Global Educational Research Journal
Abbreviated Key Title: Glob. Edu. Res. J.
ISSN: 2360-7963 (Print) & Open Access. Vol 10, issue 12, Pp. 096-102
Published by GERJ *Full length Research*

Exploring Basic Science Teachers' Perspectives towards Using E-Learning Techniques to Deliver Instruction at a Mastery Level

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***Corresponding Author: Onyi IE , Received: 20/11/2022| Accepted: 18/1022022 |Published: x/10/2022|**

Abstract: ***Basic science is an integral part of upper basic education in Nigeria. The introduction of e-Learning has ameliorated the unprecedented crisis in the educational sector brought by covid-19. With the mastery of e-learning skills, teachers would be more fruitful in the implementation of the requirements of the curriculum. There aren't many studies done on how teachers feel about using online learning materials. Therefore, research is required to explore basic science teachers' perspectives towards using e-learning techniques to deliver instruction at a mastery level. The study used a descriptive survey research design. 140 Basic Science teachers took part in the study. The t-test, ANOVA, and Pearson Correlation were used to examine the data. The research revealed that teachers of basic science have a negative opinion of employing e-learning techniques to deliver instruction at a mastery level. Gender, teaching experience, age and educational background were shown to be non-significant (p > 0.05) in influencing basic science teachers' perception of using e-learning techniques to deliver instruction at a mastery level. While basic science teachers' level of e-Learning proficiency (r=0.564, p=.000) was statistically significant in determining their perception of using e-learning techniques for instructional delivery at a mastery level. The researchers recommend that Basic Science teachers should be trained by the government to a mastery level in order to generate teachers who can employ e-learning for instructional delivery in case of future educational obstacles***

Keywords: Basic Science, E-Learning, Instruction, Mastery level, Techniques,

Published by GERJ ISSN: 2360-7963

INTRODUCTION

Over the years, teaching and learning has been confined to the classroom using traditional Face to Face (F2F) method. F2F mode of learning ought to acknowledge the introduction of modern technologies in education. Thus, in this rapid changing world, many countries tried to redesign its education system using various modern technologies. The onset of new technology has the capacity to increase the quality of education for any nation. Every nation is endowed with numerous natural resources though, the most value-able resources remain human capital. Any country's educational system has a significant impact on the growth of its human capital. Basic Science deals with the study of nature and the events in the world. Basic Science was introduced in junior secondary schools to encourage students to acquire knowledge and skills for further studies and bring about scientific and technological development in Nigeria. According to White (2014) Basic Science is very important in our everyday live and should be taught in a way to harmonize the three major science subjects which include physics, chemistry and biology. If

junior secondary school leavers should continue with the science subjects in the senior secondary schools there is need for an intensive coaching and personal education through e-learning in Basic science. Available research report by Ugwuanyi, Okeke & Okeke (2021) indicated that students' achievement in Basic Science is poor. The poor achievement was connected with the method of teaching and teacher factor. There is need for learners to cope and adapt to academic challenges of the century.

The numerous flaws and disparities in our educational institutions, including lack of access to computers and broadband for online learning, the absence of a supportive environment for learning, and a mismatch between resources and demands (Schleicher, 2020). As Covid-19 posed the challenges of shifting from the traditional teaching method to e-learning instructional approach in developing countries, the Federal Government of Nigeria introduced free e-learning portals for primary and secondary school pupils, including the School-gate and the Mobile Classroom Coming App (FME, 2020). It was necessary for teachers to adjust to new pedagogical ideas and instructional strategies that they may not have previously used. Thus, the crisis has provided an opportunity for teachers and students to improve and maximize their ICT/computer operational skills quickly. However, access to the internet might not be so simple, particularly in a nation where many of the teachers lacked basic computer literacy. There is a large knowledge gap about capacity building workshops among many scientific teachers. Thus, the need to explore basic science teachers' perspectives towards using e-learning techniques to deliver instructions at a mastery level.

LITERATURE REVIEW

Basic scientific instruction may be conducted outside the classroom without physical touch. E-learning permits students to operate well and acquire all-around development in science, according to United Nations Education Scientific and Cultural Organization (UNESCO) (2020). Through the technique of self-directed learning offered by e-learning, students can replay the lessons whenever it is most convenient for them. According to Haciogluo (2020), e-learning can assist students in becoming creative, imaginative, and competent to use their expertise in science to address the challenges of the modern world. A motivator is the use of e-learning for efficient classroom delivery. This suggests that e-learning is not a teacher in and of itself, but rather a means of instruction, necessitating the need for science teachers to be sufficiently prepared and trained in order to take use of the many benefits of e-learning in the delivery of instruction (Ezekamnagha, 2018). Through the discussion forum, e-learning offers a platform for greater connection and collaboration with the students, removing the participation barrier. Adoption of an online learning system in Basic Science education calls for the application of e-learning methods by teachers, which depends on their technical proficiency, the reliability of the energy supply, internet access, students, parents, and various school administrations (Okoye, Ibenwa & Ekekwe, 2021).

Due to current educational obstacles, teachers must be proficient in using e-learning techniques for basic science content and methodology (Food and Agricultural Organization of the United Nation for e-learning academy, FAO, 2021). The students would be better able to compete with students throughout the world if they mastered these e-learning skills. Teachers having a mastery level in e-learning skills is advantageous and suitable for e-learning proficiency. Teachers would benefit from using e-learning techniques if they wanted to successfully apply current curricular standards. The application of knowledge and a plan from the most basic to the most complex level of the concept to motivate students to practice e-learning skills can be seen as the mastery of e-learning abilities. It is important for educators and students to enhance their computer and ICT operational skills. To increase pedagogical delivery, teachers must master e-learning techniques. They might utilize these techniques intentionally or unconsciously. The secondary schools must concentrate on both knowledge- and skill-based education utilizing e-learning in order to be proficient in its application. According to Nwaeze, Onuorah, and Ukogo (2016), teachers that are adept at e-learning give their pupils the chance to be more accountable and invested in their study of Basic Science. Through e-learning, students can advance their individual education.

Previous searches and research have led to the identification of elements influencing the use of e-learning as teacher factors, such as instructors' experience, qualification, gender, age difference, and competency (Jayalakshmi, 2016; Michael, Chiejames, Igenewaria, and Samuel, 2020; Mahaidi, 2020; Magsambol, 2021), inexperience in using e-learning resources (Adekunle, Rafiu, & Olufunke, 2021). Some research is favorable, while others are adverse. The United Nations' Food and Agricultural Organization (FAO, 2021) looked into E-learning techniques and best practices. Nwafor, Osuji, and colleagues (2021) looked into the delivery of political science curricula using e-learning systems. The planned study's goal was to learn more about the opinions of Basic Science teachers' perspectives towards using e-learning techniques to deliver instructions at a mastery level. Using the study's objectives as a guide, six hypotheses were constructed.

METHODOLOGY

One hundred and forty (140) Basic Science teachers in the Enugu state from Nsukka and Obollo-Afor Education zones make up the study's target population. All the teachers were involved in the study. The sample size is 140 Basic science teachers. In the two education zones, there are 96 public secondary schools overall (Source: Public Relations Post Primary School Management Board Nsukka and Obollo-Afor, 2020). Descriptive survey research design was used. A letter of approval was obtained from the Post Primary School Management Board. Data for the study were gathered using an instrument titled “Personal E-Learning Skills Instructional Delivery Questionnaire (PELSIDQ)”. PELSIDQ is made of three sections, section 1 consists of demographic information such as gender, age, teaching experience and educational qualification. There are 15 questions in Section 2 about the preceding teachers' computer and online learning skills. It used a 4-point grading system that included "I can't do this" (one point), "I can do this with someone else's assistance," (2-point), "I can do this independently," (3-point) and "I can teach how to do this". 13 questions about instructors' opinions of using e-learning strategies to deliver Basic Science training were included in Section 3 of the study. It used a Likert scale with four options: "Strongly Disagree" (one point), "Disagree" (two points), "Agree" (three points), and "Strongly Agree" (4-point). The survey's quantitative data was examined using the SPSS 23 program. Descriptive statistics were employed in analyzing the data. Mean difference was examined using the independent sample t-test.

RESULTS

$H0_1$: There are positive perceptions of using e-learning techniques to deliver instruction at a mastery level.

Table 1: Test of Significance for Basic science teachers perspectives towards using e-learning techniques to deliver instruction at a mastery level

Category	N	Mean	SD	t-test	P-Values
E-learning technique mastery level scale	140	1.9373	.5578	.231	.821

Table 1 revealed that there were no statistically significant differences (t=.231, p=.821). $H0_1$ was rejected since the test result exceeded the null hypothesis. Thus, Basic science teachers had negative perception of using. e-learning techniques to deliver instruction at a mastery level

$H0_2$: Gender does significant relate with Basic science teachers' perception of using e-learning techniques to deliver instruction at a mastery level.

Table 2: Gender Variables and the significance test for Basic science teachers' perspectives towards using e-learning techniques to deliver instruction at a mastery level.

Category		N	Mean	SD	T	P-Values
Gender	Male	66	2.9173	.67889	-.369	.716
	Female	74	2.9395	.48238		

The t-test for independent samples was used to examine gender mean differences in this set of independent variables. Males (M=2.9173) and females (M=2,9395) both achieved higher scores, but there were no statistically significant differences (t=-369, p=.716). $H0_2$ was rejected since the test result exceeded the null hypothesis.

$H0_3$: Experience does significant relate with Basic science teachers' perception of using e-learning techniques to deliver instruction at a mastery level

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Table 3: Experience Variables and the significance test for Basic science teachers' perspectives towards using e-learning techniques to deliver instruction at a mastery level.

Category		N	Mean	SD	F	P
Experience	≤ 7	26	2.4389	.59100	1.879	.113
in Years	8 - 14	44	2.9885	.53153		
	15 - 21	24	3.1252	.42124		
	22 - 28	34	2.9539	.53064		
	29 - 35	12	3.0212	.46356		
	Total	140	2.8995	.52875		

Through a one-way analysis of variance, years of experience variations in this group of dependent variables were evaluated (ANOVA). According to the results, basic science teachers with 15 to 21 years of teaching experience had the most favorable perceptions (M=3.1252, SD=.42124) followed by teachers with 29 to 35 years of experience (M=3.0212, SD=.46356). Teachers with 22 to 28 years of experience (M=2.9539, SD=.53064) and 8 to 14 years of experience (M=2.9885, SD=.53153) shared similar experience. The findings also revealed that participants with less than 7 years of experience (M=2.4389, SD=.59100) had a negative perception using e-learning techniques to deliver instruction at a mastery level. $H0_3$ was rejected because (F=1.879, p=.113, alpha =.05).

$H0_4$: Age does significant relate with Basic science teachers' perception of using e-learning techniques to deliver instruction at a mastery level.

Table 4: Age Variables and the significance test for Basic science teachers' perspectives towards using e-learning techniques to deliver instruction at a mastery level.

Category (years)		N	Mean	SD	F	P
Age	25 - 31	4	3.0424	.40806	.977	.426
	32 - 38	67	2.9581	.55562		
	39 - 45	52	2.8012	.56329		
	46 - 52	14	3.0079	.40755		
	53 – 60	3	2.8553	.52261		
	Total	140	2.9329	.55985		

Age group of 25 – 31 had the most positive perception about using e-learning techniques to deliver instruction at a mastery level (M=3.0424, SD=.40806), while age group of 39 to 45 years had the least good perception (M=2.8012, SD=.56329). The proficiency level of basic science teachers' perception regarding the usage of e-learning techniques in the delivery of teaching among the age group was compared using an ANOVA. Table 4's test result showed that there were no statistically significant differences (F=-977, p=.426). $H0_2$ was rejected since the test result exceeded the null hypothesis.

$H0_5$: Educational qualification does significant relate with Basic science teachers' perception of using e-learning techniques to deliver instruction at a mastery level.

Table 5: Educational Qualification Variables and the significance test for Basic science teachers' perspectives towards using e-learning techniques to deliver instruction at a mastery level.

Category		N	Mean	SD	F	P
Educational	Dip / N.C.E	10	2.5349	.43405	.365	.701
Qualification	B.Sc/ B.A/B. Ed/ B. Sc(Ed)	103	2.7081	.46512		
	M. Sc/ M. A/ M. Ed	22	2.9512	.49329		
	Ph. D	5	3.2338	.54755		
	Total	140	2.8570	.52985		

According to Table 5's results, Basic science teachers with Ph. Ds had the most positive perception (M = 3.2338, SD=.54755), while those with Dip / N.C.E had the least good perception (M = 2.5349, SD=.43405). There were no discernible differences between teachers' educational backgrounds and their assessments of how well they use e-learning techniques to give instruction (F=.365, p=.701). H0_6 was rejected since the mean values showed that the probability value is greater than alpha level of .05.

H0_6: There is a significant relationship between Basic Science teachers' perception of using e-Learning techniques to deliver instruction at a mastery level and their e-Learning technique mastery level scale

Table 6: Test of Significance between Basic Science teachers' perspectives towards using e-Learning techniques to deliver instruction at a mastery level and their e-Learning technique mastery level scale.

Category		Perspectives towards using e-Learning techniques to deliver instruction at a mastery level	e-Learning technique mastery level scale
Correlations			
Perspectives towards using e-Learning technique to deliver instruction at a mastery level	Pearson Correlation	1	.564**
	Sig (2-tailed)		.000
	N	140	140
e-Learning technique mastery level scale	Pearson Correlation	.564**	
	Sig (2-tailed)	.000	
	N	140	140

**Correlation is significant at the 0.01 level (2-tailed).

The perspectives towards using e-Learning technique (experience) to deliver instruction at a mastery level and the e-learning technique mastery level scale were measured using Pearson r correlation coefficients. In order to respond to the sixth research question, correlation coefficients were computed. Table 6 revealed there were no statistically significant differences (p=-564, p=.000). H0_6 was accepted since the test result did not exceed the null hypothesis.

DISCUSSION

Basic science teachers had negative perception of their level of expertise in the use of e-learning techniques to deliver instruction at mastery level. This means that Basic science teachers don't generally view employing e-learning techniques to deliver education positively. This may be due to the fact that teaching and learning has been confined to the classroom using traditional Face to Face (F2F) method. In accordance with the findings, the majority of individuals either disapproved or strongly objected. Nwaeze, Onuorah, and Ukogo (2016) discovered that teachers had a negative attitude toward using e-learning, which lends credence to these findings. In other investigations, similar claims were made (Noraddin, 2015).

The result on gender showed that there are no gender disparities in basic science teachers' perceptions of how well they are using e-learning techniques to deliver education. This implies that gender has no influence on teachers' perspectives towards using e-learning techniques to deliver instruction at a mastery level. This claim might be due to the fact that e-learning involves the use of computer and new technology which interest everybody irrespective of gender. This outcome is consistent with earlier research that found gender to be a negligible factor (Adebola & Olusola, 2016; Olutola, Olatoye & Olatoye, 2018). This study, however, goes against the findings of a study by Magsambol (2021), who discovered a link between gender differences and attitudes toward online learning. The results ran counter to earlier research on related topics (Mahdi, 2020).

The number of years of experience of Basic science teachers has no influence their perspective towards using e-learning techniques to deliver instruction at a mastery level. The findings revealed a negligible link between teachers' years of experience and perception of e-learning proficiency in instructional delivery among basic science teachers, Can (2015) found no correlation

between years of teaching experience and attitude toward technology. However, this finding was at odds with a study by Mahdi (2020) that indicated instructors' attitudes toward online learning environments and their proficiency level utilization of e-learning in instruction were significantly influenced by their years of experience.

The age of basic science teachers does not influence their perspective towards using e-learning techniques to deliver instruction at a mastery level. This may be due to the fact that e-learning involves new technology which is interesting thus, all age groups demonstrated a positive attitude towards it. The outcome is consistent with (Can, 2015) who found that teachers' age has no significant relationship with teachers' attitudes. Younger and older teachers had nearly identical attitudes regarding e-learning. This study's findings were also in conflict with (Magsambol, 2021).

The educational backgrounds of basic science teachers showed no disparities in their perceptions of how well they are using e-learning techniques to deliver education. This implies that "teachers' educational qualification" does not influence their perception about using e-learning techniques to deliver instruction at a mastery level. The outcome supports a study by Mahdi (2020) that found no connection between a teacher's educational background and their use of technology. However, (Jaylkshari, 2016) disputes this study's finding that variations in educational attainment were significant.

There are substantial disparities between Basic science teachers' perspectives towards using e-Learning techniques to deliver instruction at a mastery level and their e-Learning technique mastery level scale. This implies that teachers must have a mastery knowledge of e-learning techniques before they employ e-learning techniques to deliver teaching. Adoption of an online learning system in Basic Science instruction calls for the use of e-learning techniques by teachers, which depends on their technical proficiency (Okoye, Ibenwa & Ekekwe, 2021). Teachers will be proficient when they mastered the e-learning skills and techniques. This finding is supported by earlier research by (Michael, Chiejames, Igenewaria & Samuel, 2020) showing that having experience utilizing technology can significantly improve a teacher's classroom instruction.

CONCLUSION

This study came to the conclusion that;

- Basic science teachers had a negative perception of using e-Learning technique to deliver instruction at a mastery level.
- Teachers' gender, number of years of experience, age and educational qualification has no influence on their perspective towards using e-Learning technique to deliver instruction at a mastery level.
- Teachers must have a mastery knowledge of e-learning techniques before they employ e-learning techniques to deliver teaching.

The researchers recommended that Basic Science teachers should receive training in an online learning environment in light of their findings in order to address pedagogical problems.

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