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STUDENTS' PERCEPTION ON THE INFLUENCE OF INFORMATION AND COMMUNICATION
TECHNOLOGY (ICT) IN SCIENCE TEACHING AND LEARNING (SED209 & SED317) ON THEIR
ICT AND TEACHING SKILLS

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STUDENTS' PERCEPTION ON THE INFLUENCE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN SCIENCE TEACHING AND LEARNING (SED209 & SED317) ON THEIR ICT AND TEACHING SKILLS

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Abstract

Purpose: The purpose of this paper was to explore students' perception on the influence of ICT in science teaching and learning (SED 209 and SED 317) on their ICT and teaching skills.

Methodology: The study employed a qualitative study design as a means of carrying out the research. The population consisted of all 300 level and graduating students in the Department of Science Education of Adekunle Ajasin University, Akungba-Akoko. Three research questions were designed to guide the study. The sample of the study was made up of 31 respondents from Science Education Department of the University which were selected using purposive sampling technique. Interview schedule was used to collect data from the respondents. Data collected was analyzed using content analysis.

Results: Findings revealed that the two ICT courses influence ICT skills of science education students. Findings also revealed that the knowledge gained from the two courses have really influenced students' teaching skills during teaching practice.

Unique Contribution to Theory and Practice: Based on the findings of this study, it was recommended that parent should encourage their children to develop their ICT skills before getting admission so as to enhance learning while taking SED 209 and 317. It was also recommended that government should sanction budgets in ICT head available for students to facilitate teaching and learning of science subjects.

Keywords: *ICT, perception, influence. Science Education students, skills, teaching.*

INTRODUCTION

Prior to the integration of ICT into teaching and learning, the delivery system for all educational levels was a traditional classroom setting with an instructor conducting a lecture and learners listening and writing notes (Singh, 2013). The 21st-century innovations in the educational system have challenged this mode of learning. The progress in information technology has enabled new educational delivery methods such as ICT in education. As indicated by Covington (2012), contemporary perspectives on education showed that learning comes about in a large number of ways. Learning takes place through information processing, inside or outside classroom environments. Covington (2012) remarked that the classroom, whether traditional or virtual, provides the structured community base within which students need to create an environment and construct meaning from the course narrative. Lei & Gupta (2010) opined that in a traditional face-to-face classroom, learners sit and listen to a lecture on a topic, and take notes, however in a technology facilitated classroom, students interact with computer-based hardware and software. Technology is supposed to offer rich pedagogical opportunities to change student learning, by improving student engagement (Carle, Jaffee, & Miller, 2009).

Morgan (2008) noted that since 1990s, the use of technology on university campuses has increased from the use of light projectors, video recorders, and video tapes, to multi-media applications, involving advanced hardware (e.g., laptops and LCD projectors) and interactive experience in Virtual Learning Environments.

ICT skills are becoming gradually essential in our everyday lives as well as in educational systems. There is need therefore, for upward demand on educational institutions to use ICT to teach the skills and knowledge that students need for the 21st century. This is not far from the reason why the two courses (SED 209 and SED 317) were introduced into science education curriculum. According to Korte & Husing (2007), after realizing the effect of ICT on the workplace and everyday life, today's educational institutions try to restructure their educational curricula and classroom facilities in order to bridge the existing technology gap in teaching and learning process. They further noted that this restructuring requires effective adoption of technologies into existing learning environments in order to provide learners with knowledge of specific subjects' areas, to promote meaningfully learning and to enhance professional productivity.

The continuous development of Information and Communication Technologies (ICT) has created new opportunities for teachers. Orlik (2006) remarked that during classes, a modern science teacher should be able to integrate ICT with various teaching methods. The researchers such as (Shihkuan, 2010; Valanides & Angeli, 2008; IBO, 2009; Donnelly, McGarr, & O'Reilly, 2011) remarked that teachers can use into three major areas:

The general use of computers, operating system, office applications and Internet, Use of the measuring equipment and its integration with a computer, applications for data collecting and processing, Visualization of the lessons' content with the use of modern didactic tools, modeling, use of videos and animations, interactive presentations and assessment, virtual laboratories.

Kubiatko and Vlckova (2010) noted that the amount of time spent utilising a computer had a positive and strong relation with scientific knowledge. They concluded that students who used ICT tools for educational purposes scored higher than their counterparts who did not use ICT tools for educational process.

The adoption of ICT into education and its usefulness in teaching specially for science courses has become increasing due to modern use of technology in education and the importance of ICT in teaching and learning cannot be overemphasized because it brings about effective learning. Previous studies conducted on the influence of ICT in teaching and learning science subjects indicated that ICT brings about greater change in teaching and learning of science subjects.

SED 209 and SED 317 among others were introduced into science education curriculum of Adekunle Ajasin University in 2014 and SED 209 is a prerequisite to SED 317. Ever since the two courses were introduced, the influence of these courses on ICT and teaching skills of students has not been documented. For secondary school teachers to meet up with the developing role of assisting the student to attain the 21st century skills required; the teachers need to be ICT compliance and competent and must learn to incorporate their knowledge of technology and pedagogical skills in teaching their subject content for 21st century skills(Garba,2014). The implication of this development provides the rationale and a strong base, establishing the necessity of ICT integration in teaching and learning science subjects in order to meet up with the responsibility of equipping the science students with what it takes to fit the 21st century skills.The level of ICT literacy and competence of the teacher is crucial in determining the success of ICT integration in schools (Rosnaini & Mohd. Arif, 2010). Teachers' competence toward the use and application of ICT in their educational practices is dependent on teacher education and training on one hand; and, teacher educators on the other hand. Anyikwa (2009) noted that, service teachers were found to be less prepared for the use of ICT in their teaching. This is connected with their low level of ICT literacy and competence. This implies current practices of teacher training in Nigerian Colleges of Education and other teacher training institutions in Nigeria do not provide pre-service teachers with the ICT skills and competence needed for the effective use of ICT in teaching and learning. This current study is set out to fill the identified research gap. Hence, the study tends to explore the perceptions of science education students on the influence of ICT courses on their ICT and teaching skills.

Purpose of the Study

The purpose of the study was to explore perceptions of science education students on the influence of SED 209 and SED317 on their ICT and teaching skills.

Specifically, the study is set to;

- I. Investigate science education students' views on the influence of SED 209 and SED317 on their ICT skills.
- II. Explore science education students' views on the influence of SED 209 and SED317 on their teaching skills.
- III. Explore students' view on the transformative roles of ICT and the best ways to use ICT in teaching and learning science

Research Questions

The following were raised to guide the study.

1. What are the views of science education students on the influence of SED 209 and SED317 on their ICT skills and how do they influence their ICT skills?
2. What are the views of science education students on the influence of SED 209 and SED317 on their teaching skills and how do they influence their teaching skills?
3. What are the views of science education students on the transformative roles of ICT and the best ways to use ICT in teaching and learning science?

RESEARCH METHOD

This study employed a qualitative case study design. Qualitative studies are known for their ability to understand phenomena from the participants' point of view. The study sought to explore science education students' views on influence of ICT courses on their ICT and teaching skills. This study was carried out in a Nigerian university. The population for this study consisted of all science education students from third year and final year registered the SED 209 and SED 317 courses in the participating university. A purposive sample of male 17 and 14 female students participated in the study. These students were selected from third year and final year and were deemed experienced enough teaching practices in the university to provide useful insights on influence of ICT courses on their academic life, ICT and teaching skills. The participants were also selected based on their willingness to participate in the study. The research instrument employed for this study was interview schedule. In order to

ensure reliability and validity of the outcomes of this study, the researchers ensured that there were no biases and undue influence during the whole interviewing process. This process adhered to the recognized procedures, which ought to be followed when coding, categorizing and analyzing data. The researcher transcribed the interviews verbatim and completely involved in the qualitative stage and established a trusting relationship with the participants. Furthermore, the research included primary data in the results to allow the reader to see the basis upon which the researchers' conclusions were made. For example, some of the participants' views were given with actual quotations as evidence. Interviews schedule was used as a mode of collecting data from the participants. Thirty one students were interviewed, and these were audio-recorded and later transcribed. The data was analyzed through content analysis. Content analysis refers to the analysis of textual contents gathered from interviews. Interview transcriptions were coded and categorized, and thereafter analyzed for patterns that emerged as themes.

RESULTS

Research Question 1: What are the views of science education students on the influence of SED 209 and SED317 on their ICT skills and how do they influence their ICT skills?

In order to answer this research question, the participants were asked if SED 209 and SED 317 influence their ICT skills and how they influence their ICT skills. Most of the participants emphatically responded with answer "yes" to the question. Most of the participants commented that the two courses influence their ICT skills positively. The following comments have been obtained from their responses;

"Information based on ICT can wave through your ears, you can hear it and not take note of it but when it has to do with you having to do test and evaluation on the course you know you have to know is in-depth."

(Respondent 3)

"Before learning the course, I had little knowledge about ICT but the course helped me develop and increase my knowledge in the use of ICT." **(Respondent 5)**

"As I have said earlier that I have no knowledge about the use of ICT before taking the course. The course helped me so much that I can operate computer well." **(Respondent 6)**

"I learnt how to use Microsoft word including short cut, excel, power point, Encarta, encyclopedia Britannica this has helped me in presentations, assignment etc." **(Respondent 7)**

“In the areas of Microsoft word, I could remember when Dr. Akingbemisilu taught us and till now I still remember almost all the things I was taught concerning MS word.” (Respondent 9)

“I could remember during Edu 230; I have no knowledge about online class and SED 209, I couldn't send mail before but can now do them perfectly.” (Respondent 11)

“It helped me to know the usefulness of ICT not only about social media alone.” (Respondent 23)

“It really helped me because there are some packages we were taught that can be used to keep record, student marks and it enhance the keeping of data for future references.” (Respondent 27)

“During SED 209 we were given an assignment I have never practicalized before, he could know more about it and do the assignment myself.” (Respondent 31)

From the above response, the researcher concluded that the SED 209 and SED 317 courses influence ICT skills of science education students positively.

Research Question 2: What are the views of science education students on the influence of SED 209 and SED317 on their teaching skills and how do they influence their teaching skills?

In order to answer this research question, the participants were asked if SED 209 and SED 317 influence their teaching skills and how they influence their teaching skills. Most of the participants emphatically responded with answer “yes” to the question. Majority of the respondents commented that the knowledge gained from the two courses helped them to develop instructional packages to teach science subject in their various school of assignment during teaching practice. They also commented that the knowledge gained from the two courses really influenced their teaching skills during teaching practice. The following comments are their responses:

“I was able to use the knowledge to show student some images I prepared for the lesson to be taught.” (Respondent 1)

“The instructional- materials I used was ok due to the use of the knowledge acquired from the course.” (Respondent 3)

“Because during my teaching practice I made use of some ICT equipment like browsing some abstract thing and bringing it to classroom to show the students.” (Respondent 4)

“I downloaded some materials online which I printed and use for my teaching practice. I was able to download pictures of what I was teaching. I was able to overcome the abstractness of what I was teaching because they could see what I was teaching.” (Respondent 10)

"I grouped student into group and gave them drills to do on my student which made them understood the calculations I taught them in class."(**Respondent 11**)

"It influenced my teaching skills in the aspects that I learnt that as a good teacher you have to take them through practical aspect not just talking with mouth but let them see what you are saying. As a teacher you have to learn to design some instructional materials and show it to them because it allows learning sinks more than just talking in class."(**Respondent 22**)

"The school lacked projector which was a barrier but I called students one after the other to check some things on my system".(**Respondent 27**)

"I couldn't get materials of one of the topics I taught, so I went online to search, printed some things for the students to see."(**Respondent 30**)

From the above responses, the researcher concluded that science education students' teaching skills are influenced by knowledge, experience and level of ICT literacy acquired from the two ICT courses.

Research Question 3: What are the views of science education students on the transformative roles of ICT and the best ways to use ICT in teaching and learning science?

In order to answer this research question, the participants were asked of their views on the transformative role of ICT and its impact on teaching and learning science subjects. Most of the participants commented that ICT plays a transformative role in teaching and learning science subjects. The participants also commented that ICT brings about improvement in the teaching and learning of science. They further commented that ICT strengthened the teaching and learning of science to an extent that student no longer view science subjects as an abstract subjects. The following are some of their responses:

"My view is that science is something practical instead of verbal teaching theoretical part should be there it should be taken importantly because the only way to know if someone understands something is to practicalize it." (**Respondent 4**).

"My view is that ICT has really helped student to retain more information when they are been used. The government should take it upon themselves to ensure that schools have appropriate equipment needed." (**Respondent 6**)

"If we continue to use ICT with time failure will be eradicated completely in the education system."(**Respondent 7**)

“ICT has really strengthened teaching and learning science that student no longer view science as something abstract any longer.” (Respondent 8)

“It is a good one. ICT can promote any field of study including teaching science. It reduces ignorance in science. ICT can make known what would have been abstract during teaching without ICT.” (Respondent 9)

“It has brought about changes of learners mindset about science. Has student tend to hate some science subject because it is abstract” (Respondent 26)

“It has a positive impact on the students. In this society now ICT is used to perform majority of the task.” (Respondent 31)

DISCUSSION AND ANALYSIS

Research Question 1 revealed that the SED 209 and SED 317 courses influenced ICT skills of science education students. This may due to the fact that the knowledge gained from the above courses play a significant role in improving ICT skills of science education students. This is in line with the findings of Markauskaite (2006) who argued that some science courses helps students’ to develop their ICT skills. This may suggest that some science courses led to the development of ICT skills using specific software packages or applications, such as word processors, an operating system, or Internet access software. Research Question 2 revealed that science education teaching skill is influenced by knowledge, experience and level of ICT literacy acquired from the ICT courses. This may suggest that the teacher application of computer aided instruction make teaching effective and efficient. This may also suggest that ICT usage for educational purposes bring about effective teaching. This is in line with the findings of Bransford (2001) who reported that students who have knowledge and high literacy level perform better in teaching than students without knowledge of ICT.

Research Question 3 revealed that ICT plays a transformative role in teaching and learning science subjects. This may suggest that integration of ICT in teaching and learning of science subjects brings about effective teaching and learning. It may also suggest that ICT usage in science classes facilitate learning. This is in line with the findings of Osborne (2003) who remarked that ICT has led to the development, knowledge and understanding of the basic scientific principles and the foundation on which the edifice rests and, on the other, those who would argue for an emphasis on the processes of science thinking. This is also in line with the finding of Machell and McHugh (2004) who opined that the use of projector to display what is been taught in class is the best way to teach and learn science subjects.

Conclusion

Based on the findings of this study, we may draw a conclusion that the SED 209 and SED 317 courses positively impact on learning ICT and teaching skills of science education students. Science education teaching skill is influenced by knowledge, experience and level of ICT literacy acquired from the ICT courses as well. We confirm that ICT plays a transformative role in teaching and learning science subjects and strengthened the teaching and learning of science subjects.

Recommendations

Based on the findings of this study, the following recommendations are made:

The university authorities should develop students' skills on various technologies that can help in teaching science subjects.

Parents should encourage their children to develop their ICT skills before getting admission to enhance learning while taking SED 209 and 317 courses.

Government should sanction budgets in ICT head available for students to enhance effective teaching and learning of science subjects.

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