=3.51, df=78). The result reveals that there is significant difference between the male and female students' perception on the use of new technologies in learning Physics.

Hypothesis 2

There is no significant difference between students' Information Communication Technology (ICT) knowledge and their perception of physics learning using new technologies.

Table 2: A t-test Analysis comparing students' having and not having knowledge of ICT in their perception of physics learning using new technologies.

Variables	N	$\overline{X}$	S.D	df	t-cal	t-tab
Having Knowledge	53	52.64	2.67	78	3.11	1.96
Not Having Knowledge	27	48.78	1.98			

Significant at 0.05 probability level

The data in table 2 indicates that the calculated t-value of 3.11 is higher than the critical value 1.96. On the basis of this the difference is statistically significant.

Hence, the null hypothesis which states that "there is no significant difference between students having knowledge of ICT and not having knowledge of ICT in their perception of the physics learning using new technologies was rejected (t = 3.11, df=78). The result shows that there is difference in students' perception of physics, learning using new technologies as regards having or not having knowledge of ICT.

Discussion

The foregoing shows the analysis of data collected for this study. As indicated in the findings, students have difference perception of physics learning using new technologies.

Pettit & Kukulska-Hulm (2002) describes some advantages of mobile learning, mobile device can engage individuals in learning at times they would have been doing something else, mobile devices motivate learners because of their attractiveness they enable communication from anywhere formal learning can suit existing of self-publishing and online participation, mobile learning enables multitasking. This is in consonance with the responses elicited from the students.

The testing of the first hypothesis showed that there was significant difference between male and female students in their perception of the physics learning using new technologies. Results uncovered in the investigation to determine gender effect or influence on the students' perception revealed an overall positive reflective perception regarding the usage of new

technologies in leaning physics. Males responded with a statistically high degree of acceptance toward cell phone use in physics learning.

This result is quite relevant because average female students have phobia for physics and are interested in easy-to-do work. While the average male students like engineering course that involves physics and they are also fit to tough work.

Males responded with a statistically higher degree of acceptance toward new technologies use initiated by teacher-to-students in education and by students to collaborate with other students. These finding could indicate that males were more receptive to communicating indirectly through technology rather than directly by face-to-face communication was more highly valued by females than by males. By implementing of the new technologies in the higher level of comfort responding through technology rather than in person. Another possible interpretation of higher acceptance by males relates to gender difference in technology use with males historically over-representing occupational field that involve math, science and technology (Mammes, 2004).

Instructors should be minded of these possible gendered influences regarding the use of internet devices for learning physics in the classroom and recognize some students may feel more comfortable than other students using cell phone applications and technology.

Conclusion

This study has proved that internet devices can be used for learning-browsing on phone. "New technologies can be used as a learning tool especially for physics, for knowledge construction if educator teaches students how to use them appropriately" Kolb, 2006.The participants perceived their general characteristics and uses of the devices. They perceived their general characteristics that make it appropriate for leaning physics in general as enabling visualization of the physics phenomenon or problem and its special characteristics that make it appropriate for learning physics in special occasion as collaborating, using the internet devices, to solve hard physics problems.

These special characteristics may hinder or encourage the use of the devices for learning physics, as the relatively small screen of the internet devices which hinders its use by students who have sight problem. This perception of the characteristics of the device and their participant willingness to use them in the future enable one to conclude that students are ready to learn physics with new technology e.g. internet devices.

This device possesses the potentialities that make it efficient device for learning physics in the classroom and outside it. TKolb (2006), this device may need improvement or additives but stating teaching and learning with them would benefit students' learning, from one side, and from the other side, would encourage improving it.

Recommendations

As a result of the findings gathered from this research work, the following recommendations are suggested towards effective utilization usage of internet devices for physics learning.

After considering this novel perception of internet devices physics learning, we strongly believe that a lot of opportunities and potentials are get to be realized. We are still at the beginning of exploring this promising use in the educational environment. In spite of the description that this device could cause in the classrooms, we believe that banning them from schools is not the solution.

We should keep studying the pedagogy behind the use of internet devices in the actual education environment, and develop appropriate activities that utilize this device efficiently and profitably in the classroom and learning process especially physics learning. The use of internet

devices in whole class contexts may overcome the problems of availability of up-to-date computers.

In view of the above, the following recommendations are proposed for qualitative physics learning using internet devices in Nigeria schools.

1. Federal government should review its National ICT policies in order to ensure qualitative physics learning and science education.
2. The National Policy for information technology (IT) should develop nationally relevant context software for use in school that will enhance physics learning using internet devices.
3. Internet facilities, modern technology that could be used effectively for academic and educational development also include the physics learning.
4. There should be teacher-training programme which should help to see past the technology to the pedagogical and educational games that the use of internet devices will bring to the classroom.

   Teachers in general and physics teachers in particular must as a matter of urgency are kept abreast with modern education if they must be relevant in the 21st century.

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