Online Technology Affordance and its Social Implication on Technology Education Program

Abubakar Shuaibu Chiroma, Muhammad Khair bin Noordin

Abstract:The social implication of online technology affordance in technology education program was born out of the need to bridge the digital division between developed and developing countries in Africa and specifically in Nigeria[25]. This study aimed at developing a framework for teaching and learning by exploring the online technology affordance on technology education with a view to improving the teaching and learning. Both qualitative and quantitative research method were employed, so as to find the opinion of both teachers and students. The population of this research comprised of 3500 respondents and the sample size was 346 respondent of Automobile Technology Education in the public tertiary institutions offering Automobile Technology Education in the North Eastern Nigeria[24].The model was tested via Sequential Equation Modelling (SEM) illustrated with a good goodness of fit from the factor loadings shown by the initial and final measurement model and indicating regression weights of the revised model. The findings can be useful in identifying dangers and benefits of using technology mediated learning tools, Online instruction for blended learning presents new opportunities for teaching and learning and Online instruction using technology mediated instruction enhance social connectedness in teaching and learning of automobile technology. This demonstrated that appropriate adaptations to online technology for professional development can provide practical, accessible means for a wide range of issues which is relevant and effective continuing education[16].

Index terms: Online Technology, Affordance, Social Implication, Technology Education

I. INTRODUCTION

Currently, a key trend in teacher education is the utilization of blended learning, which permits institutions to utilise the advantages of online learning whereas maintaining the structure of regular course as well as professors' role. Online affordance as an instrument for digital citizenship is for both collective and individual development (Davidson-Shivers, 2018). Digital citizenship is the ability to participate in society online; the citizenship participation should be in relation to the usage of technology [8]. It is against these background that the demand for anywhere, anytime and personalized learning environment is continuing to grow especially in this period of scarce resources. Furthermore, rural communities are changing their educational landscape as more virtual institutions came online to meet their special need. However, the digital divide between advanced and developing countries, particularly in Africa, is not adequately established. Nigeria for instance, came late and slowly in adopting digital application in most of it sectors across the nation

With regards to introducing additional teaching and learning strategy to combat shortage of qualified manpower in Nigerian tertiary institutions, authors like and Iloanusi and Osuagwu (2009) pointed to the need for Nigerian tertiary institutions to integrate online technology learning into its education sectors, especially tertiary education[2][13]. This level of education is gradually changing with the responsibility of training and equipping the institutions through digital technology such as online instruction.In line with online learning management several effort has been invested by researchers forenhancing teaching and learning process({Garrison, 2004,de Freitas, 2015 and Johnson, 2016 .The demand for anywhere, anytime and personalized learning environment is continuing to grow especially in this period of scarce resources[22].

Furthermore, rural communities are now changing their educational landscape as more virtual institutions came online tomeet their special need. Therefore, this study is poised to determine the perception of automobile technology lecturers on online learning platform as essential elements of blended learning in tertiary institutions in Nigeria. The study focus was achieved by addressing the following issues related toblended learning framework on technology education Programme and to develop a framework for teaching and learning[17]. Knowing how to teach not what to teach i.e. generally, when addressing teaching and learning issues, hardly can it be linked with teaching for learning using modern technology in TVET in Nigerian tertiary institutions[27]. This motivated the study to answer both quantitative and qualitative research questions on: a) perception of teachers and students with regards to developing blended learning framework, by exploring online technology, and its social implication on technology education program? b) Why do we influence participants' use of online technology in the classroom, and c) How does online technology support access the use of technology in the classroom?

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II. METHODOLOGY

The study was carried out in six states of North Eastern, Nigeria, compresses of Adamawa, Taraba, Bauchi, Gombe, Borno and Yobe states federal and tertiary institution, which generally offer technical vocational education and training respectively. This study implored mixed methods research design (quantitative → qualitative = explanation), which include an initial quantitative survey and then follow- up by the qualitative interview with priority on the quantitative phase. The qualitative results helped explained the initial survey results to build better understanding of the significant quantitative findings. The quantitative research method, seeks to find the perceptions of both teachers and students on issues through survey ((Creswell, 2013)). In this case, perceptions were surveyed, data was collected using questionnaire items[5][9][20]. Similarly, Sample size of this study was determined using (Krejcie and Morgan, 1970), which states that if the population is 3500 the corresponding sample size will be 346[14]. More so, data was initially screened to drop those items that were not adequately responded to. Descriptive statistics was employed to determine the mean and standard deviation of the response. Decision was taken on rejecting any item with mean less than 2.5 and standard deviation of 1.2. While above these values are accepted. Confirmatory Factor Analysis was run to determine the factor loadings. The model was validated using structural equation modelling (SEM). This shows a good goodness of fit as indicated in the Figures below.

III. FINDINGS OF THE STUDY (QUANTITATIVE)

Measurement model of online element

Online technology element was measured using twelve measuring items. Three of the items include online element (OE) 6, OE_11 and whereas OE_12 is excluded, due to the under-performance as their respective means and standard deviation were below the cut-off point. Therefore, these items were eliminated in the confirmatory factor analysis. While, normality analysis was conducted for the remaining nine items as presented in Figure 1 and 2 respectively. The results reveal that the nine items measuring online technology elements are normality distributed because the indicator of normality, which is skewness is within the range of ± 1.96.

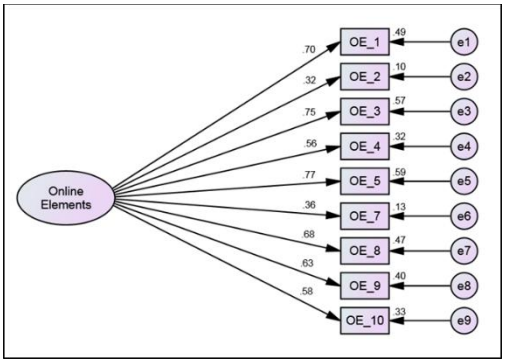


Figure 1. Measurement model online element

To obtain a measurement that fits, another CFA was conducted and goodness of fit was obtained as in Figure 2.

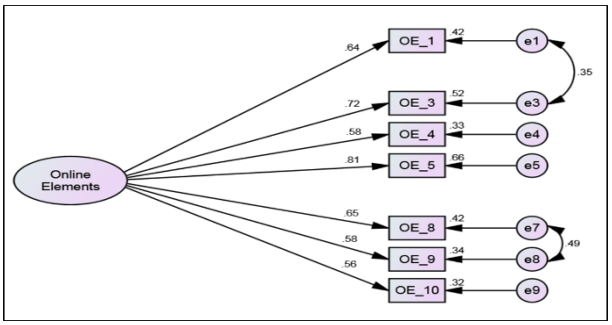


Figure 2. Final measurement model of online showing items deleted and covariance's

Table 1. Regression weight of Revised Measurement Model of Online technology Elements

			Estimate	S.E.	C.R.	P	Label
Pedagogical quality	<---	Online Elements	1				
Reflective thinking	<---	Online Elements	1.055	0.06	17.22	***	par_1
Effectiveness and Efficiency	<---	Online Elements	0.95	0.08	11.4	***	par_2
Learning environment benefits	<---	Online Elements	1.32	0.09	14.06	***	par_3
Opportunities for teaching and learning	<---	Online Elements	1.118	0.09	12.39	***	par_4
Technology mediated	<---	Online Elements	1.019	0.09	11.45	***	par_5
Teachers support	<---	Online Elements	0.989	0.09	11.39	***	par_6

Table 1 presented the results of the analysis of squared multiple correlation, which indicates the percentage of variance explained by each of the seven items measuring online elements. Furthermore, teachers' support shows 31.9% of its variance, technology mediated instruction shows 33.8% of its variance, opportunities for teaching and learning shows 42.3% of its variance, learning environment benefits shows 66.3% of its variance, effectiveness and efficiency of learning shows 33.2% of its variance, reflective thinking shows 52% of its variance, while pedagogical quality shows 41.6% of its variance.

Interestingly Online technology learning has roots in the tradition of distance education, which goes back at least 100 years to the early correspondence courses. Similarly, with the advancements in the internet technology such as the World Wide Web (www), the potential for reaching learners around the globe increased greatly. The online learning offers rich educational resources through multiple media to support both real-time and asynchronous communication between instructors and learners as well as among different learners (Means et al., 2013). Institutions of higher education and corporate training were quick to adopt online learning.

The results demonstrated that appropriate adaptations to online technology for professional development can provide practical, accessible means for a wide range of issues, which is relevant to effective continuing education (Bell and MacDougall, 2013).Furthermore, all the items in the revised model of online element seems to be significant as illustrated by the sign *** in table 1[3][4]. In addition, all the items in the construct have shown high level of significance as explained by the percentage estimates. It further explained the importance of integrating online technology element in the teaching and learning automobile technology programme in our tertiary institutions. This indicate that online instruction has influenced on how higher education redefines teaching, as tertiary institutions understand the significance and move towards the paradigm of online technology teaching and learning

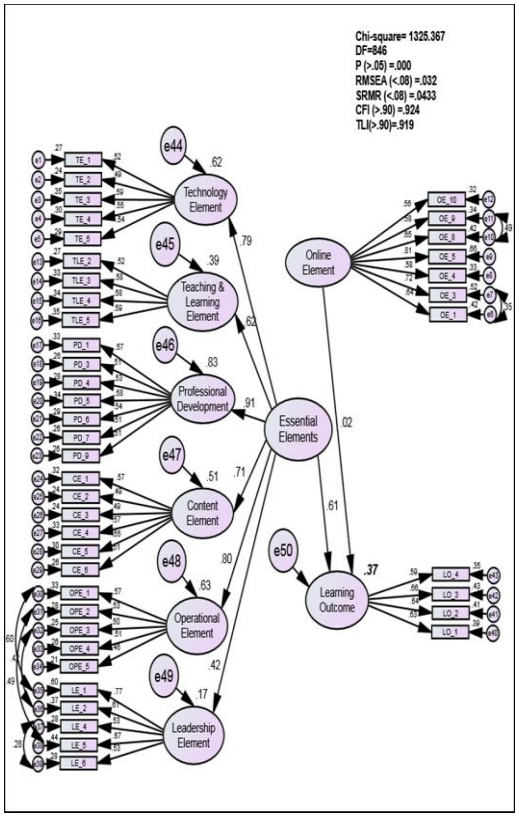
IV. DEVELOPED FRAMEWORK RESPONDENT

Based on the identified Online element The perception of students and lectures on the teaching and learning blended learning framework, the responses is here by presented by the fitness indexes below Discriminant validity index This include:

A Fitness indices
(i) RMSEA=.032
(ii) SRMR =.0433
(iii) CFI =.924
(iv) TLI =.919
B Square Multiple Correlation (R^2 =.37) as presented by the model which shows the relationship or effect of the essential element suitable for integration into the teaching and learning automobile technology education programme on the learning outcome. The discriminant
This result with a significant effect or relationship of R2 .37 above the threshold value underscore the importance of online learning which according to I Elian Allen et all (2007) focused primarily on the course content delivered online including face to face which is from zero to 29 % of the course content delivered online. This category of online include traditional and web facilitated course while the remaining 30—80% of the course content are delivered online as blended learning or hybrids. I Elian further stated that online enrolment has continue to grow at rate far in excess of the total higher education student population. About 3.5 million students at least taking one online courses and 9.7percent growth rate for online enrolment far exceeds the 1.5percent growth of the overall higher education students' populations Above all in US at least 20% of the student are taking course one online course in 2006.

Seven of the nine online elements, which is an integral component of blended learning or virtual learning platform, has an average range score of 2.39 and standard deviation of 1.253 as shown in Table 1. The finding signifies that, some respondents tend to show their disagreement with indicators measuring online element. The factor was measured using 9 items on the questionnaire, however, only four out of the twelve items were able to achieve a mean score of 2.5. In this research, data collected reveals that, items 1, 3, 4,5,8,9 and 10 are the findings of this study as shown in figure 1. below

Figure 1 : BLENDED LEARNING FRAMEWORK



The framework for this study as indicated in Fig 1 include the following essential element and with their effective on each element technology (.79), teaching and learning (.62), professional development (.91), Content (.71), Operation (.80) and leadership (.42). While online element as a fundamental component showing their significance on the learning outcome is .61 and (R^2.37) respectively which are above the threshold value of 0.83 effective and .26 significance on the learning outcome. Furthermore, the framework for this study is represented by ecosystem it is implemented at either global, regional or local with long and short-term goals. The framework indirect and direct drivers of changes. Under indirect driver of blended learning, it consists of an element and fundamental components while under direct driver of blended learning the study used an element such as Teaching, Technology, Content, Operation, Professional

Development, Leadership, Face to face and Online. This element and the fundamental frameworks provide services through employment such as job creation, competency, collaboration, social needs and graduate with employability skill towards attending to human wellbeing like poverty reduction, freedom of choice, social security and basic maternal for good Life.

This result also shows a significant effect or relationship of R^2 .37 which is above the threshold value of 0.0002.which underscored the importance of online learning which according to I Elian Allen et all (2007) focused primarily on the course content delivered online including face to face which is from zero to 29 % of the course content delivered online. This category of online include traditional and web facilitated course while the remaining 30—80% of the course content are delivered online as blended learning or hybrids. I Elian further stated that online enrolment has continue to grow at rate far in excess of the total higher education student population. About 3.5 million students at least taking one online courses and 9.7percent growth rate for online enrolment far exceeds the 1.5percent growth of the overall higher education students' populations Above all in US at least 20% of the student are taking course one online course in 2006.

a. Online instruction addresses pedagogical quality in blended learning for teaching and learning of automobile technology in our tertiary institutions in Nigeria.

b. Online technology offers reflective thinking for students during blended learning in our institution for teaching and learning of automobile technology in our tertiary institutions in Nigeria.

c. Online technology instruction offers increasing effectiveness and efficiency of learning in the classrooms for teaching and learning of automobile technology in our tertiary institutions in Nigeria

d. The provision of rich online technology learning environment benefits students positively in teaching and learning of automobile technology in our tertiary institutions in Nigeria

c. Online instruction for blended learning presents new opportunities for teaching and learning.

D Online instruction using technology mediated instruction enhance social connectedness inteaching and learning of automobile technology in our tertiary institutions in Nigeria

Students using online technology instruction enjoy teachers support during teaching and learning of automobile technology in our tertiary institutions in Nigeria.

Innovative Means of this result from the ability of online learners to be both together and apart and to be connected to a community of learners anytime, anywhere, any place, and any situation without time bound

V. QUALITATIVE PHASE

In this qualitative phase of this study, it is hoped that the result would help us explain the initial survey results to build better understanding of the significant and non- significant quantitative findings. The quantitative research method seeks to find the opinion or perception of both teachers and student on an issue through survey.

VI. QUALITATIVE RESEARCH QUESTIONS:

a. Why do we influence participants' use of online technology in the classroom?

b. How does online technology support and access influence participants' use of technology in the classroom?

Interview protocol was designed in this case based on the survey results and qualitative research questions. It consisted of two questions as well as potential probes. The two selected participants teaching in Automobile technology education individually interviewed about their attitudes toward online technology and challenges of integrating online technology to teaching. The average interview time was 40 minutes. All interviews were hand recorded.Thematic analysis being one of the most common forms data analysis in qualitative research was used

VII. RESEARCH QUESTION ONE

Why do we influence participants' use of online technology in the classroom?

The social implication of online technology on our citizens in our society is so numerous in this technological error first of all is for digital citizenship that is for the ability to participate in society online. Digital citizenship in relation to the use of an online technology. This entails ability to endow all members of a politicalcommunity with certain civil, political, and social rights of membership, including ''the right to share information/ knowledge online, to full in the social heritage and to live the life of a civilized being according to the standards prevailing in the the society ***Respondent 1***

Since education has promoted democracy and economic growth, the Internet or online technology has also the potential to benefit society as whole which invariably facilitate the membership and participation of individuals within society. It is therefore believed that digital citizenship encourages what haselsewhere been called social inclusion as it increases the likelihood of voting (civic engagement), and promotes higher incomes (economic engagement) *Respondent* ***2***

Research Question two

VIII. HOW DOES ONLINE TECHNOLOGY SUPPORT/ ACCESS AND INFLUENCE PARTICIPANTS' USE OF TECHNOLOGY IN THE CLASSROOM

Online technology can support broadcast capability through text, video, and visual images on Web sites, andaccessed using e-mail, chat rooms, and instant messagingwhile it influences participants use of technology through the role of public policy and the Internet usage in the classroom.
Respondent 1

From theeconomic perspective online technology has many aspects of what economists call positive benefits which are social benefits beyond those reaped by the individuals who use online technology. If information is available online, i helps individuals /citizens to be more informed about contemporary issue, the individual/citizens are likely to participate and the whole society is likely to profits from broader perspectiveof issues, the benefits ofbringing people together by online technology exceed the satisfaction gained by the individual participants. **Respondent 2**

IX. DISCUSSION

Inonline technology instruction through web-based learning environment, interactivity has been found to be the most important element for successful e-learning ((Violante and Vezzetti, 2015) so online technology learning globally is first gaining ground in higher education forcing teachers and student to confront the current assumption of teaching and learning in our higher institutions as illustrated by the result (improved learning environment 66.3)[18] .(Bell and Goldsmith, 2013) however, stated that stake holder in education are challenged to position their institutions to the current connectivity requirement of their students and their institutions attested by a (reflective thinking with 52.4%) expectation for quality learning responsible for blended learning and professional development. The findings of the study from the quantitative phase also support much of what is known about BL and professional development in technology education program with specific limitation on teachers use of technology and ability. Specifically external barrier like technology access and support. The finding also is of significantimpacton BL framework for integrating teaching and learning Automobile technology education program.

experience and outcome through improved pedagogical quality (41.6). Considering the importance of online skills and information and communication technologiesit is used totransform much of individual (teachers, students and society)[19].The transformative ability of online element skills is not for higher education in the 21stcentury along but as an innovative learning experience in higher education settingthat would benefit both self and the entire society.

Online skill program offers Internet-based continuing education and provides competency-based continuing education for publicteleconference and discussions to augment self-study compose competency-based continuing education for public, 2013).

X. RECOMMENDATION

From thediscursion, sofar the study suggests the following recommendations since online education communities nowadays are finding this difficult edge yet it has been promoted as being the most effective the following ways.

a. Online technology learning should be cost effective and easier than the traditional face to face educational environment as it is effective and efficient.

b. Online (social presence) should directly affect student, and instructor, satisfaction and the presence of others especially important issues for those involved in delivering online education.

c. Online technology should also continue to enable teachers to engage their students in ever-increasing ways.

d. Online tools such as (discussion, board, document sharing, e-mail HTML, PDF, MP3, WMV, FLASH) for learning should be provided by federal government to make education more democratic to improve learning environment and pedagogical quality[7].

e. Web Enhanced Instruction (WEI) should not be used to replace the traditional classroom setting, but rather to supplement the traditional lecture with course content that can be accessed from campus or the Internet.

f. Online Web Enhanced Instruction (WEI) should augment the traditional class (Face to face or lecture) need to be recognized and ascertain by the students as an addition to the traditional lecture.

g. Online learning should continue to grow and be taking place anywhere, anytime and personalized learning especially in this time of scarce resources**.**

XI. CONCLUSION

The use of online technology to enhance teaching and learning has become the mainstayin education sector. With the wide spray use of online technology content such as, discussion, board, document sharing, e-mail and virtual classroom, without contradiction, online has become a powerful force for change in today's technology rich society. Individuals shop, bank, stock and weather checking, read news, schedule vacation, participate in auction and a host of other things all online(Dahlberg, 2001). Nowadays it is common for students to register and access course material , communicate, submit and retrieve grade electronically while classrooms and conference facilities in offices round the world are web friendly with video conferencing or full virtual classroom facilities. For

this background that the demand for anywhere, anytime and personalized learning is continuing to grow especially in this time of scarce resources[11][12][21]. More over remote rural communities are changing their educational landscape as more virtual institutions came online to meet these special needs

Interestingly all the items in the revised model of online technology element seems to be significant as illustrated by the sign *** and result in table 4.20 i.e. the squared multiple Correlation for the predicators of online technology elements. In this case, online instruction has influenced how higher education redefines teaching as tertiary institutions /universities understand the significance and move towards the paradigm of online technology teaching and learning. Future studies should consider both traditional and online technology approach towards achieving affordance, effectiveness and efficiency above all for citizenship education (all-inclusive education) which is useful for economic, social and political development. In this case online technology instruction has influenced how higher education redefines teaching as tertiary institutions understand the significance and move towards the paradigm of online technology teaching and learning. Future studies should consider blending both traditional and online approach towards achieving affordance, effectiveness and efficiency.

The results demonstrated that appropriate adaptations to online technology for professional development can provide practical, accessible means for a wide range of issues which is relevant, effective continuing education (Bell and MacDougall, 2013)Finally, the importance of these factors (online element) that Influenced Blended Learning framework for Technology Education Programs in Nigeriatertiary institutions is a cumulative effect of onlinevariables (online elements)on the learning outcome as presented in Fig 2 .Thus as you hear you forget, you see you remember and as you do, you understand which is illustrated by the blended learning themes of the study there by achieving the aims and objectives of (SDG) and to provide equal access and affordable technical vocational education and training , there by achieving universal access to a quality higher education. Being one of 17 Global Goals that make up the 2030 Agenda for Sustainable Development (SDG)

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