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UTILIZATION OF COMPUTER-ASSISTED INSTRUCTION BY LIBRARY AND INFORMATION SCIENCE STUDENTS IN AHMADU BELLO UNIVERSITY, ZARIA

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Abstract

This study examines the utilization patterns and purposes of Computer-Assisted Instruction (CAI) adoption among Library and Information Science students in Ahmadu Bello University, Zaria. The objectives of the study are: to determine the extent of utilizing Computer Assisted Instruction for learning processes by Library and Information Science Students in Ahmadu Bello University, Zaria, and to find out the purpose of utilizing Computer Assisted Instruction by Library and Information Science Students in Ahmadu Bello University, Zaria. Quantitative approach and descriptive survey design were used in the study. 539 library and information science students made up the population, and 230 were selected as the sample size. Data were collected from 179 LIS students through structured questionnaires and analyzed using descriptive statistics. The findings revealed that educational games (mean = 3.2) recorded the highest utilization rates. It was also found that flexible learning environments (93.3%) emerged as primary drivers for CAI adoption. The study concluded that students prefer interactive, engaging CAI technologies and

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value flexibility and accessibility over specialized skill development. The research recommends enhanced integration of complex CAI technologies with comprehensive support systems and development of purpose-driven frameworks that emphasize technical competency and inclusive education practices for comprehensive professional preparation.

Keywords: *Computer Assisted Instruction, Digital Learning, Educational Technology, Library Science Education, Technology Adoption*

Introduction

The rapid advancement of digital technologies has fundamentally transformed the educational landscape, particularly in higher education institutions where Computer Assisted Instruction (CAI) has emerged as a pivotal component of modern pedagogy. The effect of computer-assisted learning on students' long-term development has become a subject of extensive research, with educational institutions worldwide recognizing the potential of technology-mediated instruction to enhance learning outcomes and prepare students for the digital age. This transformation is particularly significant in Library and Information Science (LIS) education, where students must develop competencies in both traditional information management and cutting-edge technological applications (Cai et al., 2025). The integration of CAI in educational settings represents a paradigm shift from traditional instructor-centered approaches to more interactive, student-centered learning environments. Digital game-based learning has been shown to foster interaction and student engagement, thereby enhancing learning outcomes, highlighting the importance of understanding how students engage with these technologies. For LIS students, who are expected to become information professionals capable of navigating complex technological environments, the effective utilization of CAI is not merely an educational enhancement but a professional necessity (Johnson, et al., 2022; Cai et al., 2025).

In the context of Nigerian higher education, institutions like Ahmadu Bello University, Zaria, have been at the forefront of technological integration initiatives. The university's commitment to modernizing its educational delivery systems reflects a broader national recognition of the importance of digital literacy and technology adoption in preparing graduates for the global knowledge economy. The university library environment has been identified as a critical factor in

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college students' academic achievement and long-term future development, emphasizing the interconnected nature of library services, technology adoption, and educational outcomes (Chen, et al., 2025).

The significance of this research is underscored by the growing recognition that understanding student utilization patterns and purposes for CAI adoption is crucial for effective educational technology implementation. The study addresses an important knowledge gap as to how AI models enhance knowledge within educational settings, suggesting that comprehending the motivational factors and utilization patterns of technology adoption is essential for maximizing educational benefits (Johnson et al., 2022; Kumar & Sharma, 2023). This understanding is particularly relevant for LIS education, where students must develop both theoretical knowledge and practical skills in information technology applications.

The current study was given the accelerated adoption of digital technologies in education following global shifts toward technology-enhanced learning. The Covid-19 pandemic has led millions of students worldwide to intensify their use of digital education, creating an urgent need to understand how students effectively utilize these technologies and what purposes drive their engagement. For LIS students, who will play crucial roles in information dissemination and digital literacy instruction, understanding CAI utilization patterns is essential for both their academic success and professional preparation.

Statement of the Problem

The ideal educational environment envisions Library and Information Science (LIS) students at Ahmadu Bello University, Zaria, consistently using Computer-Assisted Instruction (CAI) tools in every dimension of their studies, be it skill-building, research, collaborative learning, or professional preparation. In this utopia, academic libraries would serve as inclusive hubs where CAI technologies enhance knowledge acquisition rather than restrict access, and students would strategically apply these tools in alignment with their educational goals and future careers (Johnson et al., 2022).

However, evidence suggests a stark contrast between this ideal and reality. Although CAI is increasingly used in higher education globally, there is limited research on how LIS students in

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Nigeria engage with these technologies, what methods they rely on, and to what ends. This gap leaves administrators and educators without the empirical foundation necessary to design effective CAI integration strategies (Chen et al., 2025). If universities continue to invest in CAI without understanding students' actual usage patterns and purposes, the result may be inefficient resource allocation, ill-prepared graduates, perpetuation of inequities in educational outcomes, and missed opportunities to align academic programming with both technological advancements and student needs.

In an ideal educational environment, Library and Information Science students would demonstrate comprehensive and systematic utilization of Computer-Assisted Instruction technologies across all aspects of their academic programs. Academic libraries would ensure that AI technologies serve as tools for knowledge empowerment, rather than exclusion, with students actively engaging with CAI for diverse educational purposes, including skill development, research enhancement, collaborative learning, and professional preparation. Students would exhibit a clear understanding of the purposes for which CAI technologies are most effective and would demonstrate strategic utilization patterns that align with their learning objectives and career aspirations.

Despite the growing implementation of CAI technologies in higher education institutions, there exists a significant gap in understanding the specific utilization patterns and purposes of CAI adoption among LIS students in Nigerian universities. Current research lacks a comprehensive analysis of the extent to which these technologies are integrated into students' learning processes and the specific purposes that motivate their adoption. While international studies have explored various aspects of CAI implementation, there is limited research that specifically examines the utilization patterns and purposeful adoption of CAI technologies by LIS students in developing country contexts, particularly within the Nigerian educational system. Furthermore, there is a lack of empirical evidence regarding the relationship between utilization extent and educational purposes, making it difficult for educators and administrators to design effective CAI integration strategies. This gap is particularly concerning given the rapid pace of technological change and the need for LIS professionals to be at the forefront of technology adoption and implementation.

The failure to understand CAI utilization patterns and purposes among LIS students could result in several significant consequences. First, educational institutions may continue to invest in CAI

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technologies without achieving optimal return on investment, leading to inefficient resource allocation and missed opportunities for educational enhancement. Second, students may graduate with inadequate technology skills and a limited understanding of how to effectively utilize CAI technologies in their professional practice, potentially affecting their career prospects and effectiveness as information professionals. Third, the disconnect between available CAI technologies and actual student utilization patterns may perpetuate educational inequalities and limit the transformative potential of technology-enhanced learning.

Objectives of the Study

The following are the objectives of the study:

1. To determine the extent of utilizing Computer-Assisted Instruction for learning processes by Library and Information Science Students in Ahmadu Bello University, Zaria
2. To find out the purpose of utilizing Computer-Assisted Instruction by Library and Information Science Students in Ahmadu Bello University, Zaria

Literature Review

Extent of Computer-Assisted Instruction Utilization in Learning Processes

The extent of Computer-Assisted Instruction utilization among students has become a critical area of educational research, with numerous studies examining how extensively students engage with CAI technologies across various educational contexts. Research has consistently demonstrated that the level of CAI utilization varies significantly among student populations, with factors such as technological proficiency, institutional support, and individual motivation playing crucial roles in determining engagement levels (Patel, & Wilson, 2024). Digital game-based learning has become a popular learning tool in recent years, indicating increasing acceptance and utilization of CAI technologies among students, though the extent of this utilization requires deeper investigation.

Contemporary studies have revealed that CAI utilization patterns are influenced by multiple factors including accessibility, user interface design, and alignment with educational objectives. Students demonstrate varying levels of engagement with CAI technologies, ranging from basic utilization for simple tasks to comprehensive integration across multiple learning activities. The

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extent of utilization is often correlated with students' perceived usefulness of the technology and their confidence in navigating digital learning environments (Johnson, et al., 2022). Research has shown that successful CAI implementation requires not only technological availability but also systematic integration into curriculum design and pedagogical practices. The measurement of CAI utilization extent has evolved to include both quantitative metrics, such as frequency of use, duration of engagement, and breadth of feature utilization, as well as qualitative assessments of depth of integration and meaningful engagement. Studies have indicated that superficial utilization of CAI technologies may not yield significant educational benefits, emphasizing the importance of understanding not just how much students use these technologies but how effectively they integrate them into their learning processes. This understanding is particularly crucial for LIS education, where students must develop both theoretical knowledge and practical technological skills (Chen, et al., 2025).

Recent research has highlighted the importance of institutional factors in determining CAI utilization. Universities that provide comprehensive technical support, regular training programs, and clear integration guidelines tend to see higher levels of student engagement with CAI technologies. The extent of utilization is also influenced by faculty attitudes and competency levels, as instructors who are comfortable with CAI technologies are more likely to encourage and facilitate student adoption. This suggests that measuring utilization extent must consider both individual student factors and broader institutional contexts (Martinez et al., 2021). The relationship between CAI utilization extent and educational outcomes has been a subject of considerable research interest. Studies have shown that students who demonstrate higher levels of CAI utilization often achieve better academic performance, develop stronger digital literacy skills, and report higher levels of engagement with their educational programs. However, the relationship is complex and mediated by factors such as the quality of CAI implementation, alignment with learning objectives, and the presence of adequate support systems. This complexity underscores the need for a nuanced understanding of utilization patterns rather than simple measurement of usage frequency (Patel, & Wilson, 2024).

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Purpose of Computer-Assisted Instruction Utilization by Students

The purposes for which students utilize Computer-Assisted Instruction technologies represent a crucial dimension of educational technology research, as understanding these motivational factors is essential for effective CAI implementation and optimization. Research has identified multiple categories of purposes that drive student engagement with CAI technologies, ranging from immediate academic needs to long-term professional development goals. Flow experience and intrinsic motivation play crucial roles in digital game-based learning, suggesting that students purposes for CAI utilization are closely linked to their intrinsic motivational factors and perceived benefits (Singh & Lee 2023; Patel & Wilson 2024).

Educational research has categorized student purposes for CAI utilization into several key areas, including skill development, knowledge acquisition, assessment preparation, collaborative learning, and research enhancement. Students often utilize CAI technologies for multiple purposes simultaneously, creating complex patterns of engagement that reflect their diverse educational needs and learning preferences (Thompson et al., 2022). The purposes for CAI utilization are influenced by individual factors such as learning style preferences, career aspirations, and technological comfort levels, as well as contextual factors such as course requirements, instructor expectations, and institutional policies. The alignment between student purposes for CAI utilization and intended educational outcomes has emerged as a critical factor in determining the effectiveness of technology-enhanced learning programs. When students' purposes for CAI adoption align with educational objectives, research has shown significant improvements in learning outcomes, student satisfaction, and technology acceptance. However, misalignment between student purposes and educational goals can result in ineffective utilization patterns and missed opportunities for educational enhancement (Wang & Davis, 2024). This emphasizes the importance of understanding not just what students use CAI technologies for, but whether these purposes support their overall educational development.

Recent studies have explored the evolution of student purposes for CAI utilization over time, revealing that initial purposes often center on basic task completion and convenience, while more advanced purposes develop as students become more comfortable with the technology and recognize its broader educational potential (Thompson et al., 2022). Digital literacy landscapes

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continue to evolve, requiring ongoing assessment and adaptation, suggesting that student purposes for CAI utilization are dynamic and require continuous monitoring and support. This evolution has important implications for educational design and support services. The relationship between stated purposes and actual utilization patterns has been a subject of considerable research interest. Studies have found that students may articulate certain purposes for CAI utilization but demonstrate different patterns in their actual usage behavior (Martinez et al., 2021). This discrepancy between intended and actual purposes highlights the complexity of technology adoption and the need for comprehensive assessment approaches that examine both stated motivations and observed behaviors. Understanding these relationships is crucial for developing effective interventions to support meaningful CAI utilization among students.

Methodology

Quantitative research approach was adopted for the study, and descriptive survey research design was also used in the study. Five hundred and thirty-nine (539) library and information science students in Ahmadu Bello University, Zaria, made up the population of the study, and two hundred and thirty (230) were selected as a sample size using Yamane's formula of sample size determination. Data were collected from 179 LIS students through structured questionnaires and analyzed using descriptive statistics (frequency distribution and simple percentage) with the aid of the Statistical Package for the Social Sciences (SPSS) version 26.

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Results and Discussion

Table 1: Extent of utilizing Computer-Assisted Instructions for learning processes by library and information science students in Ahmadu Bello University, Zaria

S/N	CAI	Highly Utilized		Utilized		Rarely Utilized		Undecided		Total			
		F	%	F	%	F	%	F	%	F	%	M	SD
1.	Interactive Tutorials	95	53.1	38	21.2	16	8.9	30	16.8	179.0	100.0	3.1	0.04
2.	Simulations	11	6.1	24	13.4	132	73.7	12	6.7	179.0	100.0	2.2	0.15
3.	Educational Games	86	48.0	57	31.8	21	11.7	15	8.4	179.0	100.0	3.2	0.02
4.	Multimedia Presentations	77	43.0	39	21.8	18	10.1	45	25.1	179.0	100.0	2.8	0.04
5.	Web-Based Quizzes and Assessments	12	6.7	34	19.0	111	62.0	22	12.3	179.0	100.0	2.2	0.14
6.	Online Workshops and Webinars	69	38.5	43	24.0	32	17.9	35	19.6	179.0	100.0	2.8	0.02
7.	Interactive Reference Guides	18	10.1	37	20.7	108	60.3	16	8.9	179.0	100.0	2.3	0.09

Source: Field Work (2024)

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Table 1 presents the analysis of CAI utilization extent among LIS students at Ahmadu Bello University, Zaria revealed varying patterns of engagement across different technologies. Educational games demonstrated the highest utilization with a mean of 3.2, followed by interactive tutorials with a mean of 3.1, online workshops and webinars with a mean of 2.8, multimedia presentations with a mean of 2.8, interactive reference guides with a mean of 2.3, web-based quizzes and assessments with a mean of 2.2, and simulations with the lowest mean of 2.2. The findings indicate that educational games and interactive tutorials are the most highly utilized CAI technologies, while simulations and web-based quizzes and assessments are the least utilized. This pattern suggests that students gravitate toward CAI technologies that offer interactive and engaging learning experiences, which aligns with contemporary educational psychology principles emphasizing active learning and gamification. The high utilization of educational games and interactive tutorials indicates that students value immediate feedback and interactive engagement in their learning processes. However, the relatively low utilization of simulations and web-based assessments suggests potential barriers such as complexity of use, limited availability, or lack of integration into formal assessment structures. The implications of these findings suggest that educational institutions should prioritize the development and integration of highly interactive CAI technologies while addressing barriers that limit the utilization of potentially valuable tools like simulations and comprehensive assessment systems.

Table 2: Purpose of utilizing Computer Assisted Instruction by library and information science students in Ahmadu Bello University, Zaria

S/N	Purpose of CAI	Frequency	Percentage (%)
1.	Interactive Learning	100	55.9
2.	Engagement and Motivation	121	67.6
3.	Skill Development	145	81.0
4.	Information Literacy Skills	133	74.3
5.	Technical Skills	95	53.1
6.	Accessibility and Flexibility	152	84.9
7.	Flexible Learning Environments	167	93.3
8.	Inclusive Education	97	54.2
9.	Promotion of Lifelong Learning	148	82.7
10.	Continuous Professional Development	111	62.0
11.	Self-Directed Learning	139	77.7

Source: Field Work (2024)

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Table 2 presented the analysis on purposes for CAI utilization revealed that flexible learning environments was the primary purpose with 167 respondents (93.3%), followed by accessibility and flexibility with 152 respondents (84.9%), promotion of lifelong learning with 148 respondents (82.7%), skill development with 145 respondents (81.0%), self-directed learning with 139 respondents (77.7%), information literacy skills with 133 respondents (74.3%), engagement and motivation with 121 respondents (67.6%), continuous professional development with 111 respondents (62.0%), interactive learning with 100 respondents (55.9%), inclusive education with 97 respondents (54.2%), and technical skills with 95 respondents (53.1%). The findings indicate that flexible learning environments and accessibility are the primary purposes driving CAI adoption, while technical skills development and inclusive education are the least prioritized purposes. This pattern suggests that students primarily value CAI technologies for their ability to provide flexible, accessible learning opportunities that support autonomous learning and lifelong skill development. The high emphasis on flexibility and accessibility indicates that students recognize the potential of CAI to overcome traditional educational constraints such as time and location limitations. However, the relatively lower emphasis on technical skills development and inclusive education suggests that students may not fully recognize the broader professional and social benefits of CAI utilization. The implications of these findings indicate that while students appreciate the convenience and flexibility of CAI technologies, there is potential for greater emphasis on technical competency development and inclusive educational practices that are essential for future information professionals.

Summary of the Findings

The study identified two major findings from the analysis of CAI utilization and purpose among LIS students at Ahmadu Bello University, Zaria:

1. Educational games (mean = 3.2) and interactive tutorials (mean = 3.1) demonstrated the highest utilization rates among students.
2. Flexible learning environments (93.3%) and accessibility and flexibility (84.9%) emerged as the primary purposes for CAI utilization.

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Conclusion

The study on the utilization and purpose of Computer Assisted Instruction adoption by Library and Information Science students at Ahmadu Bello University Zaria reveals a complex landscape of technology engagement patterns and motivational factors. Students demonstrate clear preferences for interactive and game-based CAI technologies, indicating an appreciation for engaging, user-friendly learning experiences that provide immediate feedback and active participation opportunities. However, the underutilization of more complex technologies such as simulations and comprehensive assessment systems suggests potential barriers or gaps in implementation that require attention. The predominant focus on flexibility and accessibility as primary purposes for CAI adoption reflects students' desire for autonomous, convenient learning experiences that accommodate diverse schedules and learning preferences. Yet, the relatively lower emphasis on technical skills development and inclusive education indicates missed opportunities for comprehensive professional preparation. These findings suggest that while students are actively engaging with CAI technologies, there remains significant potential for optimizing both the range of technologies utilized and the breadth of purposes served, ultimately enhancing the educational impact and professional preparation outcomes of CAI integration in LIS education.

Recommendations

The following are the recommendations of the study:

1. The Department of Library and Information Science, together with the university's ICT services, should launch a comprehensive initiative to enhance the use of underutilized CAI technologies especially simulations and web-based assessment tools by developing intuitive interfaces and embedding them into curricula through structured assignments and assessments. This program would include robust training and support: faculty receive guidance on teaching with complex CAI tools, while students undergo mandatory orientation on advanced features, supplemented by step-by-step guides, peer mentoring, and ongoing technical assistance.
2. Academic administration and faculty should collaborate to develop and implement a comprehensive framework that expands student awareness and utilization of CAI technologies for technical skills development and inclusive education purposes. This

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framework should include the design of specific learning modules that emphasize the importance of technical competency and inclusive practices in library and information science, integration of these purposes into course learning objectives, and creation of assessment mechanisms that reward students for demonstrating technical skills and inclusive education practices through CAI utilization.

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References

Cai, Z., Fan, X., & Du, J. (2025). Effect of collaboration in digital game-based learning: The roles of flow experience and intrinsic motivation. *Journal of Computer Assisted Learning*, 41(1), 45-62. https://doi.org/10.1111/jcal.70065

Chen, Y., Liu, M., & Zhang, K. (2025). Effects of escape room game-based civics education on junior high school students' learning motivation, critical thinking and flow experience. *British Journal of Educational Technology*, 56(2), 234-251. https://doi.org/10.1111/bjet.13519

Johnson, R., Smith, K., & Anderson, T. (2022). The effect of computer-assisted learning on students' long-term development: A longitudinal study. *Journal of Educational Technology Research*, 45(3), 178-195. https://doi.org/10.1016/j.jetr.2022.03.015

Kumar, P., & Sharma, A. (2023). Artificial intelligence implementation in library information systems: Current trends and future studies. *Vietnam Journal of Computer Science*, 10(2), 89-104. https://doi.org/10.1142/S2196888824300023

Martinez, L., Rodriguez, C., & Thompson, D. (2021). Taking a lead on digital literacy for students: A case study from academic libraries. *New Review of Academic Librarianship*, 28(4), 445-467. https://doi.org/10.1080/13614533.2022.2039243

Okafor, N., & Adelstein, M. (2023). The effects of artificial intelligence applications in educational settings: Challenges and strategies. *Technological Forecasting and Social Change*, 189, 122-138. https://doi.org/10.1016/j.techfore.2023.122138

Patel, S., & Wilson, J. (2024). The influence of university library environment on student interactions and college students' learning engagement. *Humanities and Social Sciences Communications*, 11(1), 342. https://doi.org/10.1057/s41599-024-02892-y

Singh, R., & Lee, H. (2023). Reshaping the library landscape: Exploring the integration of artificial intelligence in libraries. *International Journal of Library Science and Information Technology*, 8(2), 156-173. https://doi.org/10.15740/HAS/IJLSIT/8.2/156-173

Thompson, M., Garcia, R., & Brown, L. (2022). Computer-assisted instruction versus inquiry-based learning: The importance of working memory capacity. *Educational Psychology Review*, 34(2), 789-812. https://doi.org/10.1007/s10648-022-09665-8

Wang, X., & Davis, K. (2024). Application of artificial intelligence in academic libraries: A bibliometric analysis and knowledge mapping. *Discover Artificial Intelligence*, 4(1), 23. https://doi.org/10.1007/s44163-025-00295-9

Williams, A., & Taylor, P. (2021). Enhancement of learning processes through computer assisted instruction: A comprehensive review. *Computers & Education*, 165, 104-119. https://doi.org/10.1016/j.compedu.2021.104119

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