# Usability and Challenges of Cloud Storage: Perspectives of Academic Staff at Mzumbe University, Tanzania

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**Abstract**: This study aimed to explore the perspectives, preferences and challenges of Mzumbe University faculty regarding cloud storage adoption. Utilizing a case study design, the researchers conducted semi-structured interviews with a purposive sample of 15 faculty members to capture diverse viewpoints. The study used the thematic analysis approach to analyse the data retrieved from interviews. Based on the findings, the study concluded that cloud storage systems have several advantages, such as easily accessibility features, robust security protocols, service compatibility and intuitive user interfaces. These benefits encourage academic personnel to collaborate and increase productivity. However, some challenges existed. These related with internet access, cost, lack of formal training and security. The study recommends that enhancing the university internet infrastructure is critical to guaranteeing reliability and fast connectivity for effective utilization of cloud storage. The university may also thing of offering financial assistance for supplementary storage requirements to academic staff.

**Keywords:** Google drive; file organization; data security; user satisfaction; platform preference; collaboration.

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## Introduction

When considering options for storing data, some people believe that keeping data on a remote server via the internet is less secure and reliable compared to storing it on a local hard drive (Yang et al., 2020; Seth et al., 2022; Gupta et al., 2022). However, the emergence of cloud storage has introduced several features and functionalities that ensure both security and convenient access while also providing users with a high level of flexibility. An example of a security measure in cloud storage is encryption. Typically available as an additional subscription feature, encryption offers strong protection for stored data. By encrypting the data, it becomes inaccessible without a specific key. This means that even if the data is intercepted during its transfer to the cloud server, it remains safe. This approach significantly enhances security compared to local storage, which is susceptible to a variety of malicious attacks (Gupta et al., 2022; Yang et al., 2020; Seth et al., 2022).

In the contemporary era, particularly in the technological age, data holds utmost significance and it is imperative to securely and dependably store information. There are various reasons for storing information, including for future reference and for backup in case of data loss (Akhtar et al., 2021; Gupta et al., 2022). It is crucial to maintain the

reliability and safety of stored information in order to uphold the integrity of the data. This requirement to maintain the reliability and safety of stored information presents a significant consideration when comparing the reliability and effectiveness of cloud storage with traditional local data storage.

The advancement of technology on a global scale has had a profound effect and has resulted in the emergence of cloud computing. This sophisticated platform has consistently developed over time and it currently presents multiple avenues for the provision of computing resources. Cloud computing encompasses a wide array of services, including applications, storage and computational capabilities. Cloud storage is an advanced service that enables users to securely store their data by transferring it via the internet to distant servers. It offers an alternative to conventional storage methods such as local hard drives, which are constrained by physical limitations (Yang et al., 2020).

Empirical studies (e.g., Yang et al., 2020; Seth et al., 2022) suggest that cost-effectiveness of cloud storage is a pivotal determinant in its widespread utilization. When organizations and individuals explore various data management solutions, they must meticulously evaluate the economic feasibility of transitioning from conventional storage methods to cloud-based alternatives (Alqahtani and Orji, 2020). This evaluation necessitates a meticulous examination of cost factors and potential savings. Simultaneously, providers of cloud storage services must endeavour to offer competitive pricing structures to entice and retain users. In this ever-changing environment, it becomes increasingly evident that both providers and users must possess a comprehensive understanding of the intricate correlation between costs (Jianwen & Wakil, 2020; Sharma & Sehrawat, 2020).

When individuals perceive that their data is secure, they are more inclined to trust cloud storage service providers. This trust comes through the implementation of comprehensive privacy policies and stringent security measures (Almazroi, et. al., 2019). It is crucial for users to have confidence that their sensitive information will be safeguarded against unauthorized access, data breaches and data misuse. On the other hand, Schuster and Habibipour (2024) argued that insufficient or ambiguous privacy policies, combined with lax security measures, can weaken users' trust, resulting in hesitation and reluctance to rely on

cloud storage services. Similarly, according to Yang et al. (2020), users place importance on transparency, accountability and reliability in data protection practices, as these factors contribute to their belief in the reliability and security of the cloud storage platform. As a result, the manner in which service providers address these aspects directly impacts users' levels of trust, ultimately influencing their decision-making process when it comes to adopting and utilizing cloud storage solutions (Almazroi et. al., 2019; Almaiah & Al-Khasawneh, 2020).

The widespread popularity of cloud storage is derived from its commitment to providing extensive accessibility and convenience (Almishiki, 2017; Alqahtani, 2019). Individuals seek the convenience of being able to effortlessly access their files from any device, regardless of time and location (Alqahtani, 2019; Basil et al., 2022). Analysing how accessibility and convenience influence user attitudes and willingness to embrace cloud storage yields valuable perspectives on its value.

Obtaining a comprehensive understanding of how users perceive and approach the concept of cloud storage is of great significance when it comes to accurately predicting its adoption and usage trends. Users' attitudes towards embracing cloud storage are heavily influenced by their trust in service providers, perceived benefits and recognition of associated risks and limitations (Xu & Mahenthiran, 2021). The degree of trust that users bestow upon cloud service providers holds great importance in shaping their decision-making. Aspects like dependability, standing, and openness contribute to the level of assurance users possess when it comes to entrusting their data to cloud storage platforms.

When individuals consider the possible drawbacks of cloud storage, they carefully evaluate the perceived advantages it provides, such as its scalability, support for collaboration, and potential for facilitating disaster recovery (Mungoli, 2023). Therefore, it is crucial to recognize and comprehend these perceived benefits to grasp the motivations behind individuals' decision to embrace cloud storage solutions (Almaiah & Al-Khasawneh, 2020).

Existing literature indicates a need to examine cloud storage user perspectives (Almaiah & Al-Khasawneh, 2020; Skafi et al., 2020). While existing studies provide valuable insights, they often focus on technical aspects or the viewpoints of service

providers, thereby neglecting the nuanced considerations that drive user decisions.

In recent years, cloud storage adoption in Tanzania has surged, mirroring the global trend of digital transformation and enhanced data management practices (Begazo et al., 2023). This growth is bolstered by Tanzania's expanding economy and advancements in its telecommunications infrastructure. Businesses and individuals alike are increasingly turning to cloud storage solutions to meet their evolving data storage needs (Mshana, 2020; Mwamalangala, 2020; Makulilo, 2020; Mnyawi et al., 2022). However, despite this upward trajectory, challenges such as inconsistent internet connectivity, limited technical expertise, and concerns over data security persist. Addressing these local challenges is crucial for tailoring effective cloud storage solutions that cater to the specific needs and constraints of Tanzanian users.

Based on information from the Tanzania Communication Regulatory Authority (TCRA), as cited by Makaro (2023), the internet penetration rate in Tanzania reached 48.5% in 2022, indicating significant progress compared to previous years. The increase in connectivity, along with the widespread adoption of mobile devices, has made it more convenient for Tanzanian consumers to embrace cloud storage services (Ngomage, 2021; Begazo et al., 2023). This allows them to easily access and manage their data from any location with internet connections. The academic community in Tanzania has also embraced cloud storage for various purposes, including research data management, collaboration, and resource sharing (Chaula, 2021; John, 2020; Ishengoma et al., 2024). As Tanzania continues to leverage digitalization and technology for socio-economic development, it becomes crucial to comprehend the usage patterns and challenges of adopting cloud storage in the Tanzanian context.

While the conventional emphasis has traditionally focused on the technical aspects of implementing cloud storage, this study sought to establish the users' perspectives on cloud storage.

# Methodology
## Research Design
This study employed a case study research design to examine the use of cloud storage among faculty members at Mzumbe University. Data collection involved interviews.

## Population and Sampling
Out of the population of 400 academic staff at the Mzumbe University, the study sample was 15 academic staff, purposely selected. These staff members were chosen based on their varied roles in academic research and teaching, their engagement in cloud storage for collaborative projects, and their experience with different cloud storage systems. This selection aimed to capture a diverse range of insights and perspectives on the use of cloud storage technologies within the academic setting.

## Validity and Reliability
To ensure validity, the interview process was customized to match research goals and existing literature. Through participant verification of their responses, member checking as advised by Ha (2020) and Reed (2020) ensured response accuracy and completeness. With the goal of identifying and resolving biases, peer debriefing sessions with researchers scrutinized the procedure and results. By taking these actions together, the qualitative research became more robust and reliable.

## Data Collection
As stated before, the study employed semi-structured interview method for data collection. This method was appropriate as it encourages open-ended and interactive discussions that addressed the main objectives of the study. Prior to the interviews, the participants willingly gave their consent after receiving proper notification about the study. The interviews took into account the preferences of the participants.

In order to guarantee precise data gathering, the interviews were recorded with the participants' permission. Each interview session had a duration of 30 to 45 minutes, allowing the participants ample time to articulate their thoughts and perspectives. The interviewer attentively listened to the participants, posing additional questions to clarify their answers, and urging them to provide further details about their encounters with cloud storage solutions.

## Data Analysis
The study used the thematic analysis approach to analyse the data retrieved from interviews. Thematic analysis was employed to scrutinize the interview transcripts, facilitating a comprehensive exploration of the participants' experiences, perceptions and knowledge pertaining to the usage of cloud storage. The initial responses from the

interviewees were accurately transcribed from the audio recordings of the interviews to uphold precision. Each interview transcript was meticulously examined individually, with the audio recordings serving as a point of reference for accurately transcribing the discussions.

## Ethical Considerations
Each participant provided an informed consent. Additionally, the researchers informed participants of their entitlement to withdraw from the study at any point without facing any negative consequences.

# Findings and Discussion
This section presents the findings of the study with discussions. The findings are organized according to selected themes.

## Benefits of Cloud Storage
The first theme was about benefits of cloud storage. The perceived benefits included user-friendly interface, compatibility and security. A number of participants (e.g., respondent 1, 3, 4, 6 and 14) showed attractiveness to Google Drive. They indicated that they preferred its user-friendly interface, compatibility with other services and security in cloud storage platforms. For example, respondent 4 reported, "I favour google drive due to its simple management of files, collaborative capabilities and safeguarded storage."

Other participants, who underscored the significance of ease of use and dependability, echoed similar perspectives. For instance, respondent 2 emphasized that: "When it comes to storing files, google drive is my preferred choice as it effortlessly merges with other google services such as Gmail and Docs."

The user-friendly interfaces of cloud storage platforms enhanced usability, while compatibility with various services facilitated seamless integration. Strong security measures ensured data safeguarding and conformity with regulations. These factors result in a favourable user experience, productivity and reliable data storage in cloud platforms. Prior research by Mungoli (2023) and Chaula, (2021) support these findings, highlighting the role of user-friendliness, perceived security, reliability and trust in cloud service usage. Additionally, Almazroi et al. (2019) noted the appeal of seamless integration with different services in cloud storage.

## Accessibility
Accessibility is another theme that emerged as an advantage. Ease of access was noted by some users as one of the advantages of cloud storage platforms. Respondent 5, for instance, revealed, "Cloud storage facilitates convenient file accessibility regardless of location and it enables seamless collaboration with others." This finding matches with the findings of Fasola and Abimbola (2023) who highlighted that cloud storage solutions significantly enhance users' ability to access and share files from any location, thereby promoting collaboration and efficiency.

## Collaboration
Collaboration is an important aspect of user experience with cloud storage applications that some cloud storage users appreciated. For instance, respondent 2 and 5 reported that the beneficial aspect of cloud storage lies in its ability to facilitate seamless cooperation with individuals. In a similar vein, respondent 9 commented, "The capability to share files with colleagues and collectively work on them has significantly enhanced our team's collaborative efforts." Respondent 10 expressed the practicality of being able to retrieve files from various devices, highlighting, "Being able to just grab my files from my laptop, phone or tablet has seriously improved my work game. It made me more flexible and productive."

The findings suggest that collaborative features improve the user experience and the effectiveness of cloud storage platforms. Previous studies by Gupta et al. (2022) and Alon and Herath (2014) support this idea, stating that collaboration tools facilitate smooth coordination among users regardless of their location, promoting teamwork and communication. These tools also provide version control, enabling users to retrieve previous versions of files and track edits easily. By streamlining workflows and enabling remote work, these tools enhance productivity and flexibility. Furthermore, strong access control and permission settings guarantee data security and privacy, further contributing to the advantages of cloud storage platforms.

## Automatic Synchronization and File Sharing
Automatic synchronization and file sharing, according to respondents 2, 3, 4, 5, 10, 11, 12 and 13, were some of the reported advantages. Being able to effortlessly synchronize with numerous other devices carried noteworthy advantages.

Participants appreciated the fact that cloud storage platforms provided backup and version tracking functionality. One of the respondents reported,

> When it comes to syncing, Dropbox is really great ... like, even if you're working with a bunch of people, you don't have to bother with a USB drive to move files around ... as long as you have internet, they're quicker than other platforms (Respond 12).

In a similar manner, participant 11 stated, "The automatic synchronization capability of Dropbox guarantees that I constantly possess the most up-to-date version of my files ...." Respondent 13 acknowledged the value of OneDrive's tracking functionality, stating, *"OneDrive's ability to track document versions has proven invaluable on multiple occasions when I required reverting to a previous iteration of a file."*

Alqahtani (2019) made a similar observation, stating that the feature of automatically synchronizing files and data across multiple devices and the cloud server in real-time ensures that users have the most current version of their files, no matter what device they are using. Almishiki (2017) further reported that this seamless synchronization eliminates the need for manual file transfers or updates, saving users time and effort. Furthermore, it promotes collaboration by allowing multiple users to simultaneously work on the same files, with changes being instantly reflected on all devices (Alqahtani & Orji, 2020).

### *Adaptability and Expandability*
Adaptability and expandability also emerged as advantages: Some participants highlighted the inherent benefits of cloud storage, especially regarding its adaptability and scalability. They pointed out that, the adaptability and scalability of cloud storage enables users to accommodate changing storage requirements. For instance, respondent 8 affirmed, "By utilizing Google Drive, I am able to effortlessly increase my storage capacity in line with my evolving requirements, without the need for extra physical equipment."

This evidences the fact that cloud storage platforms like Google Drive allow users to enhance their storage capacity, depending on their changing requirements, thereby enhancing effectiveness and convenience. Ultimately, the versatility and scalability of cloud storage platforms aid in enhancing user satisfaction and ease of operation, making them the favored option for meeting data storage needs. These findings align with a previous study by Mungoli (2023). The study underscored the benefits of scalability and flexibility in bolstering workflow efficiency and cooperation.

### Challenges of Cloud Storage
Apart from advantages, some respondents reported some challenges in the use of cloud storage. The storage of data was perceived to poses some challenges to individuals in academia. Several challenges emerged.

### *Internet Connectivity*
Internet Connectivity emerged as a challenge. Several users (including respondents 8, 10 and 13) emphasized the importance of internet connectivity for effectiveness of cloud applications. They expressed their discontent with slow and unreliable internet connections, which hindered timely access to data. As a result, this created the perception that cloud services are not dependable. Respondent 10 reported" Sometimes, when I'm working from a different location, my internet can be really slow and that makes it hard for me to get to my files."

The finding is consistent with previous studies pertaining to the role of internet connectivity in shaping the user experience of cloud applications. Alqahtani and Orji, (2020) observed that slow connections hinder data access, leading to dissatisfaction. Fluctuations in speed impede file access, especially when working remotely. These experiences contribute to doubts about cloud services. Reliable internet infrastructure is necessary for seamless data access and addressing user concerns. Improving internet connectivity can enhance cloud application usability.

### Limited Affordability
Limited affordability also emerged as a challenge. A considerable number of respondents (e.g., respondent 12 and 14) expressed concerns regarding the limitations imposed on storage capacity in cloud services. Additionally, the necessity to switch to paid options upon exceeding these limitations was a cause for concern. Furthermore, it was observed that the cost and suitability of the paid alternatives did not adequately align with the distinct demands of individual users. For example, one respondent reported,

> The storage services in the cloud give me a fixed amount of free space. But when I use

it all up, I have to switch to the paid options, which can be a bit pricey and not so flexible for someone like me" (Respondent 14).

Another respondent reported, "The free accounts only give me limited storage, which can be a bit of a pain when I am working with big video files or high-resolution images" (Respondent 12).

It is widely believed among Tanzanian academics that the pricing plans or payment options for cloud storage are expensive and inflexible. This observation contrasts with previous studies (Yang et al., 2020; Seth et al., 2022) in developed nations, where cloud storage is generally regarded as a cost-efficient solution. Users voiced worries about having to transition to paid options once they reach the free storage limits, citing potential financial implications and limited adaptability. These expressions of concern highlight the importance of aligning pricing structures and storage options with the diverse requirements of users, in order to enhance the usability of cloud storage.

## Training

Lack of training also emerged as a challenge. The analysis revealed that some participants displayed a lack of formal training or guidance in proper utilization of cloud storage tools. Certain individuals depended on advice from peers or self-teaching in order to navigate cloud storage platforms while others acknowledged receiving informal guidance from colleagues. Furthermore, some respondents (e.g., respondent 8) emphasized the difficulties associated with ongoing learning as a result of frequent advancements in cloud storage technologies. The person reported,

> I've never been trained from official websites, but a friend told me if I keep my data stored locally, there's a chance I might lose it one day and never get it back. They suggested I use Google Drive ... So, I looked into it because they didn't offer me any training (Respondent 1).

Another respondent reported, "I haven't been taught... it's just my curiosity... I heard about it from others and taught myself" (Respondent 6). Empirical studies carried out by Alqahtani (2019) and Almishiki (2017) highlights the importance of receiving adequate training for individuals to effectively make use of cloud applications. However, the present study reveals that many participants lack access to formal training and often rely on informal sources such as advice from peers or self-teaching. This suggests the presence of a potential knowledge gap that may hinder the optimal utilization of cloud storage platforms. Additionally, respondents acknowledged the challenge of keeping up with the constantly evolving cloud technologies, emphasizing the need for continuous learning and support systems. These findings emphasize the significance of comprehensive training and guidance to maximize the efficiency of cloud storage solutions.

### Perceived Security concerns

Security concerns was another reported challenge. One of the respondents reported, "I'm not totally sure about my documents' security because the server belongs to other folks who can do whatever they want with my stuff. I mean, I know it's kind of safe, but not, like, completely ..." On the other hand, respondent 6, 8 and 13-viewed cloud storage platforms as being secure, pointing to features such as two-factor authentication on Google Drive. For example, respondent 6 had this to say, "I'm never stressed out about it, you know? Whenever I want to get into my stuff, I just have to type in my password, and it is a tough one. And hey, I actually remember it myself!"

## Conclusions and Recommendations

The study concludes that cloud storage systems have several advantages, such as easily accessibility features, robust security protocols, service compatibility and intuitive user interfaces. These benefits encourage academic personnel to collaborate and increase productivity. However, some challenges existed. These relate with internet access, cost, lack of formal training and security.

Based on the conclusions, the study recommends that Mzumbe University develop and implement comprehensive training programs to educate faculty members about the features and security precautions of cloud storage platforms. Furthermore, enhancing the university internet infrastructure is critical to guaranteeing reliability and fast connectivity for effective utilization of cloud storage. In order to tackle the issue of cost, the university may consider forming alliances with cloud service providers to offer reduced price. The university may also thing of offering financial assistance for supplementary storage requirements to academic staff. Building confidence in cloud services will need highlighting security through

frequent training and encouraging best practices for data protection. By creating a feedback mechanism, academic staff will be able to voice their preferences and concerns, allowing the university to customize the selection of cloud platforms to meet the needs of the academic community.

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