



Teaching and Learning in Post-Covid-19 Era: An Evaluation of Digital Transformation Experience

¹ Pauline E. Onyeukwu, ² Jude E. Madu, ³ Abiodun Adeniyi

^{1,2,3} Faculty of Management and Social Sciences, Department of Business Management, Marketing and Mass Communication, Baze University, Abuja

Abstract: This study aimed to ascertain how digital technologies have impacted teaching and learning capabilities in private universities post COVID-19 experience. Utilizing a descriptive research design, the response of a sample size of 229 lecturers from private universities in Abuja was obtained through a structured questionnaire whose reliability was tested with Cronbach's Alpha method. Data obtained was analyzed with descriptive statistics, while the hypotheses postulated were tested with the multiple regression models through the application of SPSS version 20. Based on the analyses, the finding is represented in the following formula: $Y = F(X_1, X_2, X_3, U)$. Where Y represents learning capabilities measured through content assimilation and skill acquisition; F represents a function or dependent; X_1 represents Zoom teaching and learning method; X_2 represents Goggle meet/classroom teaching and learning method; X_3 represents Social Media teaching and learning method; while U technical factors and acceptable error. Based on the findings, the study recommends that private universities should: start utilizing a combination of virtual and physical methods of teaching and learning; motivate lecturers to develop the culture of online teaching and learning through Zoom meetings and Goggle Classroom; as a matter of priority, provide the needed technical needs such as steady electricity, internet connectivity, data and laptops or computers for lecturers; and encourage and execute constant training for lecturers on the use of digital tools for teaching and learning.

Keywords: COVID-19, Digital Transformation, Education, Learning, Private University and Teaching

1. Introduction

Learning comprises all activities aimed at achieving a permanent behaviour change. It is 'the process of acquiring new knowledge, behaviour, skills, values, attitudes and preferences' (Wikipedia, 2022). Learning is realized through education. Education is the process of facilitating learning (Wikipedia, 2022). Education is majorly classified into formal and non-formal learning (UNESCO, 2021). Formal education takes place in educational and training institutions and is usually structured with curriculum aims and objectives which act as a guide to the teacher. Non-formal education can best be described as a 'complement or alternative to the formal system of education because it is not usually executed through the rigid structured form of curriculum as ascribed to formal education. Generally, education entails learning, and learning is realized through teaching, storytelling, discussion and research. This implies that learning cannot be consummated without interaction between the teacher and the learner. This interaction can be physical or virtual. Before the emergence of the COVID-19 Pandemic, execution of teaching and learning. The devastating impact of COVID-19 is not a palatable story that requires further emphasis. But it's the interesting part that relates to this study is that the major method of contacting the dreadful disease or causing its' spread was close contact with infected persons or the environment. It took concerted and lengthy efforts to discover and administer pharmaceutical solutions to the pandemic. Even when pharmaceutical solutions were discovered and administered, an increasing number of deaths have been recorded the world over. As a result, campaigns for adherence to non-pharmaceutical measures were launched. Because people had difficulty adhering to non-pharmaceutical measures and more deaths were recorded, governments all over the world including Nigeria decided to shut down all social and economic activities. In Nigeria, the educational system was mostly affected because the Nigerian educational system was yet to key into the digital method of teaching and learning. This created the need to urgently and vigorously implement the digital method of teaching and learning in the country.

1.1 Problem of the Study

The digital method in education is the use of information and communication technology in teaching and learning. This is achieved through the use of online teaching and learning apparatus which includes: Zoom meeting/learning, Goggle

classroom/meeting, and Social Media live streaming. Despite the advantages associated with the digital method of teaching and learning, private universities are still experiencing difficulties utilizing it. Difficulties such as doubts about the ability of the digital method in teaching and learning to realize the essence of teaching and learning; doubts about the competence of lecturers and students operating the apparatus for digital teaching and learning; and technological challenges in digital teaching and learning environment.

1.2 Research Questions

- (i) What is the relationship between the Zoom method of teaching and learning and students learning capabilities?
- (ii) What is the relationship between the Goggle meet/classroom method of teaching and learning and students learning capabilities?
- (iii) What is the relationship between the Social Media method of teaching and learning and students learning capabilities?

1.3 Research Aim and Objectives

The aim was to ascertain how Digital (online) technologies have impacted teaching and learning capabilities in private universities post COVID-19 experience. The objectives of the study include:

- (i) to ascertain the impact of the Zoom method of teaching and learning on students learning capabilities.
- (ii) to ascertain the impact of the Goggle meet/classroom method of teaching and learning on students learning capabilities.
- (iii) to ascertain the impact of the social media method of teaching and learning on students learning capabilities.

1.4 Research Hypotheses

Based on the problems, questions and objectives of this study, the following hypotheses were postulated:

HO₁: There is no significant relationship between the Zoom method of teaching and learning and content assimilation.

HO₂: There is no significant relationship between the Goggle meet/classroom method of teaching and learning and content assimilation.

HO₃: There is no significant relationship between the Social Media method of teaching and learning and content assimilation.

HO₄: There is no significant relationship between the Zoom method of teaching and learning and skill acquisition.

HO₅: There is no significant relationship between the Goggle meet/classroom method of teaching and learning and skill acquisition.

HO₆: There is no significant relationship between the Social Media method of teaching and learning and skill acquisition.

2. Literature Review

Digital Transformation in Education

Digital transformation in education is the use of information and communication technology in teaching and learning. This also implies the use of online teaching and learning apparatus including Zoom meeting, Google meeting/classroom and Social Media live streaming to deliver lectures. This information can only be accessed when or where there is adequate or steady internet service. The internet service is accessed through modern communication tools such as GSM Network that will be connected to Desktop computers, laptops and smartphones. Furthermore, the accessibility of the internet through these Information and Communication Technology tools is not devoid of environmental factors such as poor electricity supply, high cost of data, activities of Hackers and lack of adequate skills in the use of these digital tools by lecturers and students.

Teaching and learning in Tertiary Institutions

Teaching includes all activities aimed at ensuring the transfer of knowledge from a more skilled person to a lesser skilled person. It is a situation where more mature persons organize themselves to build better skills and utilize such skills to identify, analyze and provide solutions to problems bothering society. Specifically, the National Policy on Education, 2004 as quoted in Ogunode, 2020 states that the aims of Tertiary Education include: "(i) the acquisition, development and inculcation of the proper value orientation for the survival of the individual and societies; (ii) the development of the intellectual capacities of individuals to better utilize the environment; (iii) the acquisition of needed skills which will enable individuals to become useful to the society: and (iv) to develop local and external knowledge of one's environment". Teaching and learning are in two extreme ends. Teaching is utilized to spur learning. If teaching is not adequately executed, learning will not be guaranteed. "Learning constitutes activities aimed at bringing together individual and environmental experiences and influences for acquiring, enriching or modifying knowledge, skills, values, attitude, behaviour and the external environment" (Unesco, 2022). Learning can easily be determined through content assimilation and skill acquisition. This is because, if a learner does not understand what the teacher teaches, such learner

will not assimilate useful information and knowledge. This result of lack of assimilation will manifest in the inability to acquire the needed skill.

2.1 Theoretical Review

Learning theories

Learning theories were developed to explain the process that individuals pass through to acquire knowledge or learn. The most influential learning theories include Behaviorist theory, Cognitive theory, Constructivist theory, Humanist theory and Connectivist Theory.

Behaviourist Theory

The foundation of the theory was laid by B.F Skinner, 1900, who developed the theory that learning takes place through a series of rewards or punishments realized through a conditioned behaviour that anticipates an outcome (Padgett, 2020). Skinner's theory believes that reward attracts repetition of the behaviour, while punishment discourages repetition of behaviour. This theory can be linked to classwork such as regular assignments or quizzes to students and marks awarded and shown to students as soon as possible. When students see a good grade, they will tend to sustain their efforts, but when they see bad results, they will try to improve on their performance. This will invariably lead to a greater commitment from both lecturers and students.

Cognitive Theory

The cognitive theory of learning is traceable to the work of Jean Piaget, in 1950. The theory believes that learning is a process of acquisition of knowledge through the acquisition, processing and interpretation of information according to the information received and the environment. Cognitive Theorists see learning as the bridge between the environmental stimuli and students' responses (Picciano, 2011). This theory implies that learning is achieved through sequential teaching; and that students tend to learn faster through visual aids that are linked to happenings around the environment.

Constructivist Theory

This theory was originally founded by Lev Vygotsky, in 1970. Theorists utilizing this theory believe that the learner is a scheme that utilizes a foundation by the teacher. This means that teaching and learning are achieved through a collaborative effort of both teachers and learners. According to Vygotsky, 1970 in Padgett, 2020, "Students learn best when working collaboratively with those whose proficiency level is higher than their own, allowing them to complete tasks they are not yet able to do independently". The implication of this theory is that teaching and learning through an online process is better achieved through a participative or interactive session between teachers and learners. Students are mostly given problem-solving cases and allowed to proffer solutions that are subject to discussion by the teachers and the students.

Humanist Theory

This theory is based on the philosophy developed by Abraham Maslow's Hierarchy of Needs Theory. The theory proposes that since self-actualization is the ultimate goal of every individual, every student learns to realize their goals while teachers are facilitators and coaches who must recognize the unique needs of each student and support the academic and social development of the students. Therefore the teacher's responsibility is to create a conducive environment for students to realize their dream. This theory implies that teachers should focus on identifying the potential of the student and keep developing the potential.

Connectivist Theory

This is a modern learning theory that is based on social interactions between teachers and students and between students through information and communication technology tools. This theory is influenced by technology and focuses on learners' ability to frequently source and update the relevant information. The implication of this is that posting lecture materials and slides through the Google classroom and lecturers interacting with the students through social media can encourage teaching and learning.

2.2 Empirical Review

The Researchers reviewed several studies related to this study. One of the studies reviewed is titled 'impact of virtual classroom learning on students of Nigeria Federal and State Universities'. This study was executed by Anekwe, 2017 and published in the European Journal of Research and Reflection in Educational Sciences. The study aimed to examine the impact of the virtual classroom on students learning. The study was executed with students in federal and state universities in southeast Nigeria as respondents. The questionnaire was administered to a sample size of 506 students through a stratified random sampling technique. Data obtained was analyzed with descriptive statistics, while all the hypotheses postulated were analyzed with t-test statistics. The major findings include: that virtual classroom has a positive impact on students learning capabilities, and students are willing to adopt the virtual learning method. Based on the findings, major recommendations include: more students should be encouraged to participate in the virtual learning method; lecturers should be trained and be consistent in the virtual learning method; government should as a matter of

urgency provide an adequate and dependable environment for virtual learning, and the universities should ensure they have steady and free internet connectivity.

Another relevant study to this research is titled “Telecommuting: A Panacea to COVID-19 Spread in Nigeria Universities”. This study was executed in 2020 by Onyeukwu, P.E., Adeniyi, A. and Amin, and H.J. the study was aimed at examining how telecommuting could serve as a panacea to the spread of COVID-19 in Nigeria universities. A sample size of 119 respondents comprising lecturers and students from selected universities in FCT Abuja were administered with a structured questionnaire. Data realized was analyzed with descriptive statistics, while the hypotheses postulated were analyzed with ANOVA. Major findings include: telecommuting strongly affects the spread of COVID-19; online teaching encourages social distancing, social media has a negative correlation with community spread of COVID-19, and internet usage can curb the spread of COVID-19 in Nigeria universities. Based on the findings, the study recommends among others that: government should encourage educational institutions to be ICT compliant to enable telecommuting work effectively.

3. Methodology

The descriptive research design was adopted for this study. Secondary data was obtained from textbooks and journals retrieved from the researcher's library and the internet. Primary data was obtained from the opinion of lecturers of Baze University Abuja who are seasoned in the online method of teaching and learning in the Nigerian university system. A sample size of 229 lecturers obtained through the application of the Raosoft sample size determination technique method at a 95% (0.05) confidence level was administered with a structured questionnaire. The respondents reached the convenience sampling technique. Their opinion formed the bases for data analysis and subsequent recommendations. Data obtained were analyzed through descriptive statistics, while all the hypotheses postulated were tested with the multiple regression model which resulted in a structural equation model.

4. Data Presentation and Analysis

4.1 Data Presentation

Table 4.1: Questionnaire Distribution to Respondents and Retrieval

Respondents	Issued Questionnaire	Used Questionnaire	Percentage (%) Used Questionnaire
Lecturers	229	224	97%

Source: Survey Data, 2022.

Table 4.1 above shows that out of 229 copies of the Questionnaire distributed, 224 representing 97.0% were properly filled and returned. This number, therefore, forms the bases for data analyses and recommendations. Furthermore, the reliability of the research instrument was tested through the Cronbach Alpha statistical tool and all the items in the instrument were adjudged reliable as shown below.

Reliability Statistics

Cronbach's Alpha	N of Items	Items
.975	5	Zoom method and content assimilation
.981	5	Google/Classroom meet and content assimilation
.972	5	Social Media and content assimilation
.983	5	Zoom method and skill acquisition
.957	5	Google/Classroom meet and skill acquisition
.973	5	Social Media and skill acquisition

Summary of Reliability Statistics

Cronbach's Alpha	N of Items
.995	30

4.1.1 SECTION “A” Lecturers Experience

This section analysed lecturers' experience in the use of digital technologies in teaching and learning during the post-Covid-19 pandemic and the focus centred on the method of teaching and learning used before the Covid-19 pandemic, the method of teaching and learning used during the pandemic, most preferred teaching and learning method for privately-owned universities and factors affecting digital teaching and learning in privately-owned universities.

4.1.1.1 Responses on Method of Teaching and Learning used before Covid-19 Pandemic

Table 4.2: Distribution of Respondents according to teaching and learning methods used before the covid-19 pandemic

METHOD OF TEACHING AND LEARNING USED BEFORE COVID-19 PANDEMIC					
		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Physical Method	196	87.5	87.5	87.5
	Virtual	0	0	0	87.5
	Both	28	12.5	12.5	100.0
	Total	224	100.0	100.0	

Source: SPSS Output (Based on questionnaires” Data 2022).

Responses in table 4.2 show that out of the valid 224 copies of the questionnaire returned, 196 subjects representing 87.5% of respondents accepted that the physical method of teaching and learning was predominant in privately-owned universities before the covid-19 pandemic, and none of the respondents accept that privately-owned universities were using the virtual method of teaching and learning before the covid-19 pandemic, however, 28 subjects representing 12.5% of respondents accepted that privately-owned universities were using both physical and virtual methods of teaching and learning before the covid-19 pandemic. The bar chart in figure 4.1 simplifies the responses by indicating the physical method of teaching and learning as predominant in privately-owned universities before the covid-19 pandemic.

4.1.1.2 Responses on Method of Teaching and Learning used during Covid-19 Pandemic

Table 4.3: Distribution of Respondents according to teaching and learning methods used during the Covid-19 pandemic

METHOD OF TEACHING USED DURING THE COVID-19 ERA					
		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Physical	0	0	0	0
	Virtual	168	75.0	75.0	75.0
	Both	56	25.0	25.0	100.0
	Total	224	100.0	100.0	

Source: SPSS Output (Based on questionnaires” Data 2022).

Responses in table 4.3 on the method of teaching and learning used in privately-owned universities during Covid-19 shows that none of the respondents indicated that the physical method of teaching and learning was adopted during the Covid-19 pandemic, however, 168 subjects representing 75% of respondents indicated that virtual method of teaching and learning was adopted while 56 subjects representing 25% of respondents indicated that both methods were used. Additionally, the bar chart in figure 4.2 represents these responses by indicating that the virtual method of teaching and learning was invoked in privately-owned universities during the covid-19 pandemic.

4.1.1.3 Responses on Most Preferred Method of Teaching and Learning in Privately-owned Universities

Responses in table 4.4 show the most preferred method of teaching and learning among privately-owned university respondents. None of the respondents suggests virtual teaching and learning methods for privately-owned universities. 56 subjects representing 25% of respondents suggested a physical method of teaching and learning while 168 subjects representing 75% of respondents are interested in both virtual and physical methods of teaching and learning for privately-owned universities. These responses were further represented with a bar chart in fig. 4.3 which indicated the frequencies of the respondents based on the most preferred method of teaching and learning in privately-owned universities.

Table 4.4: Distribution of Respondents based on the most preferred method of teaching and learning in privately-owned Universities

MOST PREFERRED TEACHING AND LEARNING METHOD FOR PRIVATELY-OWNED UNIVERSITIES

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Virtual	0	0	0	0.0
	Physical	56	25.0	25.0	75.0
	Both	168	75.0	75.0	100.0
	Others	0	0	0	
	Total	224	100.0	100.0	

Source: SPSS Output (Based on questionnaires” Data 2022).

4.1.1.4 Responses on Factors affecting Online/Digital Teaching and Learning in Privately-owned Universities

Table 4.5: Distribution of respondents based on factors affecting online/digital teaching and learning in privately-owned universities

FACTORS AFFECTING DIGITAL (ONLINE) TEACHING AND LEARNING IN PRIVATELY-OWNED UNIVERSITIES

		Frequency	Per cent	Valid Percent	Cumulative Percent
Valid	Cost of Acquiring Data	112	50.0	50.0	50.0
	Availability of Network	28	12.5	12.5	62.5
	Lack of Access to Digital Tools	84	37.5	37.5	100.0
	Electricity/power Availability	0	0	0	0
	Activities of Hawkers	0	0	0	0
	Lack of Digital Skill among Lecturers	0	0	0	0
	Total	224	100.0	100.0	100.0

Source: SPSS Output (Based on questionnaires” Data 2022).

Table 4.5 shows responses on factors affecting teaching and learning in privately-owned universities. Out of the total 224 valid questionnaires returned, 112 frequencies representing 50% of respondents indicated that the cost of acquiring data is the major factor affecting digital/online teaching and learning in privately-owned universities. 28 subjects representing 12.5% of respondents insist on the availability of networks as a challenge while 84 subjects representing 37.5% of respondents indicated lack of access to digital tools as a challenge to online/digital teaching and learning in privately-owned universities. Availability of power, activities of hawkers and lack of digital skills among lecturers were considered inconsequential to digital teaching and learning in privately-owned universities. In expanding this analysis, a bar chart was further used (fig. 4.4) which represented various responses.

4.2 SECTION “B” Univariate and Bivariate Analysis

4.2.1 Univariate Analysis

This section is primarily concerned with the analysis of the univariate variables relating to the respondents' views on the questions contained in the various sections and items on the research instruments. The primary analysis entailed the assessment of the distribution and application of statistical analysis on each variable as a means of examining the tendencies of these variables. The study variables included two major variables; the predictor variable and the criterion variable. The predictor variable is Digital Transformation, which has Zoom Learning, Google/classroom Meet and Social Media as dimensions and the criterion variable of Teaching and Learning Capabilities with the measures of Content Assimilation and Skill Acquisition.

The research instrument generated data that showed the degree of agreement of the major variable, as well as the dimensions and measures. The data obtained from the field was measured using a 5-point Likert scale based on (SA) Strongly Agree (5), (A) Agree (4), (UD) Undecided (3), (D) Disagree (2) and (SD) Strongly Disagree (1). As such

interpretations for each variable are premised on the extent to which its mean distributions reflect either significant evidence (where $x > 3.00$) or the extent to which it reflects insignificant evidence (where $x < 3.00$).

Mean Analysis of Data

Tables; 4.6 and 4.7 analysed question one (1) which is posted on the impact of the Zoom method of teaching and learning on students learning capabilities. This question analysed students' capabilities in terms of content assimilation and skill acquisition which are the measures of students learning capabilities. Furthermore, Tables; 4.8 and 4.9 analysed questions two (2) on the Google classroom/meet method of teaching and learning on content assimilation and skill acquisition. Finally, Tables; 4.10 and 4.11 analysed question three (3) on the Social Media method of teaching and learning and learning capabilities also evident in content assimilation and skill acquisition. The variables are assessed using sets of five (5) indicators which assess the respondents' positions on the relationship between the variables.

Research Question One

What is the relationship between the Zoom method of teaching and learning and students learning capabilities?

Table 4.6: Distribution for an indicator of Zoom method of Teaching and learning and Content Assimilation Descriptive Statistics

Indicators	N	Min	Max	Sum	Mean	Std. Deviation	Variance
ZOOM METHOD OF TEACHING AND LEARNING AND CONTENT ASSIMILATING	224	2.00	5.00	750.40	3.3500	1.05949	1.123
Zoom method of teaching and learning attracts content assimilating of students in privately-owned universities	224	2	5	756	3.38	1.114	1.240
Smaller Group discussions in the Zoom method of teaching and learning attract content assimilation of students in privately-owned universities	224	2	5	728	3.25	1.202	1.444
Student's presentations in the Zoom method of teaching and learning attract content assimilation of students in privately-owned universities	224	2	5	728	3.25	1.092	1.193
Shared images in the Zoom method of teaching and learning attract content assimilation of students in privately-owned universities	224	2	5	840	3.75	1.092	1.193
Breakout rooms Zoom method of teaching and learning attracts content assimilating of students in privately-owned universities	224	2	5	700	3.13	1.056	1.114
Valid N (listwise)	224						

Source: SPSS output (Based on questionnaires' data 2022)

The data in (table 4.6) illustrate the summary of the statistics for the dimension of the predictor variable “Digital Transformation” with summarized values for central tendency as it relates to content assimilation based on the responses to the indicators. The analysis revealed that all (5) indicators in the scale had weighted mean scores above the criterion mean of 3.00 based on a 5-point Likert scale. In summary, with a grand mean of 3.35, the respondents are undecided about the impact of the Zoom method of teaching and learning on content assimilation.

Table 4.7: Distribution for an indicator of Zoom method of Teaching and learning and Skill Acquisition Descriptive Statistics

Indicators	N	Min	Max	Sum	Mean	Std. Deviation	Variance
ZOOM METHOD OF TEACHING AND LEARNING AND SKILL ACQUISITION	224	2.00	4.60	705.60	3.1500	.98071	.962
Zoom method of teaching and learning attracts skill acquisition to students in privately-owned universities	224	2	4	616	2.75	.831	.691
Smaller Group discussions in the Zoom method of teaching and learning attract skill acquisition to students in privately-owned universities	224	2	4	700	3.13	.929	.863

<i>Pauline E. Onyeukwu, Jude E. Madu, Abiodun Adeniyi</i>							
Teaching and Learning in Post-Covid-19 Era: An Evaluation of Digital Transformation Experience							
Students' presentations in the Zoom method of teaching and learning attract skill acquisition to students in privately-owned universities	224	2	5	728	3.25	1.092	1.193
Shared images in the Zoom method of teaching and learning attract skill acquisition to students in privately-owned universities	224	2	5	756	3.37	1.114	1.240
Breakout rooms in Zoom method of teaching and learning attract skill acquisition to students in privately-owned universities	224	2	5	728	3.25	1.092	1.193
Valid N (listwise)	224						

Source: SPSS output (Based on questionnaires' data 2022)

The data in (table 4.7) illustrate the summary of the statistics for the dimension of the predictor variable "Digital Transformation" with summarized values for central tendency as it relates to skill acquisition based on the responses to the indicators. The analysis revealed that (4) indicators in the scale had weighted mean scores above the criterion mean of 3.00 based on a 5-point Likert scale while only (1) of the indicators has a weighted mean score below the criterion mean. In summary, with a grand mean of 3.15, the respondents are undecided about the impact of the Zoom method of teaching and learning on Skill Acquisition.

Research Question Two

What is the relationship between the Goggle meet/classroom method of teaching and learning and students learning capabilities?

Table 4.8: Distribution for an indicator of Google meet/Classroom method of Teaching and learning and Content Assimilation

Descriptive Statistics

Indicators	N	Min	Max	Sum	Mean	Std. Deviation	Variance
GOOGLE CLASSROOM/MEET METHOD OF TEACHING AND LEARNING AND CONTENT ASSIMILATION	224	2.00	5.00	772.80	3.4500	.99090	.982
Google classroom/meet method of teaching and learning attracts content assimilation to students in privately-owned universities	224	2	5	812	3.63	1.114	1.240
Secured meeting in Google method of teaching and learning attracts content assimilation to students in privately-owned universities	224	2	5	756	3.38	.994	.989
Turnitin in Google method of teaching and learning attracts content assimilation to students in privately-owned universities	224	2	5	756	3.38	.859	.738
Online editing and grading in Google's method of teaching and learning attract content assimilation to students in privately-owned universities.	224	2	5	784	3.50	1.121	1.256
Online Quiz and Exam in Google method of teaching and learning attracts content assimilation to students in privately-owned universities	224	2	5	756	3.37	1.114	1.240
Valid N (listwise)	224						

Source: SPSS output (Based on questionnaires' data 2022)

The data in (table 4.8) illustrate the summary of the statistics for Google/Classroom meet, a dimension of the predictor variable "Digital Transformation" with summarized values for central tendency as it relates to content assimilation based on the responses to the indicators. The analysis revealed that all (5) indicators in the scale had weighted mean scores above the criterion mean of 3.00 based on a 5-point Likert scale which implied that all the indicators were accepted by

the respondents. In summary, with a grand mean of 3.45, the respondents are undecided about the impact of the Google/Classroom meet method of teaching and learning on content assimilation.

Table 4.9: Distribution for an indicator of Google meet/Classroom method of Teaching and learning and Skill Acquisition

Descriptive Statistics									
Indicators				N	Min	Max	Sum	Mean	Std. Deviation
GOOGLE CLASSROOM/MEET METHOD OF TEACHING AND LEARNING AND SKILL ACQUISITION				224	2.00	5.00	767.20	3.4250	1.09073
Google classroom/meet method of teaching and learning attracts skill acquisition to students in privately-owned universities				224	2	5	700	3.13	1.056
Secured meeting in Google method of teaching and learning attracts skill acquisition to students in privately-owned universities				224	2	5	784	3.50	1.121
Turnitin in Google method of teaching and learning attracts skill acquisition to students in privately-owned universities				224	2	5	756	3.38	1.114
Online editing and grading in the Google method of teaching and learning attracts skill acquisition to students in privately-owned universities				224	2	5	812	3.63	1.114
Online Quiz and Exam in Google method of teaching and learning attracts skill acquisition to students in privately-owned universities				224	2	5	784	3.50	1.227
Valid N (listwise)				224					

Source: SPSS output (Based on questionnaires' data 2022)

The data in (table 4.9) illustrate the summary of the statistics for Google/Classroom meet, a dimension of the predictor variable "Digital Transformation" with summarized values for central tendency as it relates to skill acquisition based on the responses to the indicators. The analysis revealed that all (5) indicators in the scale had weighted mean scores above the criterion mean of 3.00 based on a 5-point Likert scale which implied that all the indicators were accepted by the respondents. In summary, with a grand mean of 3.42, the respondents are undecided about the impact of the Google/Classroom meet method of teaching and learning on skill acquisition.

Research Question Three

What is the relationship between the Social Media method of teaching and learning and students learning capabilities?

Table 4.10: Distribution for indicators of Social Media method of Teaching and learning and Content Assimilation

Descriptive Statistics									
Indicators				N	Min	Max	Sum	Mean	Std. Deviation
SOCIAL MEDIA METHOD OF TEACHING AND LEARNING AND CONTENT ASSIMILATION				224	2.00	4.60	627.20	2.8000	.89081
The social Media method of teaching and learning attracts content assimilation of students in privately-owned universities.				224	2	5	616	2.75	.970
Facebook's method of Social Media teaching and learning attracts content assimilation of students in privately-owned universities.				224	2	5	588	2.63	.994

<i>Pauline E. Onyeukwu, Jude E. Madu, Abiodun Adeniyi</i>							
Teaching and Learning in Post-Covid-19 Era: An Evaluation of Digital Transformation Experience							
WhatsApp method of Social Media teaching and learning attracts content assimilation of students in privately-owned universities.	224	2	4	588	2.63	.859	.738
YouTube method of Social Media teaching and learning attracts content assimilation of students in privately-owned universities.	224	2	4	700	3.13	.929	.863
Twitter/Instagram methods of Social Media teaching and learning attract content assimilation of students in privately-owned universities.	224	2	5	644	2.88	1.056	1.114
Valid N (listwise)	224						

Source: SPSS output (Based on questionnaires' data 2022)

The data in (table 4.10) illustrate the summary of the statistics for the Social Media teaching and learning method, a dimension of the predictor variable "Digital Transformation" with summarized values for central tendency as it relates to content assimilation based on the responses to the indicators. The analysis revealed that only (1) indicator in the scale had weighted mean scores above the criterion mean of 3.00 based on a 5-point Likert scale while (4) indicators in the scale had a weighted mean below the criterion mean of 3.00. In summary, with a grand mean of 2.80, the respondents Disagree that social media teaching and learning methods impact content assimilation.

Table 4.11: Distribution for indicators of Social Media method of Teaching and learning and Skill Acquisition

Descriptive Statistics

Indicators	N	Min	Max	Sum	Mean	Std. Deviation	Variance
SOCIAL MEDIA METHOD OF TEACHING AND LEARNING AND SKILL ACQUISITION	224	2.00	4.40	670.00	2.9911	.92882	.863
The social Media method of teaching and learning attracts skill acquisition to students in privately-owned universities.	224	2	5	662	2.96	1.023	1.047
Facebook's method of Social Media teaching and learning attracts skill acquisition to students in privately-owned universities.	224	2	5	672	3.00	1.121	1.256
WhatsApp method of Social Media teaching and learning attracts skill acquisition to students in privately-owned universities.	224	2	4	644	2.87	.929	.863
YouTube method of Social Media teaching and learning attracts skill acquisition to students in privately-owned universities.	224	2	4	700	3.13	.929	.863
Twitter/Instagram methods of Social Media teaching and learning attract skill acquisition to students in privately-owned universities.	224	2	4	672	3.00	.868	.753
Valid N (listwise)	224						

Source: SPSS output (Based on questionnaires' data 2022)

The data in (table 4.11) illustrate the summary of the statistics for the Social Media teaching and learning method, a dimension of the predictor variable "Digital Transformation" with summarized values for central tendency as it relates to skill acquisition based on the responses to the indicators. The analysis revealed that three (3) indicators in the scale had weighted mean scores above the criterion mean of 3.00 based on a 5-point Likert scale while two (2) indicators in the scale had a weighted mean below the criterion mean of 3.00. In summary, with a grand mean of 2.99, the respondents Disagree that social media teaching and learning methods impact skill acquisition.

4.2.2 Bivariate Analyses

The bivariate relationship determination in this section was done using Multiple Regression in the assessment of the relationship between the dimensions of digital transformation and the measures of learning capabilities. Thus, in determining the respective strength and statistical relationship of the association between these variables, the researchers were guided by the work of Cohen et al. (2007). The coefficient of correlation (effect size), the strength of association and statistically significant decision according to Cohen, et al. (2007) are interpreted below.

Table 4.12: Cohen et al statistical correlation decision scale frame

S/N	Statistical Significance	Association
i.	0.1 – 0.29	Very Weak
ii.	0.3 – 0.49	Weak
iii.	0.5 – 0.69	Moderate
iv.	0.70 – 0.79	Strong
v.	0.80 – 1.00	Very strong

Source: Cohen et al (2007)

Cohen et al (2007) posited that effect size is an easy way to quantify both relationships and differences between two groups and at the same time to measure the effectiveness and statistical significance. Generally, the decision rule for the acceptance or rejection of hypothetical statements is premised on the adoption of a 0.05 significance threshold due to its 95% test on all hypotheses. Similarly, for ease of presentation analysis and interpretation understanding, the researchers proposed hypotheses are thus grouped into:

- (i) Those relating to the zoom method, google meet/classroom method, social media method of teaching and learning and content assimilation
- (ii) Those relating to zoom method, google meet/classroom method, social media method of teaching and skill acquisition.

Decision Rule

If the probability value (PV) in the coefficient table is less than the 0.05 alpha level, we reject the null hypotheses and accept the alternate hypotheses of a significant relationship.

If the probability value (PV) is greater than the 0.05 alpha level, we accept the null hypothesis of no significant relationship.

The dimensions of Digital Transformation (DT): Zoom Learning (ZL), Google/classroom/Meet (GM) and Social Media (SM) were correlated against; Content Assimilation (CA) and Skill Acquisition (SA) which are the measures of Learning Capabilities. The correlation is aimed at determining the degree of relationship that exists between digital transformations and the learning capabilities of privately-owned Universities in Nigeria. The correlation values with their related significant values are shown in the tables below.

First model: $CA=b_0+b_1(ZL)_1+ b_2(GM)_2 + b_3(SM)_3 + U_1.....(Eq.3b)$

Table 4.13: Regression Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate	
1	.918 ^a	.842	.840	.33909	Durbin-Watson 1.365

a. Predictors: (Constant), SM, GM, ZL

b. Dependent Variable: CA

Source: SPSS output (2022)

The above model summary in table 4.13 produced a correlation coefficient; ‘R’ of 0.918^a which shows that there is a very strong significant correlation between Zoom Learning (ZL), Google/classroom Meet (GM), and Social Media (SM) and Content Assimilation (CA). The R² stood at 0.842 which implies that about 84% variation in Content Assimilation (CA) is attributed to changes in the independent variable (Zoom Learning, Google Meet and Social Media). The standard error is 0.33909, thus, a measure of the variation of the observation made from the (actual values of Y) around the

computed value of Y on the regression line is close to 0 and far from 1. The Durbin-Watson “d” = 1.356, is between the two critical values of 1.5 < d < 2.5 and therefore we can assume that there is no first-order linear auto-correlation in the data. Hence the model is of absolute good fit.

Table 4.14: ANOVA

ANOVA						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	135.218	3	45.073	392.009	.000 ^b
	Residual	25.295	220	.115		
	Total	160.513	223			

- a. Dependent Variable: CA
b. Predictors: (Constant), SM, GM, ZL

Source: SPSS output (2022)

The probability value of 0.000 indicates that the regression relationship was significant in determining how Zoom Learning (ZL), Google Meet (GM) and Social Media (SM) influence Content Assimilation (CA). The F calculated at a 5 per cent level of significance was 392.009. Since F calculated is greater than the F critical (value = 2.4472), this shows that the overall model was significant.

Table 4.15: Multiple Regression Analysis on the Dimensions of Digital Transformation

Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.628	.094		6.686	.000
	ZL	.831	.162	1.038	5.137	.000
	GM	.120	.150	.140	.800	.425
	SM	.267	.077	.280	3.462	.001

- a. Dependent Variable: CA

Source: SPSS output (2022)

The regression equation in the table, 4.15 has established that taking; Zoom Learning (ZL), Google Meet (GM) and Social Media (SM)constant, Content Assimilation (CA) will be 0.628 at a significant level of 0.000 which is less than the chosen alpha of α (0.05). This shows that if all the dimensions of the independent variable were held constant, Content Assimilation (CA) will increase. These further test hypotheses 1, 2 and 3 of no significant relationship between Zoom Learning (ZL), Google Meet (GM), Social Media (SM) and Content Assimilation (CA). The coefficient values in table 4.14 show a model constant (a) value of 0.628 and ZL(bx₁) value of 0.831, indicating that, every one per cent increase in the Zoom method of teaching and learning will increase content assimilation by 83%. T-value for ZL(bx₁) produced 5.137, which is significant at P value (.000), which is less than the chosen alpha of α (0.05). Hence, hypothesis one is rejected meaning there is a strong significant linear relationship between Zoom Learning (ZL) and Content Assimilation. Also, the coefficient values in table 4.14 show a model constant (a) value of 0.628 and GM(bx₂) value of 0.120, indicating that, for every one per cent increase in the Google Meet method of teaching and learning, content assimilation will increase by 12%. T-value for GM(bx₂) produced 0.14, is not significant at P value (0.425), which is greater than the chosen alpha of α (0.05). Thus, hypothesis two is accepted meaning there is no strong significant linear relationship between the Google Meet (GM) method of teaching and learning and Content Assimilation. Furthermore, the coefficient values in table 4.14 show a model constant (a) value of 0.628 and SM(bx₃) value of 0.267, indicating that, every one per cent increase in the Social Media method of teaching and learning will increase content assimilation by 26%. T-value for SM(bx₃) produced 3.462, which is significant at P value (.001), which is less than the chosen alpha of α (0.05). Hence, hypothesis three is rejected meaning there is a strong significant linear relationship between the Social Media method of teaching and learning and Content Assimilation.

Second model: SA=c₀+c₁(ZL)₁+ b₂(GM)₂ + b₃(SM)₃+U₁.....(Eq.4b)

Table 4.16: Regression Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. The error in the Estimate	Durbin-Watson
1	.933 ^a	.871	.870	.32877	1.407

a. Predictors: (Constant), SM, GM, ZL

b. Dependent Variable: SA

Source: SPSS output (2022)

The model summary in table 4.16 produced a correlation coefficient; ‘R’ of 0.933^a which shows that there is a very strong significant correlation between Zoom Learning (ZL), Google Meet (GM), and Social Media (SM) and Skill Acquisition (SA). The R² stood at 0.871 which implies that about 87% variation in Skill Acquisition (SA) is attributed to changes in the independent variable (Zoom Learning, Google Meet and Social Media). The standard error is 0.32877, thus, a measure of the variation of the observation made from the (actual values of Y) around the computed value of Y on the regression line is close to 0 and far from 1. The Durbin-Watson “d” = 1.407, is between the two critical values of 1.5 < d < 2.5 and therefore we can assume that there is no first-order linear auto-correlation in the data. Hence the model is of absolute good fit.

Table 4.17: ANOVA

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	161.024	3	53.675	496.565	.000 ^b
	Residual	23.780	220	.108		
	Total	184.804	223			

a. Dependent Variable: SA

Source: SPSS output (2022)

b. Predictors: (Constant), SM, GM, ZL

The probability value of 0.000 indicates that the regression relationship was significant in determining how Zoom Learning (ZL), Google Meet (GM) and Social Media (SM) influence Skill Acquisition (SA). The F calculated at a 5 per cent level of significance was 496.565. Since F calculated is greater than the F critical (value = 2.4472), this shows that the overall model was significant.

Table 4.18: Multiple Regression Analysis on the Dimensions of Digital Transformation

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	.345	.075		4.628	.000
	ZL	.481	.103	.518	4.681	.000
	GM	.226	.080	.271	2.838	.005
	SM	.151	.113	.154	1.341	.181

a. Dependent Variable: SA

The regression equation in the table, 4.18 has established that taking; Zoom Learning (ZL), Google Meet (GM) and Social Media (SM) constant, Skill Acquisition (SA) will be 0.345 at a significant level of 0.000 which is less than the chosen alpha of α (0.05). This shows that if all the dimensions of the independent variable were held constant, Skill Acquisition (SA) will increase. These coefficients further test hypotheses 4, 5 and 6 of no significant relationship between Zoom Learning (ZL), Google Meet (GM), Social Media (SM) and Skill Acquisition (SA). The regression equation in Table 4.18 shows a model constant (a) value of 0.345 and ZL(cx_1) value of 0.481, indicating that, every one per cent increase in the Zoom method of teaching and learning will increase skill acquisition by 48%. T-value for ZL(cx_1) produced 4.681, which is significant at P value (.000), which is less than the chosen alpha of α (0.05). Hence, hypothesis

four is rejected meaning there is a strong significant linear relationship between Zoom Learning (ZL) and Skill Acquisition (SA).

Furthermore, the regression equation in Table 4.18 shows a model constant (a) value of 0.345 and GM(cx₂) value of 0.226, indicating that, for every one per cent increase in the Google Meet method of teaching and learning, skill acquisition will increase by 22%. T-value for GM(cx₂) produced 2.838, which is significant at P value (0.005), which is less than the chosen alpha of α (0.05). Thus, hypothesis five is rejected meaning there is a strong significant linear relationship between the Google Meet (GM) method of teaching and learning and Skill Acquisition (SA). Finally, the regression equation in Table 4.18 shows a model constant (a) value of 0.345 and SM(cx₃) value of 0.151, indicating that, every one per cent increase in the Social Media method of teaching and learning will increase skill acquisition by 15%. T-value for SM(cx₃) produced 1.341, is not significant at P value (.181), which is greater than the chosen alpha of α (0.05). Hence, hypothesis six is accepted meaning there is no strong significant linear relationship between the Social Media method of teaching and learning and skill acquisition.

Model specifications

According to Freedman (2009), regression analysis is concerned with the study of how one or more variables affect changes in another variable.

The formula for multiple regression: $\psi = a_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + e \dots$ (Eq.3.1)

Where: ψ = Dependent variable
a = constant term for the independent variables to be estimated
b = index of predictor variables to be estimated
x = Variables
e = error level

To test the hypotheses of the study, this study has two variables, the criterion variable; Digital Transformation (DT) and the predictor variable; Learning Capability (LC). This research adopts Zoom Learning (ZL), Google Meet (GM), and Social Media (SM) as dimensions of the predictor (independent variable), while Content Assimilation (CA), and Skill Acquisition (SA) formed the measures of the criterion variables (dependent variables).

Thus, the models were adopted:

The effect of Digital Transformation (DT) on Learning Capability (TL) implicit function (Eq.2a) and Explicit function (Eq.2b)

LC = F(DT).....(Eq.2a)

LC = $a_0 + a_1dt + u_1$ (Eq.2b)

First model: The relationship between Zoom Learning (ZL), Google Meet (GM), Social Media (SM) and Content Assimilation (CA);

CA = F(ZL,GM,SM).....(Eq.3a)

CA = $b_0 + b_1(ZL)_1 + b_2(GM)_2 + b_3(SM)_3 + U_1$ (Eq.3b)

Second model: The relationship between Zoom Learning (ZL), Google Meet (GM), Social Media (SM) and Skill Acquisition (SA);

SA = F(ZL,GM,SM).....(Eq.4a)

SA = $c_0 + c_1(ZL)_1 + b_2(GM)_2 + b_3(SM)_3 + U_1$ (Eq.4b)

Explanation of Terms

DT = Digital Transformation

LC = Learning Capabilities

ZL = Zoom Learning

GM = Google Meet

SM = Social Media

CA = Content Assimilation

SA = Skill Acquisition

Co, Bo, ao = Intercepts to be estimated

$a_1, \dots, a_3; b_1, \dots, b_3; c_1, \dots, c_3$ = coefficients to be estimated

Multiple Regression Model

The Multiple Regression Model was used to analyze the Learning Capabilities (Effective Knowledge Transfer and skill development) of the independent variables such as Zoom Learning, Google Meet and Social Media Live Streaming. The model is specified implicitly as follows:

$$Y = f(X_1, X_2, X_3, U)$$

Where, Y = Learning Capabilities (Content Assimilation and Skill Acquisition)
X₁ = Zoom Learning (ZL)
X₂ = Google Meet (GM)
X₃ = Social Media (SM)
U = Error term

4.3 Summary of Findings

Based on the analysis of data, the following findings were made:

- That a combination of the physical and online methods of teaching and learning is most preferred.
- That the cost of acquiring data, availability of network and lack of access to digital tools are the factors prevailing against the digital method of teaching and learning.
- That the respondents were undecided about the impact of the Zoom method of teaching and learning on content assimilation.
- That the respondents were undecided about the impact of the Zoom method of teaching and learning on skill acquisition.
- That the respondents were undecided about the impact of the Google/Classroom meet method of teaching and learning on content assimilation.
- That the respondents were undecided about the impact of the Google/Classroom meet method of teaching and learning on skill acquisition.
- That the respondents disagreed on the impact of social media teaching and learning methods on content assimilation.
- That the respondents also disagree on the impact of the social media method of teaching and learning on skill acquisition.
- It was also revealed that there is a strong significant linear relationship between Zoom Learning, the Social Media method of teaching and learning and Content Assimilation.
- However, it was revealed that there is no strong significant linear relationship between the Google/classroom Meet method of teaching and learning and Content Assimilation.
- It was further revealed that there is a strong significant linear relationship between Zoom Learning, Google/classroom Meet method of teaching and Skill Acquisition.
- Finally, it was found that there is no strong significant linear relationship between the Social Media method of teaching and learning and skill acquisition.

5. Conclusions and Recommendations

5.1 Conclusions

The emergence of COVID-19 is an eye-opener to the education sector in Nigeria. It has encouraged the private universities that are actually in business to make a profit and realize the essence of utilizing the long-existing opportunities inherent in the information and communication technology industry to move ahead of competitors. Digital transformation through the appropriate mechanism will enhance the capabilities of both lecturers and students in private universities. Therefore, there is an urgent need for all actors in the private university system to implement the digital method of teaching and learning.

5.2 Recommendations

Based on the findings and discussion above, the researchers recommend the following:

1. Private universities should start utilizing a combination of virtual and physical methods of teaching and learning.
2. private universities should motivate lecturers to develop the culture of online teaching and learning through Zoom meetings and Goggle Classroom.

3. Private universities should as a matter of priority, provide the needed technical needs such as steady electricity, internet connectivity, data and laptops or computers for lecturers.
4. Private universities should encourage and execute constant training for lecturers on the use of digital tools for teaching and learning.

References

- Bosu, R.S., (2019). The Role and use of ICT in Administrative Activities in Higher Education Institutions: The views of Administrators in Higher Education Institutions in Ghana, *International Journal of Innovative Research & Development*, Volume 8 Issue 12 Pg 1-7.
- Egielewa, P., Idogho, P.O., Iyalomhe, F.O., & Cirella, G.T., (2021). COVID-19 and Digitalized Education: Analysis of online Learning in Nigerian Higher Education, *E-Learning and Digital Media*, Vol. 19(1) Pg 19-35.
- Eze, S.C., Chinedu-Eze, V.C., & Bello, A.O., (2018). The Utilization of E-Learning facilities in the Educational Delivery System of Nigeria: A Study of M-University, *International Journal of Education Technology in Higher Education*, 15(34) Pg 1-20.
- Nigeria Center for Disease Control (NCDC), (2020). COVID-19 Pandemic in Nigeria: Confirmed Cases by States. www.ncdc-covid-19.gov.ng
- UNESCO, (2022). Most Influential Theories of Learning, International Bureau of Education, www.ibe.unesco.org/en/geqaf.
- Ogunode, N. J., & Musa, A., (2020). Higher Education in Nigeria: Challenges and the ways forward, *Electronic Research Journal of Behavioral Sciences*, Volume 3, Pg84-97.
- Onyeukwu, P.E., Adeniyi, A. & Amin, H.J., (2020). Telecommuting: A Panacea to COVID-19 Spread in Nigeria Universities, *International Journal of Innovation & Economic Development: Innovators Services LTD*, Vol 6(1) pages 47-60.
- Padgett, D., (2020). Learning Theories: Understanding the 4 Major ones for the Classroom. www.franklinecovey.com.
- Usuh, E.N., (2021). An Empirical Analysis of COVID-19 Realities influencing Small Business Failures. *International Journal of Small Business and Entrepreneurship Research*, Volume 9 Number 1, Pages 1-21.
- World Health Organization (WHO), (2020). Monthly COVID-19 Pandemic in Nigeria: Reports of the Prevalence of Spread of Coronavirus. www.Wikipedia.who.covid19pandemic.