KIU Journal of Education (KJED)

Volume 5 Issue 1
Page 8 - 16

April – May 2025
https://kjed.kiu.ac.ug/

The Adoption of Instructional Courseware in Higher Education: First-Year Students' Awareness, Availability, and Computer Self-Efficacy

Oluwadamilare Peter Jegede[1], Emmanuel Lawani Omoarebu[2], Bolanle Susan Olaniyan[3], Olubusayo Victor Fakuade[4]*

[1] School of E-learning, College of Education Open and Distance Learning, Kampala International University, Kampala, Uganda, https://orcid.org/0009-0008-8326-0401 , peter.jegede@kiu.ac.ug

[2] School of E-learning, College of Education Open and Distance Learning, Kampala International University, Kampala, Uganda, https://orcid.org/0009-0008-8326-0401

[3] Academic Registry, King Ceasor University, Kampala, Uganda, bolaniyan@kcu.ac.ug https://orcid.org/0000-0002-6191-7911

[4] School of E-learning, College of Education Open and Distance Learning, Kampala International University, Kampala, Uganda, olubusayo.fakuade@kiu.ac.ug

*Corresponding author: emmanuel.lawani@kiu.ac.ug / elawani217@gmail.com

Abstract

This study investigated awareness, availability, and utilisation of instructional courseware among first-year university students, emphasising the critical role of learners' computer self-efficacy in effectively leveraging these digital resources. Despite demonstrating high awareness of various educational technologies, students often do not engage with these tools consistently, a discrepancy attributed to factors such as accessibility and confidence in using technology in educational settings. This study used a descriptive survey design involving simple random sampling of 485 first-year undergraduate students at the University of Ibadan. Data were collected using an instrument titled the Awareness, Availability, and Usage of Instructional Courseware Questionnaire (AAUICQ), structured into three sections. This paper asserts that educational institutions must not only advocate for the promotion of instructional courseware, but also facilitate access and provide digital literacy programs that enhance learners' self-efficacy. The integration of metacognitive strategies within instructional courseware has been shown to empower students by aiding their ability to reflect on their learning processes, thereby encouraging autonomous learning and improving academic outcomes. These findings suggest that a comprehensive framework that synergises accessibility, self-efficacy, and tailored instructional strategies is essential for optimising the educational potential of instructional courseware, particularly in the evolving landscape of higher education. Hence, the study concludes that the ongoing discourse on educational technology provides insights into the interplay between awareness, availability, and self-efficacy in the effective use of instructional courseware, ultimately offering actionable recommendations for educators and policymakers to enhance digital learning environments.

Keywords: Instructional Courseware, Computer Self-Efficacy, Awareness and Availability, Digital Literacy, Higher Education

Introduction

The awareness and availability of learners in higher education are critical factors to consider in the design and development of instructional courseware. Adopting a learner-centric approach ensures that course materials are designed to address students' unique experiences by using different modalities. Moreover, the computer self-efficacy theory establishes that learner engagement is affected by learners' confidence in using technology, which also affects educational outcomes. Embracing e-learning practices in Nigeria has gained traction, particularly in response to shifts in global educational trends and an increasing need for flexible learning. Studies on the awareness, availability, and usage of instructional courseware is an understudied topic in university students' educational technology. The primary aim of this study is to determine how instructional courseware is designed, what resources are available to students, and how students access and utilise these resources in their academic work.

This study focuses on students' familiarity with instructional courseware, accessibility, and academic use. Evidence suggests that students from various educational contexts increasingly use educational technology (EdTech) tools to optimally engage in learning activities. Studies have shown that 18.4% of students who do not use EdTech report a lack of teacher guidance and mentorship (Yimmam, 2023). E-learning has employed methods aimed at improving communication between lecturers and students, thus facilitating the teaching and learning processes. This development indicates that instructional courseware has the

potential to help overcome barriers to education and to improve educational opportunities for learners. Despite these acknowledged advantages, there are numerous hurdles to the effective use of instructional courseware at Nigerian universities. Ofor-Douglas (2020) identified the basic challenges of inadequate e-learning facilities and insufficient funds for maintenance as important obstacles to e-learning utilisation. Moreover, Ashiru's (2025) research highlights the need to modernise the curriculum to teach relevant global skills and address local socioeconomic issues, indicating that the existence of obsolete instructional frameworks may hinder the use of teaching technologies. The impact of instructional courseware extends beyond its content delivery. It has the potential to transform pedagogical approaches, enabling educators to implement innovative teaching strategies such as flipped classrooms, blended learning, and gamification. Courseware often incorporates assessment tools and analytics, allowing instructors to track student progress, identify areas of difficulty, and provide targeted intervention. As technology continues to advance, the capabilities of instructional courseware are likely to expand, potentially revolutionising the way knowledge is imparted and acquired in educational institutions worldwide.

Literature Review

Instructional courseware, as defined by Lee (2012), represents a fusion of the terms "course" and "software", referring to technology-based learning materials designed to enhance instructional delivery. Digital resources, often in the form of educational software, have become increasingly important for modern teaching and learning. According to Thiruchelvam et al. (2018), courseware encompasses a wide variety of educational tools, but is primarily associated with software that facilitates technology-enhanced learning experiences. Instructional courseware has evolved significantly since its inception and has become an integral part of modern educational practice. It encompasses a diverse range of digital resources including interactive simulations, multimedia presentations, and adaptive learning platforms. These tools are designed to enhance various learning styles and preferences, and offer personalised learning experiences that can be tailored to individual student needs. The flexibility and accessibility of courseware have made it particularly valuable in both traditional classroom settings and distance learning environments.

Concept of instructional courseware

The term instructional courseware in higher education refers to a digital product designed to facilitate learning and cognitive processing through the use of interactive multimedia technologies. It includes a gamut of resources from texts and audio to illustrations, photos, graphs, animations, video, and narration that are integrated to actively engage learners in higher-order thinking and problem-solving (Olasunkanmi & Lawani, 2023). Not only does this variety of presentation types meet different learning needs, but according to Khadimally (2016), it also shows the development of deep cognitive processing by enabling interactions with content materials at multiple levels. The development of instructional courseware design is based on modern instructional design frameworks. ADDIE is a foundational model for Analysis, Design, Development, Implementation, and Evaluation that helps instructional designers develop coherent and effective digital learning experiences by first evaluating learners' needs, designing appropriate content, and thereafter assessing the instructional effectiveness of courseware (Pribadi & Chung, 2023; Senadheera et al., 2024). However, other instructional design models after ADDIE are considered to be based on the foundational principles of ADDIE. Hence, the concept of instructional courseware in higher education is broad and complex. It encompasses the purposeful application of multimedia elements, following specific design models such as the ADDIE model, and complying with current developments in digital teaching to promote and maintain active interaction among learners in the learning environment.

Instructional Courseware and Learner Awareness

Enhanced autonomous learner awareness gained through self-monitoring is the key to improving academic performance. Research suggests that addressing learners as active participants through strategic awareness instruction boosts self-efficacy (Hong, 2018; Umam et al. 2020). Instructional courseware facilitates learner awareness by promoting self-regulation and reflection. Ucam et al. (2020) emphasised the positive impact of effective metacognitive training on learners' comprehension performance and stressed the need for self-assessment components and reflective workouts in digital learning environments. Similarly, reflecting on instructional design, Hong (2018) proved that teaching strategies increase learners' application of useful techniques and confidence in independently overcoming challenges.

Furthermore, scenario-based instructional designs offer a delineated model that enhances self-regulation within learners, prompting awareness of problem solving and knowledge-construction strategies. Şeker (2016) demonstrated that scenario-based learners become recognition-aided problem-solvers, who can identify strengths and weaknesses that enhance their adaptability and academic performance. Such processes foster a shift from passive information intake to self-regulated learning by making learners aware of their reflection processes and how they can modify them. Incorporating self-directed metacognitive activities into instructional courseware in online learning can increase learner awareness. Pei et al., (2023) argued that self-directed online metacognitive listening practice helps learners use strategies that strengthen self-efficacy and improve learning outcomes.

Availability of Instructional Courseware in Higher Education

The existence of instructional courseware in higher education is subject to a plethora of technological, institutional, and economic considerations that govern the efficiency of the development, dissemination, and usage of digital learning resources. To achieve wide availability, there is a need to produce adequate digital courseware and develop sufficient systems and services that allow easy access to and integration of these materials into teaching. An important facet of availability is the embedding of instructional courseware

within the existing technological framework, which includes Learning Management Systems (LMSs) and cloud storage systems. Yao and Zhao (2022) noted the use of courseware tools such as smartboards in teaching mathematics, but pointed out that other more advanced instructional technologies are not fully utilised. The development of cloud computing in the digital age has significantly improved digital resource accessibility, beyond the limitations of LMSs. Alharthi et al. (2015) explain how cloud services can alleviate some of the infrastructural barriers that educational institutions face, thus enabling access to more advanced courseware products. However, inadequate connectivity and the need for specialised technical assistance in particular regions continue to hinder the effective adoption of cloud solutions. The role of Open Educational Resources (OER) has been increasingly acknowledged as instrumental to improving courseware availability.

The availability of instructional courseware is shaped by the market-based dynamics. Regele Regele, (2019) remarks on how business and profit motives can construct digital courseware, often emphasizing credentialing instead of good instructional design. By contrast, Bankar et al. Bankar et al. (2023) discussed that although new digital products are being developed for teaching medicine, their actual effectiveness depends significantly on the framework of access and contextual relevance. As discussed, the availability of instructional courseware in higher education augments factors that include the adoption of technological platforms, such as LMSs and cloud services, institutional willingness to support digital initiatives, strategic marketing through OERs, and industry competition that drives product development. For instance, Ward's (2012) taxonomy defines advanced courseware with learner awareness as developing through explicit strategy instruction design, metacognitive prompts, scenario-based learning activities, interactions, and feedback systems. Such strategies greatly augment self-efficacy and foster self-directed lifelong learning across educational levels and domains (Hong 2018; Umam et al. 2020; Şeker 2016; Pei et al. 2023).

Study Rationale

The reason for conducting this research stems from the growing significance of digital materials in higher education and the need to determine how optimally these resources are utilised in students' learning activities. The outcomes of this study may help other higher education stakeholders such as educational institutions, instructional designers, and policymakers. By gauging students' awareness of courseware, researchers can discover disconnections in the promotion or communication of learning resources.

Statement of the Problem

Despite their growing relevance, particularly in the era of digital transformation in education, a critical gap remains in understanding how students engage in instructional courseware, particularly at the foundational level of university education. At the University of Ibadan, where students come from diverse academic and socioeconomic backgrounds, it is unclear to what extent first-year students are aware of the existence of instructional courseware or whether such tools are readily available to them. Moreover, even when instructional courseware is present, its usage may be hindered by students' level of computer self-efficacy; that is, their confidence in using digital technology for academic purposes. Singun (2025) identified 80 barriers to digital transformation in higher education across nine key areas with an effort to address major persistent issues in strategy, leadership, resources, and culture that hinder progress by highlighting the need for strategic reevaluation and sustained commitment to overcome ongoing digital transformation barriers. Despite the insight into these factors, institutions risk underutilising valuable digital resources that could otherwise enhance student learning outcomes. Therefore, this study sought to investigate students' level of awareness and availability of instructional courseware, and assess the extent to which these factors, in combination with students' computer self-efficacy, predict the use of such digital tools. Addressing this issue is essential for developing strategies for improving the integration and effectiveness of instructional courseware in higher education.

Research Questions

1) How aware are first-year students of the existing instructional courseware?
2) What instructional courseware are available to first-year students?

Hypothesis

H01: Predictors of awareness and availability of instructional courseware do not have significant effects when combined with students' computer self-efficacy.

Methodology

This study employed a descriptive survey research design to explore availability, awareness, and computer self-efficacy related to instructional courseware among first-year students at the University of Ibadan, Ibadan North Local Government Area, Oyo State, Nigeria. The target population consisted of 485 100-level students, and respondents were selected using a simple random sampling technique from undergraduate residences across the university. Data were gathered using a researcher-designed instrument titled the Awareness, Availability, and Usage of Instructional Courseware Questionnaire (AAUICQ). The questionnaire was structured into three sections: Section I collected demographic data (age, gender, and course of study); Section II focused on the key variables of awareness of instructional courseware (11 items), availability (15 items), and computer self-efficacy (10 items, adapted from Olasunkanmi, (2017). The items in Section II were measured using a four-point Likert scale ranging from Strongly Agree to Strongly Disagree, with reverse coding applied where necessary. To ensure reliability, a pilot study was conducted using 20 students outside the study sample, and the instrument yielded satisfactory Cronbach's alpha values of 0.70 for awareness, 0.60 for availability, and 0.70 for computer self-efficacy. Questionnaires were administered in person within student residential areas and participants were assured of confidentiality to encourage honest responses. The

collected data were analysed using SPSS Version 22.0, with descriptive statistics (means, percentages, and the scales used in the survey allowed for comparison with a Standard Mean (SM) of 2.71, representing a threshold level of awareness.) used to summarise responses and inferential statistics, including multiple regression analysis used to examine the joint and relative contributions of awareness, availability, and computer self-efficacy to students' use of instructional courseware, with significance tested at the level of 0.05.

Results

Demographics

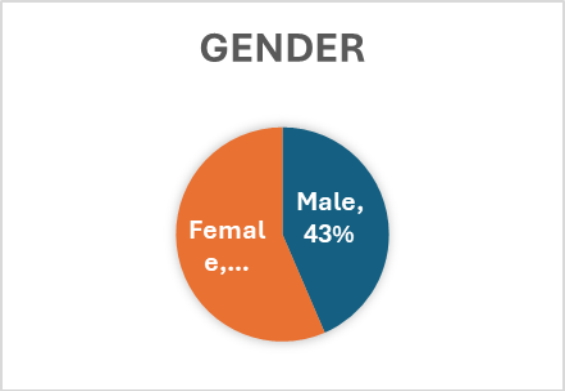

Figure 1. Distribution of the respondents based on gender

The demographic distribution of respondents revealed that 56.5% were male while 43.5% were female, indicating a slightly higher representation of male students in the study

Table 1: Distribution of the Respondents by Age

Age	F	%
16 to 17 years	166	34.2
18 to 19years	189	39.0
20 to 21 years	114	23.5
22 years and above	16	3.3
Total	485	100.0

In terms of age, the majority of respondents fell within the 18 to 19 years category (39.0%), followed by those aged 16 to 17 years (34.2%), 20 to 21 years (23.5%), and 22 years and above (3.3%)

Table 2: Distribution of the respondents by Current course of study

Current course of study	Frequency	Percentage
Communication and Language Arts	49	10.1
Mathematics	40	8.2
Microbiology	55	11.3
Physiology	44	9.1
Computer Science	52	10.7
Mechanical Engineering	41	8.5
Agriculture	66	13.6
Dentistry	49	10.1
Library Studies	43	8.9
Biochemistry	46	9.5
Total	485	100.0

The students represented a diverse range of academic disciplines, with the highest number being agriculture (13.6%), followed by microbiology (11.3%), Computer Science (10.7%), and Communication and Language Arts and Dentistry (10.1%) (Table 4.3), reflecting the broad academic spread across the university.

RQ 1: How aware are first-year students of existing instructional courseware?

Table 3: Awareness Of Instructional Courseware (N=485)

Items	Aware %	Not Aware %	M	Rank
UTME CBT	382(78.8)	103(21.2)	2.87	Accepted
PassNG WAEC	381(76.5)	104(23.5)	2.88	Accepted
PassNG PUTME	312(64.3)	173(35.7)	2.71	Accepted
UTME CBT	451(93.0)	34(7.0)	3.44	Accepted
JAMB UTME Practice	454(93.6)	31(6.4)	3.49	Accepted
JAMB (AVAJAMB CBT)UTME CBT Software	392(80.9)	93(19.1)	3.11	Accepted
My School JAMB CBT Practice	396(81.6)	89(18.4)	2.94	Accepted
CT-Learning Slingshot	431(88.9)	54(11.1)	3.06	Accepted
ESET…	360(74.2)	125(25.8)	2.82	Accepted
DoviLearn	414(85.4)	71(14.6)	2.99	Accepted
N=485, Weighted mean = 3.03, Standard Mean=2.68			3.03	

The survey findings revealed a generally high level of awareness among the students regarding various instructional courseware tools. Specifically, 93.0% of respondents reported being aware of UTME CBT, with a mean score of 3.44, whereas only 6.4% indicated a lack of awareness. Similarly, Avalanche JAMB (AVAJAMB CBT) was known to 80.9% of the students, with a mean of 3.11, and the CT-Learning Slingshot had an awareness rate of 88.9%, supported by a mean score of 3.06. Awareness of DoviLearn stood at 85.4% (mean = 2.99), while 81.6% of the students were familiar with My School JAMB CBT Practice (mean = 2.94). For PassNG WAEC, 76.5% reported awareness, with a mean of 2.88, and another entry on UTME CBT reported a 78.8% awareness (mean = 2.87). Awareness of the Examination Simulation and Evaluation Tool (ESET) was slightly lower at 74.2% (mean = 2.82), and the lowest awareness level was recorded for PassNG PUTME, known by only 64.3% of respondents, with a mean score of 2.71. These results suggest strong overall awareness of instructional courseware among first-year students, particularly for platforms linked to national

examinations, although some tools remain relatively unknown

5.1.3 RQ2: What instructional courseware are available to first-year students?

Table 4: Availability Of Courseware (n=485)

Items	Available %	Not available %	M	Rank
Computer applications that teach Mathematics and English language are very common	429 (88.4)	56 (11.6)	3.17	Accepted
I have seen courseware been sold in bookstores or online before	424 (87.5)	61 (12.5)	3.17	Accepted
My secondary school has one or more courseware available for students	444 (91.5)	41 (8.5)	3.16	Accepted
I could easily purchase /download any educational computer application for my personal use	435 (89.7)	50 (10.3)	3.14	Accepted
Which of the following were available to you in preparing for O'Level and UTME exams	445 (91.8)	40 (8.2)	3.33	Accepted
UTME CBT	425 (87.7)	60 (12.3)	3.29	Accepted
PassNG WAEC	412 (84.9)	73 (15.1)	3.02	Accepted
PassNG PUTME	263 (54.2)	222 (45.8)	2.53	Accepted
UTME CBT Hall	421 (86.8)	64 (13.2)	3.15	Accepted
JAMB UTME Practice	143 (29.5)	342 (70.5)	2.02	Rejected
Avalanche JAMB (AVAJAMB CBT) UTME CBT Software	259 (53.4)	226 (46.6)	2.32	Rejected
MYSchool JAMB CBT Practice	167 (34.4)	318 (65.6)	2.08	Rejected
CT-Learning Slingshot	215 (44.3)	270 (55.7)	2.16	Rejected
ESET - (Examination Simulation and Evaluation Tool)	219 (45.2)	266 (54.8)	2.27	Rejected
DoviLearn	184 (37.9)	301 (62.1)	2.18	Rejected
N=485, Weighted mean = 2.73, Standard Mean=2.02			2.73	

The results of the analysis are presented in Table 4. revealed that instructional courseware is generally available to a significant extent among students in Ibadan, particularly for exam-related tools. The highest levels of availability were reported for courseware used in O'Level and UTME exam preparations (91.8%, mean = 3.33), UTME CBT tools (87.7%, mean = 3.29) and computer applications in Mathematics and English (88.4%, mean = 3.17). Students also reported a high availability of courseware in their secondary schools (91.5%) and noted the ease of purchasing or downloading educational apps (89.7%). However, availability declined for more specific tools, such as PassNG PUTME (54.2%), Avalanche JAMB (53.4%), ESET (45.2%), DoviLearn (37.9%), and JAMB UTME Practice (29.5%), all of which had mean scores below 2.6**.** The weighted mean of 2.73, well above the standard mean of 2.02, indicates that overall, respondents perceive instructional courseware to be available, particularly for widely recognised educational needs. Nevertheless, disparities in availability across specific platforms suggest a need for improved access and broader institutional support for a wider range of courseware tools.

5.1.4 Ho1: Predictors of awareness and availability of instructional courseware do not have significant effects when combined with students' computer self-efficacy

Table 5: Summary of Regression Analysis of the combined prediction of awareness, availability of instructional courseware, and computer self-efficacy of first-year students.

Model Summary

.R	R Square	Adjusted R Square	Std. Error of the Estimate
0.671	0.541	0.744	4.7205

Summary Regression ANOVA

	Sum of Squares	Df	Mean Square	F	P	Remark
Regression	8798.43	3	2932.81			
Residual	10718.081	481	22.283	131.62	0.000	P<0.05 Sig.
Total	19516.503	484				

Table 5 shows a significant joint contribution of the independent variables (computer self-efficacy, awareness, and availability of instructional courseware) to the dependent variable (students' use of instructional software). In other words, students' use of instructional software correlated positively with the independent variables (computer self-efficacy, awareness, and availability of instructional courseware). The table also shows a coefficient of multiple correlations (R) of 0.671 and a multiple R-square of 0.541. This indicated that 74.4% (adjusted. R2=0.744) of the variance in students' use of instructional software was accounted for by independent variables when considered together. The significance of the joint contribution was tested at p<0.05, using the F-ratio at the degrees of freedom (df-3/481). The table also shows that the analysis of variance for the regression yielded an F-ratio of 131.617. The above is significant at the level of 0.05. This implies a significant joint contribution of computer self-efficacy, awareness, and availability of instructional courseware to students' use of instructional software.

Table 6: Test of significance of the regression coefficients

Variable	Unstandardized Coefficients		Standardized Coefficients			
Model	(B)	Std. Error	Beta	t	Sig.	Remark (Sig.)
Constant	21.557	2.212	-	9.744	.000	-
Awareness	0.019	0.060	0.133	2.320	.046	P<0.05
Available	0.159	0.037	0.176	4.268	.000	P<0.05
Computer Self-Efficacy	0.863	0.050	0.606	17.393	.000	P<0.05

There was a correlation coefficient of the significant relative contribution of computer self-efficacy, awareness, and availability of instructional courseware to students' use of instructional software. Using the standardised regression coefficient to determine the relative contributions of the independent variables, self-efficacy (β =0.606, t= 17.393, p < 0.05) was the most potent contributor to the prediction, followed by availability (β = 0.176, t= 4.268, p < 0.05) and awareness (β = 0.133, t= 2.320, p < 0.05). This implies that computer self-efficacy, awareness, and the availability of instructional courseware significantly contribute to students' use of instructional software.

Discussion of Findings

These findings have several important implications. First, the high awareness levels suggest fertile grounds for the integration of instructional courseware into formal teaching and learning, particularly when tied to recognised academic goals such as exam preparation. Second, while students demonstrate high awareness, this does not automatically translate to consistent usage, a factor influenced by other variables such as availability and computer self-efficacy, as highlighted in Ashiru (2025). Therefore, institutions must not only promote these tools, but also ensure that they are readily accessible and supported through digital literacy initiatives that enhance students' confidence in using them (Hong, 2018; Umam et al., 2020). This is crucial, especially in environments in which digital inequality and infrastructural limitations persist.

The results revealed a high degree of awareness among the respondents of most instructional courseware systems deployed in pre-higher education. With the mean score for each item consistently exceeding the standard threshold of 2.71, it can be inferred that most respondents were conversant with these digital tools. Several factors might have contributed to this trend. Hence, instructional tools are seamlessly integrated into Learning Management Systems (LMS) or accessed via cloud-based solutions, thereby promoting user interaction and awareness (Alharthi et al., 2015; Khan et al., 2020). In most cases, increased awareness levels are attributable to institutional measures, including workshops, training sessions, and the widespread dissemination of information on these platforms (Fearnley & Amora, 2020). The competitive nature of digital courseware developers and the emphasis on technology-enhanced learning in higher education have likely spurred more robust promotion, resulting in improved student awareness (Regele, 2019; Bankar et al., 2023) and the competitiveness of university entry standardised examinations, which has led to several technology-driven solutions being utilised by tutorial centres and academic coaching agents. The weighted mean of 3.03 across all instructional courseware items indicates that awareness and support are robust across various platforms. Nonetheless, it should be noted that there were differences, such as comparatively lower mean scores for some of the later tools, such as PassNG PUTME (mean =2.71) and UTME CBT (mean =2.87).

The importance of these findings goes beyond availability; they consider the impact on student performance, as well as the adoption of technologies into education. Mohammed et al. (2023) and Iroriteraye-Adjekpovu and Nwabuaku (2024) underscored the importance of retention, grasping concepts, and better performance in exams, aided by proper multimedia and computer-assisted instructional methods. The positive weighted mean in the current study illustrates that instructional spending is beginning to produce benefits in Ibadan's secondary school area. Nonetheless, the low sufficiency of sophisticated courseware indicates the need for additional investigation and innovation in educational technology, particularly in terms of providing equal access to learning tools that encompass all the fundamental academic information (Anunobi et al. 2018).

Furthermore, the availability of instructional courseware ($\hat{I}^2$ = 0.176, t = 4.268, p < 0.05) was also a significant contributor. This means that, irrespective of the student's individual attitude toward self, technology, or technological competencies, the presence of these materials, whether physical or virtual, boosts their chances of use. Such associations fit into the framework, suggesting that ease of access and available-related help make it easier to apply certain technologies (Sehgal et al., 2017). Equally, the variable awareness (β = 0.133, t = 2.320, p < 0.05), albeit the least impactful of the three predictors, had a significant influence, suggesting that, to some degree, knowledge, in terms of

awareness of the existence and operation of the tools, is basic to their application. Students are well informed about the available resources, and this information may motivate them to apply instructional software, a problem noted in other studies dealing with technology use in education (Yang, 2024).

Conclusion and Recommendations

In conclusion, the analysis of the survey data highlights that, for some reason, an overwhelming proportion of respondents from the sample of higher education institutions seemed to possess knowledge of and show appreciation for different types of courseware instructional systems. From the analysis, it is apparent that the mean awareness scores surpassed the benchmark mean (2.71) which is indicative of the already reported widespread issuance and use of instructional materials. The way awareness is measured highlights the importance of promoting and maintaining digital learning tools, so that students and educators can unlock their full benefits. Future work could investigate what, if any, particular elements, such as technological support systems, institutional policies, or user skills enhance or limit awareness. Self-efficacy of computing strongly suggests that providing resources to increase students' confidence in their abilities to use technology will improve the use of technology resources for teaching and learning. Simultaneously, these resources should be made available and promoted to maximise their use and effectiveness in educational outcomes. These conclusions serve to further understand the factors affecting secondary students' technology usage in Ibadan and demonstrate the need for diverse approaches that consider both attitudes and infrastructure in utilising digital resources for teaching and learning. These insights emphasise the importance of continued expansion and refinement of digital instructional materials and recommend that stakeholders in the educational sector consider adopting a more integrated approach to digital resource dissemination to bridge existing gaps. Hence, educators should be trained to effectively utilise courseware in learning environments and ensure equitable access to courseware resources for all students.

References

1) Alharthi, A., Yahya, F., Walters, R., & Wills, G. (2015). An overview of cloud services adoption challenges in higher education institutions. https://doi.org/10.5220/0005529701020109
2) Al-Zahrani, A. (2015). Toward digital citizenship: Examining factors affecting participation and involvement in the internet society among higher education students. International Education Studies, 8(12), 203. https://doi.org/10.5539/ies.v8n12p203
3) Anunobi, A., Njedeka, V., Gambari, G., Isiaka, A., Abdullahi, A., Bashiru, M., … Omotayo, T. (2018). Development and validation of web-based courseware for junior secondary school basic technology students in Nigeria. Journal of Education and Learning (Edulearn), 12(1), 74–83. https://doi.org/10.11591/edulearn.v12i1.5163
4) Ashiru, O. (2025). Modernise curriculum, prioritise education in 2025, educators tell FG. The PUNCH.
5) Atwood, L., Kelleher, R., Richards, M., & Nichols, M. (2023). Reusing distance courseware to enable blended delivery: A New Zealand case study. Open Praxis, 15(1), 37–48. https://doi.org/10.55982/openpraxis.15.1.516
6) Awofala, A., Akinoso, S., Fatade, A. (2017). Attitudes towards computer and computer self-efficacy as predictors of preservice mathematics teachers' computer anxiety. Acta Didactica Napocensia, 10(3), 91–108. https://doi.org/10.24193/adn.10.3.9
7) Balcı, B., Çiloğlugil, B., İnceoğlu, M. (2020). Open courseware-based logic design course. Croatian Journal of Education - Hrvatski Časopis Za Odgoj I Obrazovanje, 22(2). https://doi.org/10.15516/cje.v22i2.3499
8) Bali, B., Garba, E. J., Ahmadu, A. S., Takwate, K. T., Malgwi, Y. M. (2024). Analysis of emerging trends in artificial intelligence for education in Nigeria. Discover Artificial Intelligence, 4(1), 110. 8. Bali, B., Garba, E. J., Ahmadu, A. S., Takwate, K. T., Malgwi, Y. M. (2024). Analysis of emerging trends in artificial intelligence for education in Nigeria. Discover Artificial Intelligence, 4(1), 110.
9) Bankar, M., Bankar, N., Singh, B., Bandre, G., & Shelke, Y. (2023). The role of e-content development in medical teaching: How far have we come? Cureus. https://doi.org/10.7759/cureus.43208
10) Baturay, M., Gökçearslan, Ş., & Ke, F. (2017). The relationship among pre-service teachers' computer competence, attitude towards computer-assisted education, and intention of technology acceptance. International Journal of Technology Enhanced Learning, 9(1), 1. https://doi.org/10.1504/ijtel.2017.084084
11) Bourrie, D., Jones-Farmer, L., & Sankar, C. (2016). Growing the intention to adopt educational innovations: An empirical study. Knowledge Management & E-Learning: An International Journal, 8(2), 22–38. https://doi.org/10.34105/j.kmel.2016.08.003
12) Fearnley, K. & Amora, R. (2020). Learning management system adoption in higher education using the extended technology acceptance model. IAFOR Journal of Education, 8(2), 89–106. https://doi.org/10.22492/ije.8.2.05
13) Getenet, S., Cantle, R., Redmond, P., & Albion, P. (2024). Students' digital technology attitude, literacy and self-efficacy and their effect on online learning engagement. International Journal of Educational Technology in Higher Education, 21(1). https://doi.org/10.1186/s41239-023-00437-y
14) Göksu, İ., Özcan, K., Çakır, R., & Göktaş, Y. (2017). Content analysis of research trends in instructional design models: 1999–2014. Journal of Learning Design, 10(2), 85. https://doi.org/10.5204/jld.v10i2.288
15) Güdek, B. (2019). Computer self-efficacy perceptions of music teacher candidates and their attitudes towards digital technology. European Journal of Educational Research, 8(3), 683–696. https://doi.org/10.12973/eu-jer.8.3.683
16) Hatlevik, I. & Hatlevik, O. (2018). Examining the relationship between teachers' ICT self-efficacy for educational purposes, collegial collaboration, lack of facilitation and the use of ICT in teaching practice. Frontiers in Psychology, 9. https://doi.org/10.3389/fpsyg.2018.00935

17) Hong, S. (2018). English language learners' strategy use and self-efficacy beliefs in English language learning. Journal of International Students, 8(2), 724–741. https://doi.org/10.32674/jis.v8i2.101
18) Iroriteraye-Adjekpovu, J., & Nwabuaku, L. (2024). A comparative study on the effectiveness of traditional and computer-assisted instruction methods in determining students' achievement on graph plotting. EJCEEL, 2(1), 245–252. https://doi.org/10.59324/ejceel.2024.2(1).20
19) Ismail, M., Mgeni, M., Yunus, S., Abdulla, A., & Ahmada, R. (2019). Awareness of open education resources (OER) in higher learning institutions. https://doi.org/10.1007/978-3-030-28764-1_25
20) Kayal, S., & Das, B. (2017). E-learning system of Asia through open courseware (OCW) and educational resources (OER) for universal access to knowledge and information. International Journal of Web-Based Learning and Teaching Technologies, 12(2), 43–54. https://doi.org/10.4018/ijwltt.2017040103
21) Khadimally, S. (2016). Visual design and instructional effectiveness. Sino-US English Teaching, 13(8). https://doi.org/10.17265/1539-8072/2016.08.001
22) Khan, R., Dania, A., Osman, D., & Gettins, D. (2020). Diffusion of innovation: Adoption of learning management system technology in emerging market economies. Accounting and Finance Research, 10(1), 1. https://doi.org/10.5430/afr.v10n1p1
23) Kim, S., & Jeon, J. (2020). Factors influencing eHealth literacy among Korean nursing students: A cross-sectional study. Nursing and Health Sciences, 22(3), 667–674. https://doi.org/10.1111/nhs.12711
24) Lee, M. J. W. (2012). Courseware development for technology-enhanced learning: A critical review of the literature. Educational Technology & Society, 15(3), 84–96. https://www.j-ets.net/ETS/journals/15_3/7.pdf
25) Mejabi, O., Oloyede, M., Azeez, A., & Adedoyin, A. (2016). Analysis of open data in courseware of universities in Nigeria. Malaysian Journal of Distance Education, 17(2), 17–35. https://doi.org/10.21315/mjde2015.17.2.2
26) Mohammed, R., Ameen, K., Bala, A. (2023). Effectiveness of multimedia courseware based instruction on senior school students' retention in linear equation word problems. International Journal of Educational Innovation and Research, 2(2), 167–178. https://doi.org/10.31949/ijeir.v2i2.4700
27) Ofor-Douglas, S. (2020). E-learning practices in higher education in Nigeria. International Journal of Academia 6(1).
28) Ogunsola, K. & Fadoju, V. (2023). Investigating the use of cloud computing services among postgraduate students at the University of Ibadan, Nigeria. Advances in Multidisciplinary & Scientific Research Journal Publication, 11(1), 17–38. https://doi.org/10.22624/aims/digital/v11n1p2
29) Olasunkanmi, I. A. (2017). Development and effects of learner-generated content on postgraduate diploma students' learning outcomes in federal universities in southwestern Nigeria (unpublished thesis). University of Ibadan, Oyo State, Nigeria.
30) Pei, T., Suwanthep, J., Lu, H. (2023). The effect of self-directed online metacognitive listening practice on Chinese EFL learners' listening ability, metacognition, and self-efficacy. Frontiers in Psychology, 14. https://doi.org/10.3389/fpsyg.2023.1285059
31) Pribadi, B. and Chung, K. (2023). Designing online learning: Comparative study between Indonesian Open University and Korea National Open University. International Journal of Instruction, 16(2), 643–660. https://doi.org/10.29333/iji.2023.16234a
32) Salim, K., Abdullah, M., Ali, N., & Ali, R. (2018). Usage of online learning resources among academic staff at a Malaysian university. International Journal of Engineering & Technology, 7(3.30), 1. https://doi.org/10.14419/ijet.v7i3.30.18143
33) Scherer, R., & Siddiq, F. (2015). Revisiting teachers' computer self-efficacy: A differentiated view on gender differences. Computers in Human Behavior, 53, 48–57. https://doi.org/10.1016/j.chb.2015.06.038
34) Sehgal, P., Nambudiri, R., & Mishra, S. (2017). Teacher effectiveness through self-efficacy, collaboration and principal leadership. International Journal of Educational Management, 31(4), 505–517. https://doi.org/10.1108/ijem-05-2016-0090
35) Şeker, M. (2016). Scenario-based instruction design as a tool to promote self-regulated language learning strategies. SAGE Open, 6(4). https://doi.org/10.1177/2158244016684175
36) Senadheera, V., Ediriweera, D., Rupasinghe, T. (2024). Instructional design models for digital learning in higher education: A scoping review. Journal of Learning for Development, 11(1), 15–26. https://doi.org/10.56059/jl4d.v11i1.973
37) Singun, A. J. (2025). Unveiling the barriers to digital transformation in higher education institutions: A systematic literature review. Discover Education, 4(1), 37.
38) Thiruchelvam, P., Chit, M. L., Norkhairi, M. S., & Nabilah, S. (2018). Design and development of instructional courseware for enhancing learning experiences in higher education. International Journal of Emerging Technologies in Learning (iJET), 13(6), 234–247. https://doi.org/10.3991/ijet.v13i06.8467
39) Umam, C., Ushuludin, M., Ningrum, A., Syaifulloh, B., Suci, D. (2020). Metacognitive awareness and self-efficacy: Do they contribute to Indonesian EFL students' listening comprehension? Humanities & Social Sciences Reviews, 8(4), 138–146. https://doi.org/10.18510/hssr.2020.8415
40) Yang, Z. (2024). Examining the relationship between teacher self-efficacy and student engagement in technology-enhanced learning environments. International Journal of New Developments in Education, 6(2). https://doi.org/10.25236/ijnde.2024.060219
41) Yao, X., & Zhao, J. (2022). Chinese mathematics teachers' use of digital technologies for instruction: A survey study. Eurasia Journal of Mathematics, Science and Technology Education, 18(8), em2135. https://doi.org/10.29333/ejmste/12209