Online learning environment and learners' learning effectiveness at the Distance Learning Centre, University of Ibadan

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Abstract

Rationale of Study – The breakthrough of the Internet in broadening access to teaching and learning gave an opportunity for information sharing, knowledge sharing, collaboration and social interaction among tutors-learners, learners-learners -learners and the institution. Based on this, this study investigated the influence of online learning environment components (online course design, facilitation and assessment) on learners' learning effectiveness at the Distance Learning Centre, University of Ibadan.

Methodology – The descriptive survey research design was adopted. The population was comprised of 100-500 level students, with a sample size of 200 students randomly selected from the faculties of Arts, Education, Science, and Social Sciences. A questionnaire of thirty (30) items on the Perceived Online Learning Environment and Learners' Learning Effectiveness Scale (r=.78) was used for the study. Data were analysed using multiple regression and descriptive statistics of frequency counts and simple percentages at a 0.05 level of significance.

Findings – The study's findings revealed that the Online Learning Environment Components (Online Course Design, Facilitation, and Assessment) significantly influenced Learners' Learning Effectiveness ($F_{(3, 196)} = 12.197$; $R^2 = 0.158$) and jointly accounted for 15.8% of its variance.

Implications – Based on the findings, it was recommended that the management of the Distance Learning Centre, notably the University of Ibadan, should improve on the three online learning environment components so that this improves learners' competence in online learning, knowledge sharing and management in the digital age.

Originality – This is an original study conducted at the University of Ibadan on learning environments and information services.

Keywords

Online learning, learners' environment, learning components, distance learners, distance learning centre, University of Ibadan

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1 Introduction

Online learning has become a more significant influence in promoting education in some parts of the world. Presently, some institutions in Nigeria are using it to promote distance education (DE) and lifelong learning. The evolving digital technologies coupled with an increasing interest in computerised delivery of higher education courses have resulted in online learning through electronic mail, the Internet and multimedia. Online learning is a learning system that facilitates teaching and learning in locations away from the traditional classroom with the help of electronic resources such as computers, mobile phones and tablets. The educator and students can make use of video, audio, multimedia communications, or some combination of these in the learning process. Online learning applications and processes that can be used for instructional purposes include web-based learning, computer-based learning, virtual education opportunities and digital collaboration. The educator can deliver the educational content through the Internet, intranet or extranet, as audio or visual tapes, as narrated slides, satellite television and CD-ROM (Wani, 2013). The students access the content at their own convenient time and place (Charamba, 2021b). Through online learning, the transfer of skills and knowledge is enabled through technology.

Information and communication technology in education in developed countries facilitated the establishment of a hundred per cent (100%) ICT-based universities, known as virtual universities. Here in Nigeria, very few of our conventional universities are now carrying out their academic activities through one form of ICT or the other. While the urge to embark on online learning is still a dream to some because their ICT infrastructure is fragile. During the COVID-19 pandemic, a slight amendment occurred, which was emergency remote teaching, which is a temporary shift of instructional delivery to an alternative delivery mode due to the critical circumstances of the COVID-19 pandemic. This was organised with the intention that learning will return to the old format once the crisis or emergency has abated. The primary objective in these circumstances is not to recreate a strong educational system but to provide temporary access to instruction and instructional support in a way that is quick to set up and is reliably available during an emergency or a crisis. The recent integration of ICT in education in Nigeria offers an opportunity to consider its use in the promotion of distance education. It offers students considerable benefits in the areas of synchronous and asynchronous models of teaching and learning (Charamba, 2021a). The asynchronous model is so flexible that the educator

and student do not communicate in real-time with each other for various reasons. The educator posts the instructional content to be accessed by the student at their convenient time. These can take the form of videos, texts, or narrated Microsoft PowerPoint slides. In such cases, the educator-student dialogue mostly takes place on discussion forums or through e-mails. The synchronous learning model caters for scheduled real-time verbal or nonverbal dialogue between the educator and the student through audio and visual media such as texting, video conferencing and virtual classrooms (Seago et al., 2018).

A study by Frisnoiry and colleagues reports on improved academic performance among Mathematics Learning Method students at an Indonesian university. Based on their study, they argue that e-learning enables students to access learning materials anytime and anywhere. Students are also motivated as they receive materials in different forms, such as animations, videos and journal articles (Frisnoiry et al., 2019). Students have the opportunity to repeatedly revisit the learning materials as many times as they want (Seago et al., 2018). The permanent availability of online study materials emerged as the most common advantage of e-learning in a study conducted by Vitora et al. (2018); the participants attributed their improved academic performance to revisiting the course materials until they understood the concepts. In traditional contact classrooms, the student will have to rely on the educator's explanations, printed materials availed and the notes they would have taken during class.

Online learning is becoming popular in Nigeria as a means of increasing higher education access in response to the rising demand for higher education in the country. Students who lack the time to attend traditional lectures but have the time and inclination to learn online may now take advantage of Open and Distance learning institutions' online learning programmes available in Nigerian universities by utilising the Internet and digital technologies in accordance with instructional design principles. Martin and Borup (2022) defined it as an inventive approach to providing electronically mediated, well-designed, learner-centred, and interactive learning environments to everyone, at any place and at any time. It all comes down to using electronics for learning. Content can be delivered through the Internet, intranet/extranet, mobile phones, radios, audio and video tapes, satellite TV, and CD notes (Omoghbe et al., 2020). It has been discovered that the use of learning applications such as Moodle, Zoom, and LMS; Google applications like Classroom and Meet; and social media applications like WhatsApp and Telegram may also enhance the efficacy of online learning (Muibi, 2022).

It must be noted that online learning enhances the delivery of lectures, assessment administration, and online course design. Through online learning, a lecturer would be able to deliver lectures adequately. Previous studies have examined the online learning environment issue from different isolated perspectives with little emphasis on impact of the online course design, facilitation, and assessment on learners' learning effectiveness at the University of Ibadan's Distance Learning Centre. Hence, this study is being carried out to determine whether online course design, facilitation and assessment influence learners' learning effectiveness and their perception of the implementation of the three components in relation to their learning effectiveness in the institution. In order to determine the above, objectives were formulated to guide the study.

The specific objectives of this study are to establish the online learning environment (online course design, online facilitation, and online assessment) as influencing learners' learning effectiveness in the institution and examine how the learners perceived the implementation of the three components towards learning effectiveness.

2 Theoretical framework

Several studies have adopted or adapted theoretical frameworks to underpin their studies in relation to e-learning. The present study adopted the E-Learn Cube Framework as the suitable theory for this study. Haw et al. (2015) refined Sun et al. (2008) work and drew on the work of Khan (2001) to identify the E-Learn Cube, which consists of six critical success factors, each component contributing to the success of e-learning. The six critical success factors for e-learning are design, course, teacher, technology, support and student. Within the six factors are 17 attributes that are closely related to the study by (Haw et al., 2015). These dimensions are suitable for this study as it provides a holistic outlook on the design and development of e-learning content for learning and assessment. Therefore, the design component mainly refers to how easy and valuable the students find the access, flow, structuring and navigation of the course (Davis, 1989). Structuring the course also includes whether the content is easily digestible or chunked (Manning et al., 2021). Closely linked to the design is the course component. The content component relates to how the students experience the course in terms of the relevance of the content, flexibility and instructions and whether they feel comfortable engaging with the work (Haw et al., 2015). Another pivotal part of the E-Learn Cube is the teacher's presence. The attitude of the teacher and how they teach, assess and provide feedback to students contribute to the full experience of the student (Freeman et al., 2010). Feedback is often provided through rubrics. A rubric

is not just a grading tool but is also used to provide feedback and improve course design (Ragupathi & Lee, 2020). Technology, on the other hand, is the vehicle that is used to deliver content and create opportunities for engagement.

The student's experience with the technology might either enhance or cloud the overall student perspective of a course (D'Angelo, 2018). For many students, their first attempt at learning and assessment in an online environment can be traumatic. Therefore, support from all spheres, such as technical support, facilitator support, institutional support, or government support, is crucial (Bates, 2014). Lastly, student attitudes and motivation have an impact on both the experience and the success of online courses. However, experiences can be influenced by peers either positively or negatively (Haw et al., 2015). In light of this background, survey questions were developed and aligned to the adapted theoretical framework of Haw et al. (2015), for example, 'How did you experience the design of this module?', 'How did the quality of Internet access affect your experience and participation in this course?' or 'How has the influence of your peers influenced your participation in activities? Elaborate on your answer. How does it relate to the design, technology, and student dimensions? Each dimension highlights aspects of the student's perspective on ICT use and the constructionist approach to learning and assessment. It is imperative to know that this theory has explained the variables in the topic being investigated, such as online design, facilitation and assessments.

3 Research methodology

A quantitative research design was used for this study. The rationale for adopting this type of design was based on the fact that the researcher did not manipulate the variables. The target population comprised all distance learners from the Faculties of Arts, Education, Science, and Social Sciences ranging in level from 100 to 500. A simple random sampling technique was used to select a 200 sample size. The researchers created a questionnaire called the "Perceived Online Learning Environment and Learners' Learning Effectiveness Scale" (POLELLES) with three sub-scales: Online Course Design Scale, Online Facilitation Scale and Online Assessment Scale. The questionnaire was divided into two sections: Session A gathered demographic data such as age (15 to 31 and above years), gender, marital status, faculty, and level of studies. The second component was designed to respond to the research questions and objectives. The replies were scored on a four-point Likert scale, with Strongly Agree (SA) equaling 4, Agree (A) equaling 3, Disagree (SD) equaling 2, and Strongly Disagree (D) equaling 1. Prior to participation, respondents

were needed to check a consent form indicating that they were willing to participate in the survey. The study was given institutional approval, and the Distance Learning Centre University of Ibadan permitted access to distance learners in various departments and faculties via the online community to which they all belong. Then, they received a guarantee that the data they provided would be used solely for research purposes, as well as to assure their privacy and anonymity.

Content validity, including face validity, was utilised to ensure the validity of the instruments used in this study. The items in the instruments were given in plain and straightforward language to aid respondents' comprehension. They were arranged logically and methodically to correspond with the research questions and objectives. To improve validity, the researcher additionally ensured that the instrument contents were aligned with the study's objectives and research questions. The instrument was piloted on fifty (50) learners from the National Open University participating in the distance learning programme but were not part of the target population of this study. The internal consistency reliability coefficient was determined using the Cronbach Alpha reliability technique to examine the instrument's reliability. This technique was chosen since the questionnaire items did not include correct or incorrect responses but instead needed respondents to assess their agreement or disagreement on a scale. The Cronbach Alpha reliability test produced coefficients of 0.76 for online course design, 0.80 for online facilitation and 0.78 for online assessment, respectively, showing that the instrument is acceptable, adequate, and reliable for the research. Data were analysed using multiple regression and descriptive statistics of frequency counts and simple percentages at a 0.05 level of significance.

4 Findings of the study

The findings of this study are presented below, with the first research question in Table 1.

Research Question 1: How did the Online Learning Environment Components (Online Course Design, Facilitation and Assessment) influence Learners' Learning Effectiveness in the Distance Learning Centre, University of Ibadan? In determining the joint influence, a multiple regression analysis was run, and the result is displayed in Table 1

Table 1: Multiple Regression Analysis of Interpersonal Relationship

R=0.397 R square = 0.158 Adjusted R square = 0.145						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.331	3	1.110	12.197	0.00
	Residual	17.789	196	0.091		
	Total	21.120	199			
a. Dependent Variable: Learning Effectiveness						
b. Predictors: (Constant), Online Course Design, Online Facilitation and Online Assessment						

Table 1 presents results on the joint influence of online learning environment components (Online Course Design, Online Facilitation and Online Assessment) on learning effectiveness. The multiple regression correlation coefficient (R) of 0.397, multiple R2 of 0.158, and modified R2 of 0.145, as shown in the table, indicate a linear connection between the independent and dependent variables. This indicates that 15.8% of the dependent variable was provided by the independent variables (online course design, online facilitation, and online assessment); this difference is statistically significant at $P < 0.01$. Additionally, the multiple regression data's analysis of variance yielded an F-ratio of $F_{(3, 196)} = 12.197$, which was significant at $P<.01$. The results of the multiple regression analysis demonstrated that there is a linear relationship between the dependent variable (learning effectiveness) and the components of the online learning environment (online course design, online facilitation, and online assessment), as indicated by the multiple regression correlation coefficients (R). Significant variance in the dependent variable (15.8%) was caused by the independent factors taken together. Furthermore, the outcome suggests that the residual variance may have been explained by additional factors that were left out of this model.

Research question two: How did the distance learners perceive the implementation of online learning environment components impacted their Learning Effectiveness in the institution?

Table 2 shows a descriptive analysis of the perception of distance learners on the implementation of online learning environment components on Learning Effectiveness in the institution

Table 2: Online course design

Items S/N	**online Course Design**	Strongly Agree	Agree	Disagree	Strongly Disagree	Total

1	The online course materials are well structured, organised, clear and logical.	16 (8%)	150 (75%)	27 (13.5)	7 (3.5)	200
2	The online course materials provided clear learning objectives and outcomes.	21 (10.5%)	147 (73.5%)	32 (16%)	0 (0%)	200
3	The online course design offers appropriate assessments, timely and constructive feedback, and responsive instructor support.	27 (13.5%)	144 (72%)	29 (14.5%)	0 (0%)	200
4	The online course contents are presented in an engaging, interactive, and visually appealing manner.	26 (13%)	144 (72%)	27 (13.5%)	3 (1.5%)	200
5	The online course design had a user-friendly interface and navigation system.	26 (13%)	149 (74.5%)	22 (11%)	3 (1.5%)	200
6	The online course design provided opportunities for interaction with other learners (discussions, group activities).	23 (11.5%)	148 (74%)	27 (13.5%)	2 (1%)	200
7	The online course design had clear instructions and guidelines for assignments and activities.	24 (12%)	143 (71.5%)	31 (15.5%)	2 (1%)	200
8	The online course design includes various technology tools and multimedia elements (e.g., videos and interactive quizzes) to enhance learning.	29 (14.5%)	149 (74.5%)	21 (10.5%)	1 (0.5%)	200
9	The online course design promotes self-paced learning and flexibility.	29 (14.5%)	136 (68%)	31 (15.5%)	4 (2%)	200

10	The online course design takes into account the needs and preferences of diverse learners.	22 (11%)	149 (74.5%)	26 (13%)	3 (1.5%)	200

Note that Agree and Strongly Agree are aggregated to Agree, while Disagree and Strongly Disagree are aggregated to Disagree.

Item 1 in Table 2 indicates that 166 (83%) of the respondents agreed that the online course materials are logical, clear, and well-structured, while 34 (17%) of the respondents disagreed. Item 2 reveals that while 32 (16%) of the respondents disagreed, the majority of respondents, 168 (84%), agreed that the online course materials provided clear learning objectives and results. Item 3 reveals that while 29 respondents (14.5%) disagreed, the majority of respondents, 171 (85.5%), agreed that the online course design provided adequate evaluations, timely and constructive feedback, and responsive teacher support. Item 4 reveals that while the remaining 30 (15%) respondents disagreed, the majority of respondents, 170 (85%), agreed that the online course materials are presented in an engaging, interactive, and visually appealing way. Item 5 reveals that while 25 (12.5%) of the respondents disagreed, the majority of respondents, 175 (87.5%), agreed that the online course design featured an easy-to-use interface and navigation system. Item 6 reveals that most minors, 29 (14.5%) of the respondents, disagreed. In contrast, the majority of respondents, 171 (85.5%), agreed that the online course design offered chances and contact with other learners (for instance, debates and group activities). Item 7 reveals that while 33 (16.5%) of the respondents disagreed, the majority of respondents, 167 (83.5%), agreed that the assignments and activities in the online course contained clear instructions and rules. Item 8 reveals that while 22 (11%) respondents disagreed, the majority of respondents, 178 (89%), agreed that the online course design incorporates a range of technological tools and multimedia components (videos, interactive quizzes) to facilitate learning. According to item 9, most of the respondents 165 (82.5%) agreed that the online course design encourages flexibility and self-paced learning, while the remaining 35 (17.5%) disagreed. According to item 10, only 29 (14.5%) of the respondents disagreed, and the majority of respondents, 171 (85.5%), agreed that the online course design takes into account the requirements and preferences of various learners.

Table 3: Online facilitation

S/N	**Online Facilitation**	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Total**

11	The online facilitators provided clear instructions for the learning activities.	26 (13%)	144 (72%)	30 (15%)	0 (0%)	200
12	The online facilitators effectively engaged the participants in meaningful discussions.	26 (13%)	143 (71.5%)	30 (15%)	1 (0.5%)	200
13	The online facilitators provided timely feedback on assignments and questions.	17 (8.5%)	148 (74%)	33 (16.5%)	2 (1%)	200
14	The online facilitators created a supportive and inclusive online learning environment.	18 (9%)	145 (72.5%)	36 (18%)	1 (0.5%)	200
15	The online facilitators effectively used multimedia resources to enhance learning.	23 (11.5%)	150 (75%)	26 (13%)	1 (0.5%)	200
16	The online facilitators encouraged active participation and collaboration among the participants.	35 (17.5%)	133 (66.5%)	30 (15%)	2 (1%)	200
17	The online facilitators provided clear and concise explanations of complex concepts.	28 (14%)	138 (69%)	31 (15.5%)	3 (1.5%)	200
18	The online facilitators effectively managed the online learning platform and technology tools.	24 (12%)	145 (72.5%)	30 (15%)	1 (0.5%)	200
19	The online facilitators motivated and inspired me to engage in the learning process actively.	32 (16%)	136 (68%)	32 (16%)	0 (0%)	200
20	The online facilitation positively contributed to my overall learning experience.	38 (19%)	138 (69%)	24 (12%)	0 (0%)	200

Table 3 revealed that the majority of respondents, 170 (85%), agreed that the online facilitators gave clear instructions for the learning activities. In comparison, the remaining 30 (15%) of the respondents disagreed, according to item 11 in the above table. Item 12 reveals that 31 (15.5%) of the respondents disagreed, and the majority of respondents, 169 (84.5%), agreed that the online facilitators successfully led the participants in thought-provoking conversations. Regarding item 13, most of the respondents 165 (82.5%) agreed that the online facilitators gave prompt feedback on questions and assignments, while the remaining 35 (17.5%) disagreed. Item 14 reveals that 37 (18.5%) of the respondents disagreed, while the majority of respondents, 163 (81.5%), agreed that the online facilitators produced a helpful and inclusive online learning environment. Most of the respondents, representing 173 (86.5%), agreed, according to item 15, that the online facilitators employed multimedia materials successfully to facilitate learning, while only 27 (13.5%) of the respondents disagreed. Item 16 reported that 168 (84%) agreed that the online facilitators promoted cooperation and active involvement among participants, while the least of them, 32 (16%) of the respondents, disagreed. Item 17 shows that 166 (83%) of the respondents agreed that the online facilitators explained complicated ideas clearly and succinctly, while the remaining 34 (17%) of the respondents disagreed. The table also reveals that item 18 indicated that most of the respondents, 169 (84.5%), felt that the online facilitators did an excellent job of managing the technological tools and online learning platform. In comparison, only 31 (15.5%) of them did not agree. Item 19 reveals that 32 (16%) of the respondents disagreed, while the majority of respondents, 168 (84%), felt that the online facilitators inspired and motivated them to participate in the learning process actively. The data shown in Item 20 indicates that a significant proportion of the participants, 176 (88%), agreed that the online facilitation had a good impact on their overall learning experience, whilst 24 (12%) disagreed.

Table 4: Online Assessment

S/N	Online Assessment	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
21	The online assessment provides clear and well-defined instructions.	29 (14.5%)	118 (59%)	48 (24%)	5 (2.5%)	200
22	The format and structures of the online assessments are clear and easy to follow.	30 (15%)	123 (61.5%)	45 (22.5%)	2 (1%)	200

23	Online assessment offers various question types that assess different levels of knowledge and skills (e.g., multiple-choice, essays, and problem-solving).	29 (14.5%)	118 (59%)	51 (25.5%)	2 (1%)	200
24	The online assessment provides timely feedback on performance.	24 (12%)	128 (64%)	46 (23%)	2 (1%)	200
25	The online assessment helps to identify areas of strength and areas that need improvement.	30 (15%)	121 (60.5%)	47 (23.5%)	2 (1%)	200
26	The online assessments are fair and unbiased in their evaluation.	20 (10%)	122 (61%)	56 (28%)	2 (1%)	200
27	The online assessments provide a balanced representation of the course content and learning objectives.	29 (14.5%)	96 (48%)	71 (35.5%)	4 (2%)	200
28	The online assessment effectively measures and contributes to overall understanding and retention of the subject matter.	29 (14.5%)	92 (46%)	76 (38%)	3 (1.5%)	200
29	The online assessments are challenging and promote critical thinking, as well as reflection and self-assessment.	30 (15%)	80 (40%)	87 (43.5%)	3 (1.5%)	200
30	The online assessments are effective tools for evaluating progress throughout the course.	30 (15%)	69 (34.5%)	97 (48.5%)	4 (2%)	200

Table 4 reported that the majority of respondents, 147 (73.5%), agreed that the online assessment gives clear and well-defined instructions, while 53 (26.5%) disagreed. Item 22 reveals that although 47 (23.5%) of the respondents disagreed, the majority of respondents, 153 (76.5%), agreed that the online exams' presentation and structure are understandable and straightforward. Item 23 reveals that while 53 (26.5%) of the 147 respondents disagreed, the majority of respondents (73.5%) agreed that the online exam includes a range of question types that measure different levels of knowledge and abilities (for example, multiple-choice, essays, and problem-solving). Also, most of the respondents, 152 (76%), agreed, and 48 (24%) disagreed that the online exam provides timely feedback on performance, according to item 24. Items 25 and 26 reveal that 151 (75.5%) agreed, and 49 (24.5%) disagreed that the online assessment is helpful in identifying areas that require work and areas of strength. According to item 26, 142 (71%) of the respondents agreed that the online tests are impartial and fair in their assessment, while 58 (29%) disagreed. According to item 27, more than half of the respondents 125 (62.5%) agreed that the online assessments give a fair representation of the course material and learning objectives, while 75 (37.5%) disagreed. Furthermore, the majority of the respondents, 152 (76%), agreed, and only 48 (24%) of the respondents disagreed that the online exam provides timely feedback on performance, according to item 24. Regarding items 25 and 26, it was reported that most of the respondents, 151 (75.5%), agreed, and 49 (24.5%) of the respondents disagreed with the fact that the online assessment is helpful in identifying areas that require work and areas of strength. According to item 26, 142 (71%) of the respondents, or the majority, agreed that the online tests are impartial and fair in their assessment, while 58 (29%) disagreed. According to item 27, 125 (62.5%) of the respondents, or the majority, agreed that the online assessments give a fair representation of the course material and learning objectives, while 75 (37.5%) disagreed.

5 Discussion of findings

The first research question's findings indicate how the three components of the online learning environment—online course design, online facilitation, and online assessment—influenced the students' learning effectiveness in the institution. The results indicate that the three components individually contributed to the prediction of the students' learning effectiveness in the institution, meaning that the three components together accounted for 15.8% of the variation in the prediction of the students' learning effectiveness. This suggests that when all three components are taken into consideration, the student's

learning effectiveness will increase by 15.8%, with the remaining 84.2% of the variation being outside the purview of this study. Consequently, online course design, online facilitation and online assessment components combined have a 15.8% influence on distance learners' learning effectiveness in this study. This research supports the theories of Ergulec (2019) and Pallof and Pratt (2013), who contend that carefully thought-out instructional design may be utilised to produce a thriving online learning environment. Well-planned online learning is a complex process. In addition, in accordance with the results of the current study, Czerkawski and Lyman (2016) reaffirmed how developing technologies, such as Zoom, LMS, and Google Meet, have a significant impact on learners' learning effectiveness and may be utilised for online course design, online facilitation, and online evaluation. This result further supports the findings of Muibi (2022) and Ogedengbe and Quadri (2020), who showed that the use of social media applications like Telegram and WhatsApp, learning applications like Moodle, Zoom, and LMS, as well as Google applications like Google Classroom and Meet, helped with online course design, online facilitation, and online assessment, and enabled online learning and the effectiveness of learners' learning.

The results of study question 2 indicate what the learners' perceptions are about the success of learning when the components of the online learning environment—online course design, online facilitation, and online assessment—are implemented. The results showed that each of the three factors significantly influenced how well students would learn in the setting. As indicated by the learners' response, which indicated that the three online learning environment components were perceived as highly significant and should be integrated into the teaching and learning process in the institution, this suggests that the effectiveness of the learning process for distance learners will be improved in the institution if the online learning environment components are correctly implemented. The management of the institution considers the integration of the three components of the online learning environment to be highly essential. This result is consistent with the Universal Design for Learning principles, which emphasise the creation of inclusive, adaptable, and student-centred online learning environments to guarantee that all students have access to and may benefit from the course materials, assignments, and activities at any time and from any location. Thus, according to Crick (2021), the COVID-19 epidemic sparked changes in digital schooling. Digital learning materials offer a means for students to apply and deploy the knowledge they have learned (McGrath et al., 2020). These

recommendations support the idea that COVID-19 offers greater chances for innovation in a brand-new field of digital education.

The E-Learn Cube online learning theory identified six critical success factors, each component contributing to the success of online learning. The six critical success factors for e-learning are design, course, teacher, technology, support and student. Therefore, this study identified the online course design, the support through the facilitators, and the use of LMS as technology for interaction between learner-learners and tutor-learners put in place by the University of Ibadan's Distance Learning Centre. This theory guides the operation and management services of the distance learning programme of the Distance Learning Centre, University of Ibadan. This was evident through the results on learners' perception of each of the components. Based on this, this study contributed to knowledge in information and communication technology and knowledge management, and learning can be made possible entirely online based on the results of this study as learners found online course design, facilitation, and assessment effective in their learning. Therefore, the new knowledge this study generates is that open-distance learning programmes can be made entirely online through increased efforts on online learning growth and development in Nigeria.

6 Conclusion

The study investigated the level of effect of the online learning environment components (Online Course Design, Online Facilitation and Online Assessment) on learners' learning effectiveness at the Distance Learning Centre, University of Ibadan. In line with the findings stated above, the conclusion reached is that there are available online learning environment components (Online Course Design, Facilitation and Assessment) used in the institution and have a significant effect on learners' learning effectiveness. In a society defined by enhanced communication modes and channels that is regardless of place and time and also with the nature of the distance learning institution, the use of online learning platforms cannot be downplayed as they contribute and affect the learning effectiveness of learners even at Distance Learning Centre, University of Ibadan. This would enable the Distance Learning Centre, the University of Ibadan, to compete globally with other distance learning institutions across the world.

7 Recommendations

Based on the findings of this study, the following recommendations were:

- New forms of information and communication technologies (ICTs) for online course design should be adopted into the teaching and learning process in the institution. ICTs such as augmented reality, among others, which can simplify learning, should be accurate, logical, and coherently designed and evaluated to enhance and improve the learning effectiveness of learners in distance education.
- There should be an increase in the use of different forms of online learning assessment platforms to empower distance learners' online learning experience and improvement in the use of ICTs by maximising them to facilitate effectual output of learners' learning effectiveness in the institution.
- The design and usage of online learning facilitation using these ICTs should be user-friendly so that the learners can easily relate to it, which can positively affect learners' learning effectiveness in distance education.
- The management of the distance learning centre should formulate a functional policy that embraces and supports the use of technology in teaching and learning.
- Provision should be made for ICT infrastructure, such as training, funding, adequate internet connectivity, alternative power supply, provision of computers and other devices, and so on, that will facilitate online teaching at the distance learning centre. If the above recommendations are well implemented, they will, in turn, enhance both tutors' and learners' understanding of the integration of ICTs in teaching and learning and offer a means for students to apply and deploy the knowledge they have learned.

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