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AN APPRAISAL OF INFORMATION TECHNOLOGY STUDENTS' PERCEPTION AND USE OF CLOUD COMPUTING IN CENTRAL LIBRARY, HASSAN USMAN KATSINA POLYTECHNIC, KATSINA

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ABSTRACT

This study aimed to assess how information technology students at Musa Abdullahi Central Library, Hassan Usman Katsina Polytechnic (HUKPOLY), perceive and use cloud computing. Based on the Technology Acceptance Model (TAM), the objectives of the study are to examine perceived Usefulness, ease of use, actual usage, and barriers to adoption of cloud computing among IT students. The study employed a survey research design, using a questionnaire; a random sample of 234 students was selected, including 107 from National Diploma II (ND II) and 127 from Higher National Diploma II (HND II) majors in Computer Science, Library and Information Science, and Office Technology and Management. These students were initially selected from the total population of 275 students using the Krejcie and Morgan table. A four-point Likert scale was used, with a mean of 2.50 being the cutoff score. The data were analyzed using descriptive statistics. Students found cloud computing useful and easy to use, with an overall average of 2.89 for both criteria. The main benefits were faster access to course materials and improved academic performance. Students appreciated the ease of use and user-friendliness of platforms like Google Drive and OneDrive. However, the "Anytime Access" feature received a low rating, suggesting that the infrastructure limits flexibility. Actual usage was relatively high. Students frequently used cloud computing services for electronic resources and file storage, particularly for individual assignments and collaboration features, however, file sharing for group work and Google Docs editing were below the minimum standard. The most significant obstacles were related to infrastructure: a lack of personal devices, weak internet connectivity, and power outages.

Privacy concerns are insignificant obstacle. The study concludes that while there are positive perceptions and individual use, device availability, connectivity, and power limitations hinder full adoption, particularly for collaboration. HUKPoly should prioritize bandwidth upgrades, device lending or bring-your-own-device (BYOD) policies, stable power alternatives, and training on collaboration tools.

KEYWORDS: Appraisal, Cloud Computing, Technology Acceptance Model, IT students, Academic Library, Obstacles, HUKPOLY.

1. INTRODUCTION

Cloud computing has revolutionized information services in academic libraries, providing instant access to data storage, software applications, and collaboration tools without requiring extensive on-site infrastructure. For students in information and technology (IT) fields, platforms like Google Drive, OneDrive, and Google Scholar offer practical opportunities for rapid access to academic resources, real-time project collaboration, and participation in remote learning activities. In the context of the Hassan Usman Katsina Polytechnic Central Library, the integration of cloud computing is expected to reduce physical constraints that hinder access to information and enhance student productivity and academic efficiency.

Despite these potential benefits, it remains unclear how students actually perceive the usefulness and ease of use of these platforms, and to what extent they integrate them into their daily academic tasks. Therefore, understanding student perceptions, actual usage patterns, and the challenges that impede effective adoption is crucial. This insight will enable the library to make informed decisions regarding service improvements, infrastructure investments, and targeted digital literacy programs that better meet students' educational needs.

Statement of the Problem

Despite the increasing availability of cloud computing services in academic libraries, research conducted in Nigerian higher education institutions reveals a persistent gap between the accessibility of these technologies and their effective use in academic collaboration and productivity. Preliminary findings from the Hassan Usman Katsina Polytechnic Central Library point to a similar pattern: students find cloud computing platforms useful for accessing and storing academic materials, but their use for group work, research collaboration, and other advanced academic tasks remains limited.

Several factors appear to contribute to this limited use. Unstable Internet connectivity, concerns about data privacy and security, and inadequate access to suitable devices all present practical barriers to regular and effective use. If these challenges are not systematically studied and addressed through empirical evidence, the library risks failing to fully leverage its cloud infrastructure. Consequently, it may be unable to meet the digital learning requirements of IT students, thus limiting the overall impact of its digital transformation efforts.

Objectives of the Study

This research aims to assess how IT students at the Hassan Usman Katsina Polytechnic (HUKPOLY), Musa Abdullahi Central Library perceive and utilize cloud computing in their academic activities. It seeks to provide a comprehensive understanding of students' attitudes toward cloud computing platforms and the extent to which these tools are integrated into their learning processes within the library environment.

Specifically, the research aims to achieve four main objectives. First, it will assess the perceived usefulness of cloud computing among IT students, focusing on whether they view these platforms as beneficial for accessing resources, completing assignments, and improving academic performance. Second, it will determine the perceived ease of use by examining how easily students can use and apply cloud computing services without requiring extensive technical support. Third, it will investigate the actual use of cloud computing services for academic purposes, including tasks such as file storage, document sharing, project collaboration, and research. Finally, it will identify the barriers that limit the effective use of cloud computing in the library environment, such as infrastructure limitations, technical challenges, and concerns related to privacy and reliability.

Significance of the Study

The findings of this study will be significant to several stakeholders. For HUKPoly Library management, the study provides empirical evidence on which infrastructure and training gaps to prioritize to improve cloud service delivery and user satisfaction. For academic librarians, it highlights the role of digital literacy and faculty-library collaboration in moving students from passive storage use to active collaboration and knowledge creation. For polytechnic administrators and policymakers, the results offer guidance on investment in Internet reliability, backup power, and data security policies to support digital learning. For students, improved cloud adoption can enhance access to resources, assignment quality, and collaborative learning. Finally, the study adds to the growing body of literature on cloud

computing adoption in Nigerian polytechnics and can serve as a reference for similar institutions facing infrastructural and skills challenges.

2. Literature Review

Cloud Computing in Academic Libraries

Cloud computing is a model that provides immediate and widely available network access to a shared pool of configurable computing resources, such as servers, storage, applications, and services, which can be deployed quickly and with minimal administrative effort. In academic libraries, this model transforms service delivery from locally managed infrastructure to scalable, web-based platforms. Adopting cloud computing enables libraries to reduce capital expenditure on hardware, improve data accessibility, and support collaborative academic activities [10], [1].

Globally, academic libraries use cloud computing services for digital repositories, integrated library systems, data backups, and user-centric tools such as Google Scholar, Google Drive, and YouTube. A survey of university libraries in Africa showed that librarians primarily use cloud computing technologies for file storage and sharing, conducting user satisfaction surveys, online document editing, and providing virtual reference services. In Nigeria, however, adoption rates remain low. Studies indicate that many academic libraries have not yet implemented cloud computing, resulting in service deficiencies, difficulties accessing information, and delays in disseminating information resources [3], [1].

This low adoption rate is attributed to the absence of clear institutional policies, the lack of validation procedures from cloud service providers, and limited awareness among library staff. At Hassan Usman sman Katsina Polytechnic, preliminary observations suggest similar patterns: students use cloud platforms for basic tasks such as accessing and storing materials, but deeper integration with academic workflows remains limited [1].

Perceived Usefulness

Perceived utility is defined as "the extent to which a person believes that using a particular system will improve their job performance." In educational settings, perceived utility reflects students' belief that cloud computing improves their ability to access resources, complete tasks, collaborate with peers, and enhance their academic performance [9].

Empirical evidence supports this relationship. A study of students at a South African higher education institution found that over 65% of participants struggled to use virtual labs due to a lack of skills. However, those who perceived cloud computing technologies as valuable were

more likely to use them for coursework. The study indicated a strong and statistically significant relationship between perceived ease of use and perceived value, demonstrating that positive experiences reinforce perceived utility [6].

In Bangladesh, research on librarians' perceptions of cloud computing revealed that participants viewed cloud computing applications as useful for backup, data sharing, and collaborative research. For IT students, the perceived benefit is particularly important because cloud computing platforms align with their technical background and educational needs. Tools such as Google Drive, OneDrive, and GitHub provide real-time collaboration, version control, and remote access, directly supporting project-based learning [5].

Perceived Ease of Use

Perceived ease of use (PEOU) refers to "the degree to which a person believes that using a particular system will be easy and effortless." This concept influences both perceived ease of use and the behavioral intention to use technology. If students find cloud computing platforms difficult to use, they are unlikely to use them, regardless of their potential benefits [9].

Studies indicate that technical complexity and a lack of training are major barriers. In South Africa, 89% of respondents indicated that they could learn more through hands-on experience with cloud computing technologies, but many struggled due to a lack of skills. This demonstrates that ease of use is determined not only by user interface design but also by prior experience and training [6].

In academic libraries, ease of use is affected by the availability of support staff, user guides, and a stable internet connection. Research conducted on librarians in Africa has found that inconsistent staff training and a lack of cloud computing knowledge are significant challenges. For IT students, the perceived ease of use may be higher than for non-technology users, but inconsistent infrastructure can negate this advantage. If students experience frequent login failures, slow loading speeds, or confusing permission settings, their perception of ease of use will suffer [3].

Actual Use of Cloud Computing

Actual use refers to the extent to which individuals integrate cloud computing services into their academic activities. Common uses include file storage, document sharing, collaborative editing, remote access to databases, and participation in e-learning platforms.

Despite positive perceptions, actual use in African academic libraries remains limited. A study at the University of Dar es Salaam found that librarians are aware of cloud computing and have positive attitudes toward it, but their application is largely limited to basic storage and sharing. Similarly, research in Nigeria shows that while students acknowledge the benefits of cloud computing, they rarely use it for advanced tasks such as collaborative programming, data analysis, or joint research projects [8], [4].

This gap between perception and use is significant for IT students at Hassan Usman Katsina Polytechnic, Katsina. These students are expected to leverage cloud computing platforms for software development, data management, and collaborative projects. The low actual use undermines their technical training and diminishes the library's role as a center for digital learning. Factors influencing actual use include behavioral intention, facilitating conditions, and social influence, as illustrated in the extended TAM and UTAUT models [7].

Barriers to Implementing Cloud Computing

The barriers to cloud computing adoption in developing countries are well-documented. A systematic review of 57 studies published between 2013 and 2025 identified infrastructure readiness, regulatory compliance, financial constraints, and digital literacy as the most significant obstacles. In Africa, specific challenges include: [2], [3].

Poor Internet connectivity: Unstable bandwidth disrupts access to cloud services and discourages regular use.

Data privacy and security concerns: Users worry about unauthorized access, data loss, and monopolization by service providers.

Lack of funding and infrastructure: Many libraries lack the resources to purchase hardware, maintain power supplies, and subscribe to premium cloud computing services.

Limited digital literacy and training: Without adequate training, both staff and students cannot fully utilize the available features.

Lack of Policy Frameworks: The absence of clear guidelines on data management and cloud provider selection creates uncertainty.

In Nigeria, additional obstacles include irregular power outages and technophobia among staff. For students, device availability and data costs present further barriers to regular use. If these obstacles are not empirically documented and addressed, libraries risk failing to fully leverage cloud infrastructure and meet the digital learning needs of IT students [4], [1].

Theoretical Based of Cloud Computing Implementation and Use.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is the most widely used framework for studying user acceptance of information systems. Developed by Davis in 1989, it posits that two beliefs—perceived usefulness and perceived ease of use determine an individual's attitude toward using a system, which in turn influences behavioral intention and actual use. The TAM is simple and has been validated in multiple contexts, including e-learning, electronic library systems, and cloud computing.[9] In the context of cloud computing, the TAM has been extended to include concepts such as perceived security, trust, and enabling conditions. A study employing a multi-theoretical perspective found that attitude, self-criteria, and perceived behavioral control directly influence behavioral intention to use cloud computing applications, while beliefs about risk, benefits, vendor reputation, and skills transfer have indirect effects. For students at Hoke Polytechnic University, the Technology Acceptance Model (TAM) provides a basis for examining how perceived utility and ease of use influence their use of cloud computing platforms in the library [7].

Technology Organization Environment (TOE) Framework

The Technology Organization Environment (TOE) framework explains technology adoption at the organizational level by considering technological, organizational, and environmental contexts. A hybrid model combining the TOE and TAM frameworks was developed for academic libraries in Northeast Nigeria to examine factors such as comparative advantage, compatibility, fear of technology, government regulations, and competitive pressures [4].

This framework helps in understanding why Hassan Usman Katsina Polytechnic Library (HUKPoly) supports or does not support cloud computing adoption. Organizational factors, such as leadership support and IT infrastructure, and environmental factors, such as government policies and Internet availability, interact with technological characteristics to influence outcomes [4].

The Socio-Technical Adoption Model

Recent studies suggest that cloud computing adoption should be viewed as a socio-technical activity in which human, organizational, and technological elements evolve together. A systematic review of 186 articles concluded that differences in digital literacy, infrastructure capabilities, and government influence in developing countries significantly impact adoption outcomes [2].

This model is relevant to Hassan Usman Katsina Polytechnic because it captures the interplay between students' technical skills, the library's infrastructure, and external constraints such as Internet quality. It supports a holistic approach to intervention design rather than focusing solely on individual perceptions.

Gaps in the Literature

1. Focus on Librarians rather than Students: Most empirical studies in Nigeria focus on librarians' perceptions and behaviors in using library services. While librarians are key intermediaries, students are the primary end users of these services. The perceptions of IT students in polytechnic libraries, their actual use of these services, and the barriers they encounter remain under-researched. This leads to a gap in understanding how to design services to meet the needs of information technology learners [3], [8].

2. Inconsistent Findings on Adoption Determinants: There is no consensus on the most influential factors affecting cloud computing adoption in Nigeria. Some studies emphasize infrastructure and connectivity as major barriers, while others highlight organizational support, trust, and policies as more important. The relative importance of these factors has not been tested in the polytechnic setting [1], [3], [4].

3. Perception-Usage Gap: A recurring finding is that positive perceptions do not translate into advanced use of cloud computing tools. Students may recognize the benefits of cloud computing platforms, but their use is limited to basic storage due to certain barriers. The mechanisms underlying this gap whether technical, motivational, or contextual require further investigation [8].

4. Lack of Contextual Evidence:

Most studies were conducted at universities in southern Nigeria or other African countries. Libraries at polytechnics and institutes in northern Nigeria operate under different resource constraints, with different student demographics and institutional priorities. The findings of studies in other contexts may not be directly applicable to HUKPOLY Polytechnic [3], [5].

5. Methodological Limitations: Many studies rely on descriptive surveys with small samples and limited theoretical foundations. Few employ mixed methodologies to observe quantitative patterns and qualitative interpretations of user behavior. Without a robust methodology, it is difficult to design evidence-based interventions [1], [8].

Studies indicate that cloud computing has the potential to revolutionize academic library services; however, its adoption among Nigerian technical institute students faces infrastructure, technology, and human resource constraints. The Technology Acceptance Model (TAM) and the Usability Theory (TOE) provide robust theoretical frameworks for examining expected utility, expected usability, and actual usage. Nevertheless, gaps remain in understanding the specific experiences of IT students at Hoc Bole University. Addressing these gaps will contribute to more effective digital literacy programs, infrastructure planning, and library policy development [1], [2], [4], [9].

3. METHODOLOGY

A survey research design was adopted for this study. This design is suitable because it allows the researcher to collect quantitative data from a large number of respondents within a short period and provides a clear picture of the perceptions, ease of use, actual use, and barriers related to cloud computing among students majoring in information technology [11]. The study population consisted of students from three departments at Hassan Usman Katsina Polytechnic: Computer Science (COM), Library and Information Science (LIS), and Office Technology and Management (OTM). Only second-year National Diploma II (ND II) and second-year Higher National Diploma II (HND II) students were targeted, given their sufficient experience with library services and academic activities that require digital tools. The total number of students in the three departments was 275.

A multi-stage sampling technique was used. In the first stage, the departments were categorized as Computer Science, Library and Information Science, and Office Technology and Management to ensure representation of the various fields within information technology. In the second phase, purposive sampling was used to select second-year National Diploma II (ND II) and Higher National Diploma II (HND II) students from each department, as they represent the most experienced student group. Sample size was determined using the Krejcie and Morgan table. This table is a widely accepted reference in social science research for determining appropriate sample sizes from a known population at a 95% confidence level and a 5% margin of error. Based on this table, a sample of 234 students was selected from a total of 275 students. Table 1 shows the distribution of students and the sample across departments [12].

Table 1: Population and Sample Size Distribution.

S/N	Departments	Population	Sample
1	COM.	HND 2 104 ND2 68	80 59
2	LIS.	HND 229 ND2 47	28 40
3	OTM	HND 222 ND2 08	19 08
4	Total	275	234

Source: Field survey, 2025

A structured questionnaire was chosen as the primary data collection tool. The questionnaire was divided into two sections: Section A for demographic information and Section B for items measuring perceived usefulness, perceived ease of use, actual use, and barriers to cloud computing. A four-point Likert scale was used to ensure definitive responses from participants. The data collected in the field will be analyzed using descriptive statistics. Frequency tables and percentages will be used to present demographic characteristics. The mean score for each dimension will be calculated to determine the degree of agreement with the statements. A mean of 2.50 will be used as the cutoff for the four-point scale to determine acceptance or rejection of each item.

4. RESULTS

234 questionnaires was distributed to collect data on "Perception and Use of Cloud Computing by IT-related Students at HUKPoly Central Library" and 172 represents 73.50% of the responses retrieved. Decision rule: Mean ≥ 2.50 = Agree/Accepted; while Mean < 2.50 = Disagree/Rejected.

Demographic Characteristics

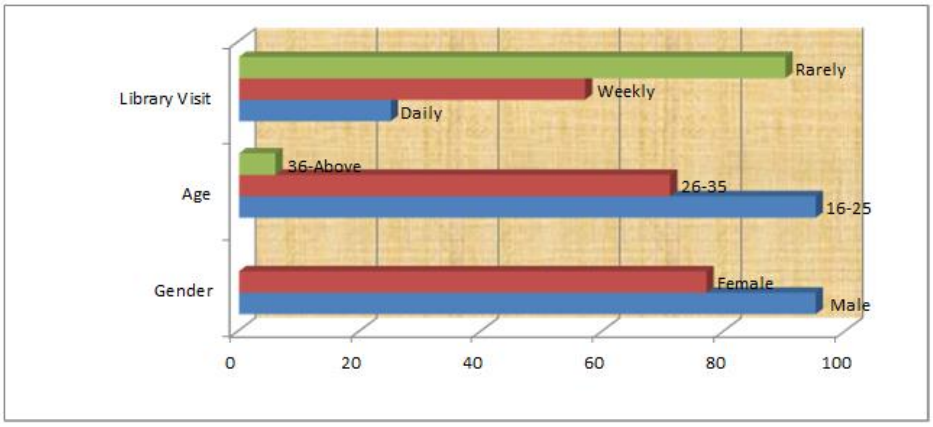


Figure 1: Demographic Characteristics.

In terms of gender, 95 participants (55.2%) were male, while 77 participants (44.8%) were female, indicating slightly higher male participation with a notable female presence. Regarding age distribution, the majority of participants (95, 55.2%) were in the 16-25 age group, suggesting they were mostly young undergraduate students. This was followed by the 26-35 age group (71, 41.3%), indicating a significant number of graduate and older students, while only 6 participants (3.5%) were 36 years of age or older. As for library frequency, only 25 participants (14.5%) reported visiting the library daily, and 57 participants (33.1%) reported visiting it weekly, while the majority (90, 52.3%) indicated they rarely visited the library for academic purposes. This pattern indicates a decrease in reliance on the physical library, as most students are likely to depend on alternative resources such as electronic or cloud platforms for their academic activities.

Perceived Usefulness of Cloud Computing

Table 2: Perceived Usefulness.

S/N	Statements	Mean	Decision
1	Cloud computing helps me access course materials more quickly at the HUKPoly Library.	3.22	AgreedHigh usefulness
2	Using cloud services improves my academic performance on assignments and projects.	3.15	AgreedHigh usefulness
3	Cloud computing makes it easier to collaborate with my classmates on coursework.	2.85	Agreed Moderate usefulness
4	I can store and retrieve my course materials at any time using cloud platforms.	2.30	Disagreed Low usefulness
5	Overall, cloud computing is beneficial for my learning activities in the library.	2.92	Agreed Moderate usefulness

Source: Field survey, 2025

The analysis shows that IT students at HUKPoly Library generally perceive cloud computing as beneficial to their academic activities, with an overall average score of 2.89, exceeding the minimum threshold of 2.50 on a four-point Likert scale. Specifically, participants agreed that cloud computing helps them access course materials more quickly in the library (average = 3.22) and that using cloud services improves their academic performance on assignments and projects (average = 3.15), indicating a high level of perceived benefit. They also agreed, albeit moderately, that cloud computing facilitates collaboration with classmates (average = 2.85) and is generally beneficial to their learning activities in the library (average = 2.92). However, respondents disagreed with the idea of being able to store and retrieve course materials at any time using cloud platforms (average = 2.30), reflecting low interest and indicating that issues such as Internet connectivity or device access still limit "anytime" use.

Perceived Ease of Use of Cloud Computing

Table 3: Perceived Ease of Use.

S/N	Statements	Mean	Decision
1	Learning to use cloud computing platforms is easy for me.	3.12	Agreed High EOU
2	I find it easy to use cloud computing services like Google Drive, OneDrive, and others	3.40	Agreed High EOU
3	I can use cloud computing in my academic work without needing extensive technical support.	2.67	Agreed Moderate EOU
4	Interacting with cloud computing platforms doesn't require much mental effort	2.55	Agreed Moderate EOU
5	Cloud computing services are easy to use for IT students like me.	3.72	Agreed High EOU

Source: Field survey, 2025

Table 3 presents data on the ease of use of cloud computing, according to a four-point Likert scale (number of participants = 172), with a mean score of 2.50. All five items exceeded this mean, resulting in an overall mean score of 2.89. This indicates that participants generally agree that cloud computing platforms are easy to use for academic purposes. Item 10 received the highest mean score of 3.72, demonstrating that students strongly agree that cloud services are easy for IT students to use, reflecting their technical confidence. Items 7 (mean 3.40) and 6 (mean 3.12) both confirm that popular tools like Google Drive and OneDrive are easy to use and require minimal learning, likely due to their simple interface and widespread use. Items 8 and 9 scored low but acceptable averages of 2.67 and 2.55, respectively, indicating students' agreement that cloud computing can be used with minimal technical support and mental effort, despite the possibility of some minor challenges related to troubleshooting or advanced features. The overall average of 2.89 underscores the high perceived ease of use among IT students at Hook Poly University Library. This aligns with the technology acceptance model, which states that perceived ease of use increases the intention to adopt. Therefore, technical complexity is not a significant barrier; students are more likely to integrate cloud computing tools into their academic work because they find them accessible and easy to use.

Actual Use of Cloud Computing

Table 4: Actual usage.

S/N	Statements	Mean	Decision
11	I use cloud computing to store my academic files and documents.	3.14	Often
12	I use cloud computing platforms to share files and work on group projects.	2.45	Rarely
13	I use cloud computing services to access electronic resources in the library.	3.40	Often
14	I use cloud computing tools such as Google Docs for collaborative project editing.	2.35	Rarely
15	I use cloud computing services for academic purposes while at the HUKPOLY. 2.55	2.55	Often

Source: Field survey, 2025

Table 4. Shows the actual use of cloud computing among 172 IT students at Hook Polytechnic University Library, based on a four-point Likert scale with a mean interval of

2.50. The overall mean of 2.78 indicates that students, in general, use cloud computing "often" in their academic activities. Item 13 recorded the highest mean of 3.40, indicating that students frequently use cloud computing services to access e-books, journals, and other electronic library resources. This reflects a significant shift toward the use of digital resources and suggests that cloud computing platforms are becoming a primary channel for retrieving academic materials outside of physical shelves. Item 11, with a mean of 3.14, also indicate frequent use of cloud storage for academic files and documents. The high scores on these two items indicate that personal storage and access to resources are the most common forms of cloud computing use among participants. Item 15 averaged 2.55, slightly above the minimum threshold, indicating that students frequently use cloud computing services for academic purposes while at HUKPoly Library. This suggests that the library environment provides the necessary infrastructure and connectivity to encourage the use of cloud computing within the library for study, research, and assignments.

In contrast, items 12 and 14 scored below the minimum threshold, averaging 2.45 and 2.35, respectively. Participants rarely use cloud computing platforms for file sharing and group projects, and they also rarely use tools like Google Docs for collaborative editing. The low scores for collaboration functions indicate that cloud computing-based collaborative work activities are not yet widely used. This may be due to a preference for in-person group meetings, limited training on collaboration features, or a weak institutional focus on cloud-based collaborative work. In summary, the overall average of 2.78 confirms a relatively high level of actual cloud computing use among participants. Students have heavily adopted cloud computing tools to meet their individual academic needs, such as storage and access to digital resources, but their collaborative use remains limited. The findings indicate that despite the widespread adoption of cloud computing, more guidance and institutional support are needed to improve student engagement with its collaborative features in group projects and shared assignments.

Barriers to Effective Use of Cloud Computing

Table 5: Barriers to Effective Utilisation.

S/N	Statements	Mean	Decision
16	Poor Internet connectivity at the HUKPoly Library limits my use of cloud computing.	3.57	Major Barrier
17	Frequent power outages make it difficult to access cloud services consistently.	3.20	Barrier
18	My concerns about data privacy and security prevent me from fully utilizing cloud platforms.	1.44	Not a Barrier
19	The lack of personal devices such as laptops/smart phones hinders my use of cloud computing.	3.82	Major Barrier
20	Insufficient training and technical support limits my effective use of cloud services in HUKPOLY library.	2.63	Barrier

Source: Field survey, 2025

Table 5 presents the barriers to effective cloud computing use among 172 IT students at HUKPoly Library. The analysis is based on a four-point Likert scale. A mean of 2.50 was used as the cutoff for barrier levels. The overall mean of 2.93 indicates that the barriers are generally considered to be significant obstacles to the effective use of cloud computing for academic purposes.

Item 19 recorded the highest mean of 3.82, classifying it as a major barrier. This demonstrates that a lack of personal devices, such as laptops and smartphones, significantly hinders students' use of cloud computing. Because cloud computing platforms require individual access points, limited device ownership restricts students' ability to interact with academic content outside of university facilities. Item 16, with an average score of 3.57, is also a significant barrier. Survey participants indicated that poor Internet connectivity at HUKPoly Library limits their use of cloud services. The high scores in both items highlight infrastructure and accessibility as the most significant barriers to cloud computing adoption. Item 17 averaged 3.20, indicating that frequent power outages hinder regular use of cloud computing. Unstable electricity supply disrupts Internet access and reduces students' confidence in relying on cloud platforms to complete their academic activities on time. Item 20, with an average score of 2.63, is slightly above the threshold and shows that inadequate training and technical support also pose a barrier. While less severe than infrastructure issues, the average score suggests that many students still lack the skills or guidance necessary to effectively utilize cloud computing features and resolve basic problems within the library environment.

In contrast, Item 18 averaged 1.44, below the minimum threshold, and was classified as "not a barrier." This indicates that concerns about data privacy and security do not prevent students from using cloud platforms. The low score may reflect high trust in cloud service providers, limited awareness of security risks, or IT students prioritizing access and functionality over potential privacy threats. In summary, the overall average of 2.93 confirms that barriers to cloud computing use are relatively high among participants. The most significant challenges are related to infrastructure: a lack of personal devices, poor Internet connectivity, and unreliable power supply. Training and support are considered secondary barriers, while data privacy concerns are not a determining factor. The findings suggest that addressing infrastructure gaps and enhancing institutional support would improve student use of cloud computing at HUKPOLY Library.

DISCUSSION OF FINDINGS

Table 2 indicates that IT students at HUKPoly Central Library generally perceive cloud computing as beneficial for academic activities, with an overall average score of 2.89, exceeding the 2.50 threshold on a four-point Likert scale. This supports the technology acceptance model, which asserts that perceived usefulness is a key factor in determining users' intention to adopt and continue using technology. The highest average score was recorded for "Cloud computing helps me access course materials more quickly in the library" (3.22), followed by "Using cloud services improves my academic performance on assignments and projects" (3.15). This suggests that speed of access and academic performance are the most prominent perceived benefits for students. This finding corroborates Al-Omran et al., who reported that students view cloud learning tools as useful for enhancing learning efficiency and academic achievement. Similarly, the moderate agreement that “cloud computing facilitates collaboration with classmates” (2.85) and “in general, cloud computing usefulness my learning activities in the library” (2.92) aligns with the observations of Besen and Ozdamli, who noted that cloud computing platforms such as Google Drive and OneDrive enhance peer interaction and teamwork in academic settings [9][13][14]. However, the low average score for the statement “I can store and retrieve my study materials at any time using cloud computing platforms” (2.30) suggests that students do not perceive cloud computing as a means of flexible and readily available access. This finding contradicts Fatima et al., who found high availability and flexibility of cloud computing services among university students, but it is consistent with Shigona et al., who attributed limited access to cloud computing services in developing countries to poor internet connectivity, unreliable power supplies, and inadequate infrastructure in academic institutions. The restriction in "access anytime" indicates that while students recognize the academic benefits of cloud computing, HUKPoly's infrastructure limitations still hinder its full use outside of library hours [15], [16].

Table 3 presents overall average of 2.89, which exceeds the minimum threshold of 2.50, indicates that IT students at HUKPoly Library generally view cloud computing platforms as easy to use for academic purposes. This finding aligns with the Davis Technology Acceptance Model, which asserts that perceived ease of use significantly influences behavioral intent and actual system usage. When users perceive technology as requiring minimal effort, barriers to adoption decrease and the intent to use it increases [9]. Item 10 recorded the highest average of 3.72, demonstrating that respondents strongly agree that cloud computing services are easy

to use for IT students. This result is expected, as IT students typically possess a basic understanding of digital technology and prior experience using software tools, which enhances their confidence in using new platforms. Item 7, with an average of 3.40, confirm that popular cloud computing services such as Google Drive and OneDrive are considered easy to use. This high rating likely stems from its intuitive interface, accessibility across various devices, and broad integration into academic workflow. Similarly, Item 6, with an average score of 3.12, indicates that learning to operate cloud computing platforms is not a major challenge, suggesting a short learning period for novice users. This supports the findings of Sabi et al., who reported that higher education students adopt cloud computing tools more quickly when the user interface is simple and training requirements are minimal [13], [17], [18].

However, Items 8 and 9 scored relatively lower, but still acceptable, averages of 2.67 and 2.55, respectively. While students agree they can use cloud computing with minimal technical support and mental effort, the lower scores compared to Items 6, 7, and 10 suggest some remaining challenges. These challenges may include occasional troubleshooting difficulties, file synchronization errors, or difficulty using advanced features without guidance. This observation aligns with the study by Bhuwasiri et al., who noted that even when learners perceive an e-learning system as user-friendly, inadequate institutional technical support can create minor barriers to full adoption. Moderate agreement on independence from support suggests that, despite the competence of HOK Polytechnic students, immediate access to technical assistance would further enhance their experience [19]. Overall, the level of usability is considered high among technical students at the HUKPoly Library. The overall average of 2.89 confirms that this group does not perceive cloud computing platforms as technically complex. Strong agreement on general usability, coupled with moderate agreement on self-sufficiency, indicates that usability is not a major barrier to adoption. This finding complements previous results on perceived utility and reinforces the argument that both concepts together support the acceptance of cloud computing for academic activities, consistent with the Technology Acceptance Model [9].

Table 4 presents data on the actual use of cloud computing among IT-related students at HUKPoly Library. Item 13 recorded the highest mean of 3.40, indicating that students often use cloud services to access eBooks, journals, and other electronic resources in the library. This reflects the growing dependence on digital library resources and the role of cloud

infrastructure in extending access beyond physical collections. The finding aligns with Park and Kim, who reported that students adopt cloud-based library services mainly for resource retrieval because it offers convenience, remote access, and instant availability of materials. Item 11, mean 3.14, also shows frequent use of cloud storage for academic files and documents. The high ratings on these two items confirm that personal storage and resource access are the dominant forms of cloud usage, consistent with earlier studies that found students prioritize cloud tools for individual productivity tasks [20], [18], [21]. Item 15, mean 2.55, reveals that students often use cloud services for academic purposes while at the HUKPoly Library. This suggests that the library's network infrastructure and study environment support on-site cloud usage. The result agrees with Alharthi et al., who noted that institutional provision of reliable Internet and digital facilities encourages students to use cloud services within academic spaces [22].

In contrast, Items 12 and 14 had means below the cut-off at 2.45 and 2.35 respectively. Respondents rarely use cloud platforms for file sharing and group projects, or Google Docs for collaborative editing. The low scores indicate that collaborative features remain underutilized despite high individual use. This pattern mirrors findings by Sabi et al., who observed that students in developing countries adopt cloud tools faster for personal tasks than for group work due to limited digital collaboration skills and low awareness of shared-work features. It also aligns with Bhuasiri et al., who argued that lack of institutional training and encouragement reduces students' engagement with collaborative aspects of cloud platforms [23], [24]. The grand mean of 2.78 confirms that actual use of cloud computing is moderately high among IT-related students at HUKPoly Library. Students have embraced cloud tools mainly for individual academic tasks such as storage and access to digital resources, while collaborative use lags behind. The findings support TAM's proposition that actual usage follows perceived usefulness and ease of use, but also highlight that collaborative adoption requires additional factors such as training, institutional policy, and peer influence. Strengthening awareness and support for collaborative cloud features could improve group learning outcomes and maximize the full potential of cloud computing in academic settings [13].

Table 5 presents the overall mean of 2.93 indicates that these barriers are generally considered "barriers" to cloud computing adoption. This suggests that while students recognize the value of cloud computing, infrastructure and technical support challenges limit

their regular use. Item 19 recorded the highest mean of 3.82, demonstrating that a lack of personal devices, such as laptops and smart phones, is a major barrier. This finding underscores that device ownership is a prerequisite for cloud computing use, given that cloud computing platforms rely on user-controlled devices to provide flexible access. This result aligns with the study by Al-Harthi et al., who reported that limited access to personal computing devices is the strongest predictor of low cloud computing adoption among students in developing countries. Item 16, with an average score of 3.57, is also classified as a major barrier, indicating that poor Internet connectivity at the HUK Polytechnic's library significantly limits the use of cloud computing. This finding is consistent with the study by Sabi et al., who identified unreliable internet connectivity as the most common barrier to cloud computing adoption in higher education institutions. Both device availability and network reliability are among the most significant constraints to the sustainable use of cloud computing [22], [23]. Item 17, with an average score of 3.20, indicate that frequent power outages are a barrier. Unstable electricity supply disrupts access to online platforms and reduces students' confidence in relying on cloud computing services for their urgent academic work. This is consistent with the study by Gupta and Mishra, who found that frequent power outages significantly undermine the adoption of information and communication technologies in African universities by increasing downtime and access costs. Item 20, with an average of 2.63, is slightly above the threshold, indicating that inadequate training and technical support are also a barrier. While less severe than infrastructure issues, this average score suggests that many students still lack the digital skills or institutional guidance necessary to fully leverage the benefits of cloud computing. This pattern echoes Bhuwasiri et al., who noted that inadequate training and technical support reduces students' self-confidence and discourages their exploration of advanced cloud computing functions [25], [19].

Interestingly, Item 18 scored a very low average of 1.44, implying that concerns about data privacy and security are not a barrier. This suggests that IT students at Hook Poly University Library either trust cloud computing providers, have a basic understanding of security protocols, or prioritize accessibility and convenience over privacy risks. This finding contradicts Sultan's assertion that privacy and security concerns were the most significant obstacles to cloud computing adoption in Western universities, but it aligns with studies in developing contexts where infrastructure deficiencies outweigh security concerns [21], [18]. The overall average of 2.93 confirms that infrastructure-related factors pose the greatest challenges to cloud computing adoption at HUKPoly Library. A lack of personal devices,

poor Internet connectivity, and unreliable power supply are the most prominent barriers, while technical support plays a secondary role. Privacy concerns are not a determining factor for this student group. The results support the technology-organization-environment framework, which posits that technological infrastructure and environmental conditions significantly influence adoption outcomes. Therefore, addressing device accessibility, improving campus bandwidth, and ensuring stable power supplies will have the greatest impact on increasing the effective use of cloud computing among students [26].

The findings of this study have practical implications for the HUKPoly Library and its management. Given the prevalence of infrastructure constraints, priority should be given to improving campus bandwidth capacity, expanding device lending programs or supporting a bring-your-own-device policy, and providing stable power through alternatives such as backup solar power systems. These changes would directly address the "anytime access" problem reported by students. To increase collaborative use, the library should offer specialized training on shared features in Google Docs, OneDrive, and other platforms, and integrate cloud-based group assignments into courses. Improved on-site technical support would also reduce minor usage difficulties and boost student confidence.

Based on the study three limitations should be noted. First, the sample is limited to students majoring in information technology fields at the HUKPoly Library, so the results may not be generalizable to non-information technology field related students or institutions with different infrastructure. Second, the cross-sectional design captures perceptions at a specific point in time and cannot establish a causal relationship between constraints and usage levels. Third, relying on self-reported Likert scale data may lead to bias in responses, as students might overestimate the benefits or underestimate the challenges. Future research should use larger, multidisciplinary samples, as well as integrated research methodologies, to validate quantitative findings by correlating them with qualitative experiments.

5. CONCLUSION

IT related students at HUKPOLY Library have adopted cloud computing for their individual academic tasks and recognized its benefits. However, inadequate infrastructure prevents them from realizing its full potential, particularly in the areas of flexible and collaborative learning. The study shows that students rate cloud computing platforms as useful and easy to use, and they frequently use them for file storage and accessing digital resources. Nevertheless, the "anytime, anywhere" promise of cloud computing remains unfulfilled due to a lack of

personal devices, poor Internet connectivity, and frequent power outages. Furthermore, the collaborative features are not being fully utilized, not because of a lack of technical skills among students, but because of limited institutional support and the necessary infrastructure for teamwork.

These findings underscore that in resource constrained environments, the adoption of educational technology is more influenced by environmental conditions and infrastructure than by user attitudes alone. For the Hassan Usman Katsina Polytechnic Library and its administration, the priority should be addressing structural constraints by improving bandwidth, hardware accessibility, and stable power solutions, along with targeted training on collaborative cloud computing tools. Only then can cloud computing transform from a mere aid for individual study into a transformative platform for collaborative learning and academic productivity.

Future research should broaden the sample size to include students from disciplines other than information technology, adopt longitudinal and multimodal approaches, and test specific interventions to measure their impact on actual use. By bridging these gaps, higher education institutions in similar contexts can better align technology adoption with the learning needs of 21st century students.

Recommendations

Based on the research findings, the following recommendations are proposed:

1. The Polytechnic should provide or support device lending programs, upgrade campus bandwidth capacity, and add stable alternative power sources such as backup solar power systems. This will help bridge the “anytime access” gap and make cloud computing truly flexible outside of library hours.
2. The library should organize regular workshops on Google Docs, OneDrive, and shared workspaces, while instructors integrate cloud-based group assignments into courses. This will shift the use of cloud computing from individual storage to peer-to-peer learning.
3. A dedicated IT support desk in the library can quickly address technical and synchronization issues, making students more self-reliant in completing their urgent academic work.
4. The administration should formalize positive perception into policy by requiring students to apply for cloud computing and provide corporate Google and Microsoft accounts. This will solidify usage and justify investment in the necessary infrastructure to support it.

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