

Appropriate electronic-learning technologies for mitigating the transmission of coronavirus disease pandemic 2019 in universities in north-central, nigeria

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Abstract: The study identified the perception of educational technology lecturers on appropriate e-Learning technologies for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. The research design used for this study was a descriptive survey research design, specifically, using cross-sectional study. The population of the study was all the 82 educational technology lecturers consisting of 55 males and 27 females from the nine Universities offering educational technology in North-Central, Nigeria. Total population sampling technique was used to select the whole population of the study. The instruments used for data collection was a structured questionnaire. Cronbach Alpha statistical method was used to determine the reliability indices of the instrument and found to be .89 and .90 respectively. The study employed the use of mean to answer the research questions and Analysis of Variance to test the null hypotheses. Findings from the study revealed among others that Zoom, Google Classroom, WhatsApp, YouTube, Telegram, EdX and Open edX, Udemy and LinkedIn Learning (Lynda) were appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. The study recommended that, lecturers should adopt the used of the identified e-Learning platforms and

contents delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Key Words: Coronavirus Disease Pandemic, Educational Technology Lecturers, e-Learning Technologies, Universities

INTRODUCTION

Coronavirus disease pandemic, also known as COVID-19 pandemic is an ongoing pandemic that causes illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). According to World Health Organization (WHO, 2020), the COVID-19 spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes. The pandemic has caused large-scale institutional shock effects in various areas of human activity including education. In an attempt to control the spread of COVID-19 pandemic, most governments around the world, including Nigeria authorized unprecedented social containment measures. These measures, among others, included social distancing and the temporary physical closure of educational institutions. This temporary closure alongside other non-pharmaceutical measures to curb the transmission of COVID-19 negatively affects teaching and learning processes in schools.

According to United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020), COVID-19 related closure impacted the study of 1540 million students across 191 nations including students in Nigerian Universities.

Universities are places of learning above secondary school level where students are trained to acquire relevant knowledge and skills in different occupations for employment in the world of work. According to Federal Government of Nigeria (FGN, 2004), University education is aimed at equipping students with the relevant attitudes, knowledge and skills in different occupations mainly for employment in the world of work. It is unfortunate that, the achievement of the aim of University education is threatened by the COVID-19 pandemic. Ogunode *et al.* (2020) revealed that, the impact of COVID-19 pandemic on Universities includes disruption of academic calendar, cancellation of local and international conferences, teaching and learning gap, disruption of examination and extension of graduation time. These are serious threat to the realization of the aim of University education. Hasan and Khan (2020) stressed that, considering the role that University education in the development of individuals as well as nations, such education must be safeguarded. Thus, as a response, government across nations emphasized and encouraged the use of electronic-learning.

Electronic-Learning (e-Learning) simply refers to the type of learning that utilizes electronic technologies to access educational curriculum outside of a traditional classroom. Henry (2011) defines e-Learning as the appropriate application of the internet to support the delivery of learning, skills and knowledge in a holistic approach not limited to any particular courses, technologies, or infrastructures. The use of e-Learning amid this new reality of COVID-19 pandemic has emerged as a potent tool to support students' learning remotely. Patil (2020) stressed that, to support students' learning in all possible manner during COVID-19 pandemic, there is need for practical application of e-Learning technologies.

The e-Learning technologies are combination of digital, computer, web-based, and portable technology that is applied and used to support and enhance the learning process. Hurix, (2020) described e-Learning technologies as the combination of computer hardware and computer controlled devices with software (operating systems, authoring tools, expert systems and courseware) to support learning. Adopting e-Learning in schools such as University required functional e-Learning technologies that include e-Learning platforms and content delivery modes (Cathy & Farah, 2020). According to Smith *et al.* (2020), appropriate use of e-Learning technologies offers enriched learning experiences, help students becomes independent and self-directed learners as well as lower the risk of COVID-19 transmission. However, ascertaining the most appropriate e-Learning technologies to be used in Universities could be achieved through the services of experts such as educational technology lecturers.

Technology education lecturers are professionals in higher institutions of learning such as Universities that acquired academic training in teaching the subject matter of any aspect of educational technology. Adewumi (2012) described educational technology lecturers as individuals with proficiency in the process of analyzing, designing, developing, implementing and evaluating instructional environment and learning materials to improve teaching and learning. These individuals possess the requirements to improve teaching and learning by offering professional guidance on the appropriate e-Learning technologies for mitigating the transmission of COVID-19 in Universities. Ridenhour *et al.* (2020) stressed that, the perception of educational experts such as educational technology lecturers on appropriate e-Learning technologies have the capacity to mitigate the transmission of COVID-19 in Universities. Hence, this study sought to identify the perception of educational technology lecturers on appropriate e-Learning technologies for mitigating the transmission of COVID-19

pandemic in Universities in North-Central, Nigeria.

Statement of the Research Problem

Universities are places of learning above secondary school level aimed at equipping students with the relevant attitudes, knowledge and skills in different occupations mainly for employment in the world of work. Unfortunately, achieving the aim of University education is threatened by the COVID-19 pandemic. Ogunode *et al.* (2020) confirmed that, the following have been identified as the negative impact of COVID-19 pandemic on University education: disruption of academic calendar, cancellation of local and international conferences, teaching and learning gap, disruption of examination and extension of graduation time. These among other negative impacts of COVID-19 pandemic threatened the realization of the aim of University education. Thus, as a response, researchers such as Arah *et al.* (2020) attempted to provide non-pharmaceutical measures in curbing the transmission of COVID-19 by assessing the perception of technology education lecturers on school-based social distancing practices for curbing the transmission of coronavirus disease in Niger state, Nigeria. Despite such effort, the effectiveness of social distancing in curbing the transmission of COVID-19 in Universities is not guaranteed considering the high students' population. Ridenhour *et al.* (2020) revealed that, the use of e-Learning technologies amid COVID-19 pandemic has emerged as a potent tool to support students' learning remotely. Hence, this study sought to identify the perception of educational technology lecturers on appropriate e-Learning technologies for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Aim and Objectives of the Study

The aim of the study is to ascertain the perception of educational technology lecturers on e-Learning technologies for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. Specifically, the objectives of the study sought to identify the

perception of educational technology lecturers on the:

1. Appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.
2. Appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria

Research Questions

The following research questions were raised to guide the study:

1. What are the appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria?
2. What are the appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria?

Hypotheses

The following null hypotheses were formulated and tested at .05 level of significance:

HO₁: There is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

HO₂: There is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Methodology

The research design used for this study was the descriptive survey research design, specifically, using cross-sectional study. This design is considered suitable for this study because, it enables the researcher to identify the perception

of educational technology lecturers on e-Learning technologies for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria at the same time. The population of the study was all the 82 educational technology lecturers consisting of 55 males and 27 females from the nine Universities offering educational technology in North-Central, Nigeria. Total population sampling technique was used to select the whole population of the study. The instruments used for data collection was a structured questionnaire developed by the researchers on five points rating scale of Highly Appropriate, Appropriate, Not Appropriate, Highly Not Appropriate and Undecided with numerical values of 1, 2, 3, 4 & 5 respectively. The instruments consisted of two parts, A and B. Part A solicited data on appropriate e-Learning platforms for mitigating the transmission of COVID-19 in Universities and part B solicited data on appropriate of e-Learning content delivery modes for mitigating the transmission of COVID-19 in Universities. Cronbach Alpha statistical method was used to determine the reliability indices of the instrument and found to be .89 and .90 respectively. The study employed the use of mean to answer the research questions and Analysis of Variance to test the null hypotheses using Statistical Package for Social Sciences (SPSS) version 25. Decision on the research questions was based on real limit of numbers while decision on the hypotheses was based on comparing the generated p-value and the stated level of significance (.05).

Results:

Research Question One

What are the appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria?

Table 1: Mean Responses of Educational Technology Lecturers on Appropriate e-Learning Platforms for Mitigating the Transmission of COVID-19 Pandemic in Universities in North-Central, Nigeria

N1=55, N2=27

| S/N | e-Learning Platforms | \bar{X}_1 | \bar{X}_2 | \bar{X}_A | Remark |
|-------------------|---------------------------|-------------|-------------|-------------|--------------------|
| 1 | Zoom | 4.18 | 4.07 | 4.15 | Appropriate |
| 2 | Google Classroom | 4.02 | 4.04 | 4.02 | Appropriate |
| 3 | Google Hangouts | 2.96 | 2.93 | 2.95 | Not Appropriate |
| 4 | WhatsApp | 4.04 | 4.04 | 4.04 | Appropriate |
| 5 | Facebook | 2.93 | 2.81 | 2.89 | Not Appropriate |
| 6 | You Tube | 4.20 | 4.11 | 4.17 | Appropriate |
| 7 | Telegram | 4.00 | 4.07 | 4.02 | Appropriate |
| 8 | EdX and Open edX | 4.15 | 4.11 | 4.13 | Appropriate |
| 9 | Udemy | 4.02 | 4.07 | 4.04 | Appropriate |
| 10 | LinkedIn Learning (Lynda) | 4.03 | 4.00 | 4.02 | Appropriate |
| Grand Mean | | 3.85 | 3.83 | 3.84 | Appropriate |

Keys: N_1 = Number of male educational technology lecturers, N_2 = Number of female educational technology lecturers, \bar{X}_1 = Mean response of male educational technology lecturers, \bar{X}_2 = Mean response of female educational technology lecturers, \bar{X}_A = Average mean response of male and female educational technology lecturers.

Table 1 revealed that, 8 out of the 10 items had average mean values between 4.02 to 4.17 while the remaining 2 items had average mean values of 2.89 and 2.95. This indicated that, the respondents were of the opinion that the 8 items were appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Research Question Two

What are the appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria?

Table 2: Mean Responses of Educational Technology Lecturers on Appropriate e-Learning Content delivery modes for Mitigating the Transmission of COVID-19 Pandemic in Universities in North-Central,

Nigeria
N1=55, N2=27

| S/N | e-Learning Contents Delivery Modes | \bar{X}_1 | \bar{X}_2 | \bar{X}_A | Remark |
|-------------------|------------------------------------|-------------|-------------|-------------|--------------------|
| 1 | Teacher-made Text Materials | 4.22 | 4.15 | 4.20 | Appropriate |
| 2 | Teacher-made video | 4.05 | 4.11 | 4.07 | Appropriate |
| 3 | Teacher made audio file | 2.98 | 3.04 | 3.00 | Not Appropriate |
| 4 | E-books | 4.04 | 4.04 | 4.04 | Appropriate |
| 5 | Video conferencing | 4.95 | 4.93 | 4.94 | Appropriate |
| 6 | Video from online source | 4.76 | 4.81 | 4.78 | Appropriate |
| 7 | Audio from internet | 2.96 | 3.04 | 2.99 | Not Appropriate |
| 8 | Slide -based course materials | 4.16 | 4.15 | 4.16 | Appropriate |
| 9 | Podcasts | 4.07 | 4.07 | 4.07 | Appropriate |
| 10 | Dialogue simulations | 3.16 | 3.19 | 3.17 | Not Appropriate |
| 11 | Virtual and augmented realities | 4.00 | 4.07 | 4.02 | Appropriate |
| 12 | Serious games | 3.00 | 2.96 | 2.99 | Not Appropriate |
| Grand Mean | | 3.86 | 3.88 | 3.89 | Appropriate |

Table 2 revealed that, 8 out of the 12 items had average mean values between 4.02 to 4.94 while the remaining 4 items had average mean values between 2.99 and 3.17. This indicated that, the respondents were of the opinion that the 8 items were appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Hypothesis One

There is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Table 3: One-Way Analysis of Variance for the test of Significant Difference between the Mean Responses of Male and Female Educational Technology Lecturers on Appropriate e-Learning Platforms for Mitigating the Transmission of COVID-19

Pandemic in Universities in North-Central, Nigeria

| Source | Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|------|------|
| Between Groups | .013 | 1 | .013 | .518 | .474 |
| Within Groups | 2.009 | 80 | .025 | | |
| Total | 2.022 | 81 | | | |

Table 3 revealed that Significant (P) value is .474 which is greater than .05. this implied that, there is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. Hence, hypothesis one was retained.

Hypothesis Two

There is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Table 4: One-Way Analysis of Variance for the test of Significant Difference between the Mean Responses of Male and Female Educational Technology Lecturers on Appropriate e-Learning Content Delivery Modes for Mitigating the Transmission of COVID-19 Pandemic in Universities in North-Central, Nigeria

| Source | Sum of Squares | df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|------|------|
| Between Groups | .005 | 1 | .005 | .372 | .544 |
| Within Groups | .996 | 80 | .012 | | |
| Total | 1.000 | 81 | | | |

Table 4 revealed that Significant (P) value is .544 which is greater than .05. this implied that, there is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in

Universities in North-Central, Nigeria. Hence, hypothesis one was retained.

Findings

1. Zoom, Google Classroom, WhatsApp, YouTube, Telegram, EdX and Open edX, Udemy and LinkedIn Learning (Lynda) were found to be appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.
2. Teacher-made text materials, teacher-made video, E-book, video conferencing, video from online source, slide –based course materials, podcasts and virtual and augmented realities were found to be appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.
3. There is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.
4. There is no significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Discussion of Findings

Findings on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria revealed Zoom, Google Classroom, WhatsApp, YouTube, Telegram, EdX and Open edX, Udemy and LinkedIn Learning (Lynda). The findings agreed with the findings of Hasan and Khan (2020) on online teaching-learning during covid-19 pandemic: students' perspective that revealed Zoom, Google Classroom, WhatsApp, YouTube and Telegram as the most suitable e-Learning

platforms. These implied that, adoption of the identified e-Learning platforms holds the potential to mitigate the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Nevertheless, the ANOVA test for significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria revealed not statistical different. This implied that, both male and female educational technology lecturers shared similar perception on appropriate e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. The finding is in agreement with Shahzad *et al.* (2020) who revealed no significant difference between the mean responses of male and female students on the effects of COVID- 19 in E- learning on higher education institution students.

Findings on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria revealed teacher-made text materials, teacher-made video, E-book, video conferencing, video from online source, slide –based course materials, podcasts and virtual and augmented realities The findings agreed with the findings of Gupta and Gupta (2020) on technology and e-Learning in higher education that revealed E-book, video conferencing, teacher-made video and video from online source as suitable e-Learning content delivery modes. These implied that, adoption of the identified e-Learning content delivery modes holds the potential to mitigate the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria

Nevertheless, the ANOVA test for significant difference between the mean responses of male and female educational technology lecturers on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19

pandemic in Universities in North-Central, Nigeria revealed not statistically different. This implied that, both male and female educational technology lecturers shared similar perception on appropriate e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. The finding is in agreement with Shahzad *et al.* (2020) who revealed no significant difference between the mean responses of male and female students on the effects of COVID-19 in E-learning on higher education institution students.

Conclusion

Based on the findings from the study, it is concluded that insight into the perception of educational technology lecturers on appropriate e-Learning technologies for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria is provided. The study revealed the appropriate e-Learning platforms and content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria. The findings of this study are particularly important for the development of an effective framework for the adoption of e-Learning technologies for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

Recommendations

Based on the findings from the study, the following recommendations were made:

1. The lecturers should adopt the use of the identified e-Learning platforms for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.
2. The lecturers should adopt the use of the identified e-Learning content delivery modes for mitigating the transmission of COVID-19 pandemic in Universities in North-Central, Nigeria.

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