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User Experience of Open Distance Learning Management Systems: An Analysis of Technology Acceptance Model

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Abstract

Open Distance Learning (ODL) management systems have become increasingly critical in providing flexible educational opportunities. However, user experience (UX) challenges persist that can impede learning effectiveness. This study investigates UX factors in ODL systems across three institutions in North-Eastern Nigeria, employing the Technology Acceptance Model (TAM) as a theoretical framework. Through a descriptive quantitative approach involving 600 respondents (49.3% male, 49.7% female), we examined correlations between accessibility, flexibility, desirability, and system usage intentions. Utilizing Spearman's Rank Correlation and regression analyses, the research revealed significant positive correlations between system accessibility and desirability ($r=0.95$, $p<0.021$), flexibility and user attitude ($r=0.67$, $p<0.012$), and desirability and behavioral intention($r=0.71$, $p<0.001$). Key findings indicate moderate user satisfaction across most constructs ($M=3.38$) with notable high scores for accessibility ($M=3.38$) but lower satisfaction with progress tracking features ($M=2.83$). The study proposes user-centered design guidelines to enhance ODL management systems, emphasizing improved tracking mechanisms, tailored course design, and continuous feedback integration. These recommendations aim to optimize digital learning environments and support more effective educational technology implementation in resource-constrained settings.

Keywords: Open Distance Learning, User Experience, Technology Acceptance Model, Educational Technology, User-Centered Design

INTRODUCTION

The proliferation of digital technologies has transformed educational delivery models, with Open Distance Learning (ODL) systems emerging as pivotal platforms for expanding educational access. In regions like North-Eastern Nigeria, characterized by complex socio-economic landscapes, these technological solutions offer unprecedented opportunities for inclusive education. However, the effectiveness of ODL platforms is fundamentally contingent upon their user experience (UX) design.

According to Nasruddin et al. (2022), ODL offers convenient learning opportunities, allowing students to access courses using a computer and internet connection while balancing their studies with other commitments. Learning Management Systems (LMS) form the backbone of ODL systems, offering platforms that host courses, assignments, assessments, and

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communication tools. Ibrahim and Aziz (2022) define an LMS as a web-based environment that delivers educational content through digital means, thereby facilitating interaction between instructors and learners. LMS platforms streamline educational processes by providing a unified interface where all educational activities can be managed (Saleh et al., 2021).

The success of ODL platforms is intricately linked to the effectiveness of Learning Management System (LMS) platforms and the quality of the user experience (UX) they offer. Maslov et al. (2021) broadly characterizes the User Experience (UX) of a Learning Management System (LMS) as "inherently a fuzzy, multi-faceted, context dependent, and dynamic concept covering all aspects of how end-users experience, behave, perceive, feel, and think about an LMS." Muslim et al. (2019) emphasize that a well-designed user interface (UI) facilitates ease of use, contributing to positive UX, which directly influences student engagement and learning outcomes.

The Technology Acceptance Model (TAM) provides a theoretical framework for understanding users' acceptance and adoption of technology, particularly in educational settings. Recent applications of TAM in ODL contexts have provided valuable insights into how various factors impact technology adoption. For instance, Almaiah et al. (2020) explored critical challenges influencing e-learning system usage during the pandemic, while Al-Maroof et al. (2020) demonstrated how perceived usefulness and ease of use significantly influenced ODL technology adoption, even in crisis situations. The model's robustness in diverse and rapidly evolving educational environments makes it particularly suitable for examining ODL system adoption in resource-constrained settings.

Despite the increasing adoption of ODL management systems in Nigeria and globally, learners continue to face significant challenges in effectively navigating and utilizing these platforms. Studies have consistently highlighted issues such as navigation complexity, information overload, poor engagement, usability problems, and barriers to accessibility (Eleken, 2023; Dhawan, 2020; Muslim et al., 2019; Zhang et al., 2020). These problems directly affect the effectiveness of ODL systems and negatively impact the overall learning experience by reducing learner motivation, engagement, and retention rates.

This study focuses on enhancing UX within ODL management systems used at key institutions in North-Eastern Nigeria, namely the National Open University of Nigeria (NOUN), North-Eastern University, and the Centre for Distance Learning (CDL) Gombe study centre University of Maiduguri. By assessing essential UX factors- accessibility, flexibility, desirability, and progress tracking this research seeks to identify critical areas for improvement to better support learner engagement and academic performance. Findings from this research will offer actionable insights and recommendations for developing ODL platforms that meet diverse learner needs, with implications for future enhancements in digital education.

METHODOLOGY

This study utilized a descriptive quantitative research design, ideal for systematically examining user experiences within Learning Management Systems (LMS) in Open Distance Learning (ODL) settings. The quantitative approach enabled objective data collection and statistical analysis to assess patterns, relationships, and user feedback on LMS usability across selected institutions.

Population and Sample
The population included learners enrolled in ODL programs at three institutions in North-Eastern Nigeria: the National Open University of Nigeria (NOUN), North-Eastern University, and the Centre for Distance Learning, Gombe study center University of Maiduguri (CDL UNIMAID). Using convenience sampling, the study aimed for 600 responses, ensuring a representative sample of the region's diverse ODL learners.

Instrumentation
Data were collected via a structured questionnaire, the questions were adapted from related literature on UX in LMS for ODL. The survey consist of two Sections and eight constructs that measured various aspects of user experience, including accessibility, flexibility, desirability, tracking progress, and constructs from the Technology Acceptance Model (TAM): perceived usefulness, perceived ease of use, behavioral intention, and attitude toward use. The survey item was measured using a 5-point Likert scale (1-strongly disagree, 2- Disagree, 3- Neutral, 4-Agree, 5-Strongly agree).

Research Hypotheses
H1: Accessibility of the ODL management system is positively correlated with its desirability for use.
H2: Flexibility of the ODL management system is positively correlated with the attitude toward using it.
H3: The desirability of the ODL management system is positively correlated with the behavioral intention to use it.
H4: The effectiveness of tracking work progress features in the ODL management system is positively associated with its perceived usefulness.
H5: Perceived usefulness and perceived ease of use positively influence behavioral intention to use the ODL management system.

Data Analysis
Statistical analysis was conducted using SPSS version 30.0, with descriptive statistics summarizing demographic information and UX assessments. Spearman's Rank Correlation was used to examine relationships among UX aspects, offering perceptions into how accessibility, flexibility, and other factors influenced user satisfaction and engagement.

RESULTS AND DISCUSSION

Table 1. Summary of respondent demographics and usage patterns

	Frequency	Percentages
GENDER		
Male	296	49.3
Female	298	49.7
Prefer not to say	6	1.0
AGE		
18-24	85	14.2
25-34	269	45.0
35-44	204	33.7
45-54	35	6.0
55 and above	7	1.2
LEVEL OF STUDY		
Undergraduate	450	75.2
Postgraduate	125	20.7
Doctorate	7	1.2
Other (please specify)	18	3
USAGE DURATION		
Less than one year	111	18.5
1-2years	259	43.3
3-5years	181	30.2
More than 5years	49	8
WEEKLY USAGE		
Less than hour	80	13.3
1-5 hours	384	64.2
6-10 hours	89	14.8
11-20 hours	33	5.3
More than 20 hours	14	2.3

The study involved respondents from Open and Distance Learning (ODL) institutions in North-Eastern Nigeria. The gender distribution showed a nearly even split, with males constituting 49.3%, females 49.7%, and 1.0% not specifying their gender. In terms of age, the majority of respondents (45.0%) were aged 25–34, followed by 33.7% aged 35–44. The younger group (18–24) comprised 14.2%, while older age brackets (45–54 and 55+) accounted for 6.0% and 1.2%, respectively. This highlights a youth-dominated sample with a limited representation of older respondents. Regarding the level of study, most respondents (75.2%) were undergraduates, while 20.7% were postgraduates, 1.2% were doctorate holders, and 3% fell into "other" categories, indicating diverse educational backgrounds. Usage duration of the ODL system revealed that 43.3% of respondents had used the system for 1–2 years, 30.2% for 3–5 years, and 18.5% for less than one year. Only 8.0% reported usage exceeding five years, suggesting relatively limited long-term engagement. The average weekly usage patterns showed that 64.2% used the system for 1–5 hours per week, indicating moderate engagement. Smaller proportions of respondents used the system for less than 1 hour (13.3%), 6–10 hours (14.8%), 11–20 hours (5.3%), and more than 20 hours (2.3%). Overall, the data provides

valuable insights into the demographic trends and usage patterns of ODL systems, emphasizing the predominance of young, undergraduate users with moderate levels of system engagement. The current study's demographic findings align with similar research in open distance learning (ODL) systems. Nasruddin et al. (2022) similarly found that younger adults (25-34 years) demonstrate high engagement with digital learning platforms. Al-Maroof et al. (2023) corroborated the moderate technology usage patterns, with users spending 1-5 hours weekly on learning platforms. Alzahrani et al. (2022) further validated the importance of user perception in technology adoption, particularly among undergraduate students. These comparative studies collectively support the current research's insights into ODL system usage, emphasizing the significance of user-centered design and technological acceptance in digital learning environments.

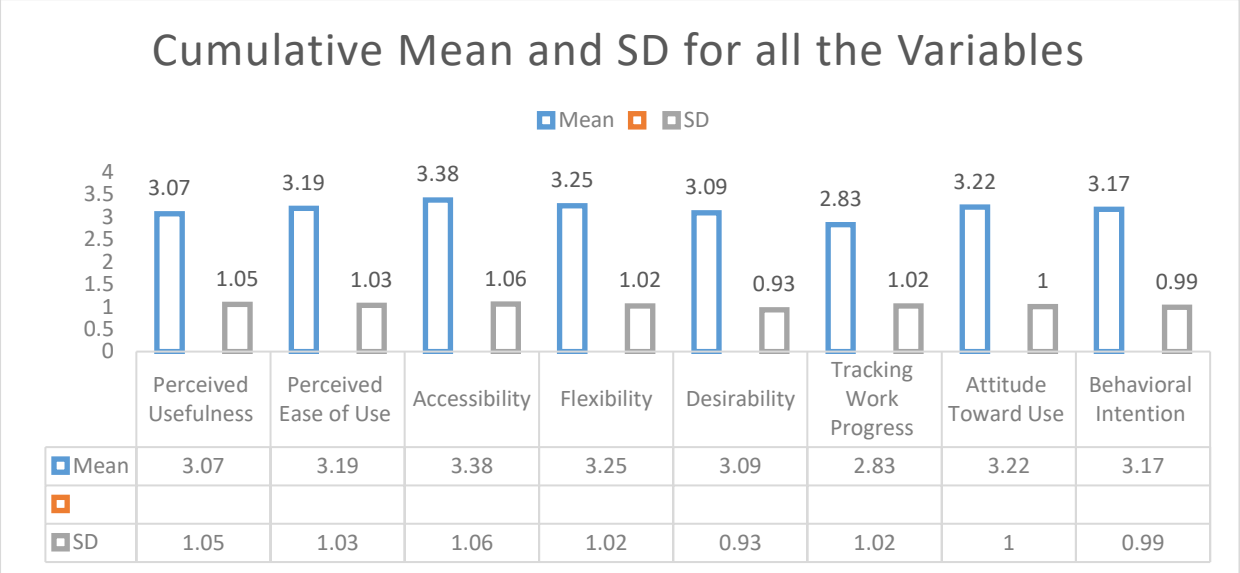
Answering research questions

In this study, quantitative data on respondents' views regarding the research questions was Collected through online survey questionnaires. For data analysis, SPSS Statistics version 30.0 Was employed to conduct descriptive statistical analyses, with an emphasis on calculating the Mean and standard deviation (SD).

Table 2 Mean scores, standard deviations, and decision points for individual items across constructs

Constructs	Items	Mean	Std. Deviation	Decision
Perceived usefulness	PU1	3.10	1.030	Agreed
	PU2	2.97	1.086	Disagreed
	PU3	3.14	1.044	Agreed
perceived ease of use	PEOU1	3.23	1.025	Agreed
	PEOU2	3.24	.997	Agreed
	PEOU3	3.10	1.057	Agreed
Accessibility	ACC1	3.41	1.059	Agreed
	ACC2	3.39	.979	Agreed
	ACC3	3.34	1.000	Agreed
Flexibility	FLX1	3.32	.993	Agreed
	FLX2	3.29	1.030	Agreed
	FLX3	3.14	1.024	Agreed
Desirability	DSR1	3.14	.914	Agreed
	DSR2	3.11	.932	Agreed
	DSR3	3.02	1.027	Agreed
Tracking work progress	TWP1	2.79	.995	Disagreed
	TWP2	2.84	1.015	Disagreed
	TWP3	2.87	1.103	Disagreed
Attitude toward use	ATU1	3.27	.980	Agreed
	ATU2	3.15	.995	Agreed
	ATU3	3.23	.979	Agreed
Behavioral intention	BI1	3.14	.980	Agreed
	BI2	3.18	.981	Agreed
	BI3	3.20	1.007	Agreed

Figure 1 Cumulative mean scores and standard deviations for constructs



The findings are presented in two main tables. Table 2 outlines the mean scores, standard deviations, and decision points (either Agreed or disagree) for individual items under each construct of the Open Distance Learning (ODL) management system. The constructs include Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Accessibility, Flexibility, Desirability, tracking of Work Progress, Attitude towards Use, and Behavioral Intention. For most items, respondents generally agreed (mean ≥ 3.0), reflecting positive perceptions of the ODL system's ability to support learning. For example, items under Perceived Usefulness and Perceived Ease of Use consistently scored above 3.0, indicating that users find the system both beneficial for their studies and easy to navigate. Similarly, items under Accessibility and Flexibility received Agreed decisions, with respondents confirming that the system is accessible across devices and offers flexibility in learning.

However, Tracking of Work Progress stands out as a construct needing improvement. The items under this category received lower mean scores, particularly concerning the system's ability to help users monitor their learning progress and manage tasks, with mean scores falling below 3.0, indicating a Disagreed decision. This suggests that progress tracking features of the ODL system are perceived as less effective, and improvements in this area could be beneficial.

Figure 1 summarizes the cumulative mean scores and standard deviations for each construct. The cumulative mean scores for Perceived Usefulness (3.07), Perceived Ease of Use (3.19), Accessibility (3.38), Flexibility (3.25), Desirability (3.09), Attitude Towards Use (3.22), and Behavioral Intention (3.17) are all above the decision mean of 3.0, indicating a generally positive attitude towards the ODL system. The standard deviations for these constructs indicate moderate variability in the responses, suggesting some differences in individual perceptions but overall consensus on the system's strengths.

In contrast, Tracking of Work Progress received a cumulative mean score of 2.83, below the decision mean, indicating that respondents are less satisfied with this aspect of the system. This is supported by the standard deviations, which suggest greater variability in responses regarding the effectiveness of tracking features, reflecting a need for improvement in this area.

Overall, the findings from both tables highlight the ODL system's strengths, including its ease of use, accessibility, flexibility, and desirability, which are all positively perceived by users. However, the results also point to the need for enhancements in the area of progress tracking, where users expressed lower Satisfaction.

Hypothesis testing

Table 3 Spearman's Rank Correlation

Hypothesis	Relationship Tested	Test Used	Correlation (r)	Significance (p-value)	Outcome
H1	ACC → DSR	Spearman's Rho	r = 0.95	0.021	Supported
H2	FLX → ATU	Spearman's Rho	r = 0.67	0.012	Supported
H3	DSR → BI	Spearman's Rho	r = 0.71	0.001	Supported
H4	TWP → PU	Spearman's Rho	r = 0.78	0.033	Supported
H5a	PU → BI	Spearman's Rho	r = 0.51	0.017	Supported

Table 4 Regression analysis

Hypothesis	Relationship Tested	Test Used	Key metrics	Significance (p-value)	Outcome
H5b	PEOU → BI	Linear Regression	R^2 = 0.659, F = 643.232	< 0.001	Supported
H6	PU/PEOU→B I	Linear Regression	R = 0.812, Adjusted R^2 = 0.657	< 0.001	Supported

The hypothesis testing results provide strong evidence supporting the positive relationships between key variables in the Technology Acceptance Model (TAM) framework within the context of an Open Distance Learning (ODL) management system. Specifically, in Table 3 each hypothesis reveals significant positive correlations: accessibility and desirability (r = 0.95), flexibility and user attitude (r = 0.67), desirability and behavioral intention (r = 0.71), and work progress tracking features and perceived usefulness (r = 0.78), all with significance levels well below 0.05, underscoring robust associations between these factors. Additionally, the regression analysis in Table 4 demonstrates a high correlation (R = 0.812) between perceived usefulness and perceived ease of use, accounting for 65.9% of the variance in behavioral intention to adopt the ODL system (R^2 = 0.659).

User-Centered Design Guidelines for Enhancing ODL Management Systems

Based on the analysis of data from this study, the study proposes evidence-based guidelines for enhancing ODL management systems. These guidelines are informed by significant correlations found in the research, particularly between accessibility and desirability (r = 0.95), work progress tracking and perceived usefulness (r = 0.78), flexibility and user attitude (r = 0.67), and desirability and behavioral intention (r = 0.71).

The primary guidelines focus on five key areas. First, accessibility enhancement should prioritize multi-device compatibility and bandwidth-efficient design, considering that 64.2% of users engage with the system for 1-5 hours weekly. Second, progress monitoring systems should be strengthened through visual dashboards and automated tracking mechanisms, addressing a key weakness identified in the findings. Third, system flexibility should be enhanced to support self-paced learning and modular course structures, catering to the predominantly undergraduate user base (75.2% of respondents).

Fourth, usability improvements should build upon the existing positive correlation between perceived usefulness and ease of use (R = 0.812), focusing on intuitive navigation and comprehensive help systems. Fifth, engagement optimization should incorporate interactive features and modern interface design to maintain user interest and participation.

Implementation should follow a phased approach, with immediate priority given to progress-tracking improvements, mobile accessibility, and deadline management systems. Secondary phase implementations should focus on self-paced learning tools and interactive content features, while long-term considerations should include advanced analytics and emerging educational technologies.

Success metrics should monitor user engagement rates, task completion rates, and system accessibility metrics, with particular attention to the needs of the primary demographic (ages 25-34) and their usage patterns. These guidelines aim to enhance the effectiveness of ODL management systems while addressing the specific needs and challenges identified through the research.

DISCUSSION

The demographic analysis reveals a balanced gender distribution with a predominantly younger adult user base (25-34 years) and undergraduate students (75.2%). Most users engage with the system for 1-5 hours weekly, indicating moderate platform utilization.

Users generally perceive the ODL systems positively in terms of usefulness and ease of use, aligning with Alzahrani et al.'s (2022) emphasis on perceived usefulness in educational technology adoption. The systems' accessibility across devices and accommodation of diverse learning needs reflects Zawacki-Richter et al.'s (2021) findings on the importance of accessibility in ODL settings.

The flexibility of the systems, particularly in supporting self-paced learning, receives positive feedback, supporting Martin et al.'s (2020) research on the correlation between flexibility and learner satisfaction. Users appreciate the visual appeal and engaging features, consistent with Ertmer and Newby's (2021) findings on the impact of aesthetic design on user engagement.

However, the tracking work progress features emerge as a significant weakness, with users expressing dissatisfaction with monitoring capabilities and deadline management. This aligns with Weller's (2022) emphasis on the crucial role of progress tracking in maintaining learner motivation and accountability.

The positive attitude toward system use and strong behavioral intentions to continue using the platform suggest overall satisfaction, supporting Hsu and Lu's (2023) findings on the relationship between user satisfaction and continued technology adoption.

CONCLUSION

The findings underscore the importance of a user-centered approach in the design and implementation of Open and Distance Learning management systems in North-Eastern Nigeria. Although users generally perceive these systems as useful and easy to navigate, there are notable areas for improvement, particularly in tracking learner progress and facilitating task completion. This study contributes to the understanding of ODL systems in the Nigerian educational landscape, especially in regions characterized by unique socio-cultural dynamics. The established correlations in the TAM framework emphasize the relevance of perceived ease of use and perceived usefulness as key predictors of behavioral intention.

Based on the research findings, several recommendations are proposed to enhance the effectiveness of Open and Distance Learning (ODL) management systems in North-Eastern Nigeria;

1. Enhanced Progress Tracking: Implement robust tracking mechanisms including automated reminders, progress dashboards, and analytics to improve learner accountability and motivation.
2. Tailored Course Design: Develop course materials and pedagogical approaches that address diverse learning styles, incorporating interactive modules and multimedia resources for the predominantly undergraduate user base.
3. Feedback Integration: Establish regular feedback channels through surveys and focus groups to inform continuous system improvements and adaptations.
4. User Interface Enhancement: Invest in user-centered design principles to create more intuitive and visually appealing interfaces that promote engagement and retention.

These recommendations are directed at university administrators, IT departments, curriculum developers, and student engagement officers for implementation within their respective areas of responsibility.

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