DIVERSIFIED ONLINE CHAT AND STORAGE FOR STUDENTS (DOCSS)

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Presented to the

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Technological University of the Philippines – Taguig Campus

In Partial Fulfillment of the Requirements in   
Technology Research

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CHAPTER I

# INTRODUCTION

## 1.1 Background of the Study

Cloud storage is defined as the provision of storage to a user via a platform. They can access cloud storage in a variety of ways, including by allocating storage and specifying the duration for which it will be used. (Fu, Ju, Lin, et al., 2011). Online storage is one of the services that let the users store data and make it available online. It is applicable to all the users, whether in business, school purposes, or for personal use. Cloud storage plays a crucial role in a person’s daily life, it helps the users to save their information/data at anytime and anywhere and it also help them save storage, especially for the mobile phone users. Cloud storage is an opportunity to download your files on the server with an ability to access to them from any gadget and any place. Before this innovation appeared, people have been exchanging files in different social networks (like Facebook) and used material storage drives. In fact, they still devote their data to material drives. That is why, currently, not all of the users understand the necessity of using cloud storage. (Everett, 2017).

In this study, the researchers wanted to diversify and add new features for the online cloud storage. The DOCSS (Diversified Online Chat Storage for Student) offers a great service to all the users, especially to all the students during this time of pandemic. This innovative service will help the users to lessen the possible storage space, through this, all the important files, data, etc. will be instantly stored in the user’s personal cloud storage that they may open anytime and anywhere. Its added features will let the users to sort their files/documents in an organized way. Aside from that, DOCSS also ensures the security and data privacy of the users. The users can share the whole folder to a specific person, and the folder that have been shared can be viewed, edit, and sort out by that specific person. These features are essential especially to all the students who will use it in the future. It is very handy and manageable, that it doesn’t require you to carry anything except for the phone and any gadget you are using. According to Everett (2017), there are reasons why we should use an online cloud storage instead of carrying flash drive every day. First is to optimize cooperation, Cloud drives are an excellent tool for transferring data instantly. This service is ideal for both remote and in-housework due to the ability to give access to multiple people. Every day, people have a need to share information with anyone from their group. The users can organize any folders, files or documents with their cloud storage and can give limit access to only certain people. Another advantage of cloud servers is their ability to interact with various online office services that allow for automated file sharing. Next is create back up for private files. When a computer or smartphone stops working, the owners of these devices suffer first from loss of money, and then from the loss of data. However, users can now avoid these incidents by securing their digital data. Using cloud storage as a storage site for their files helps to ensure that they are safe. All storages include an "auto-upload" feature, which allows the user to synchronize and download the photos in the cloud as soon as it is taken. Third is protect work from being wasted. People are well aware of all unexpected events that may occur with their PC while at work, but they frequently fail to take actions to protect themselves from unexpected situations. For example, the electricity in their neighborhood may go out. As a result, their device will be turned off, and the task file will not be saved. Under the threat of new voltage frisk, they’ll have to start from the beginning. Lastly, get more space for less money. It is less expensive to pay a small fee for limitless cloud storage than to purchase and maintain a large amount of hard disk storage space. Users of cloud storage services can take advantage of low-cost options. For example, Dropbox, a popular cloud storage provider, offers 2GB of free storage. It's sufficient to synchronize your smartphone data and preserve at least text documents. If your needs necessitate additional storage, there are other choices available.

This online cloud storage is helpful in so many ways, aside from its convenience, it also gives assurance to the users. There are lots of benefits that the users could get. According to Singh (2020), cloud storage has become one of the most convenient and efficient methods to store data online. There are many storage service providers on the internet, and this area is so vast now every big tech company owns a separate storage facility, which helps to generate a significant margin of revenue from the users. In cloud storing, the user, rather than saving the data at local storage or hard disk, stores data somewhere at the remote location, which can be accessed using internet service. There are various cloud storage service providers who sell storage services for different ranges. This online cloud storage is beneficial to all the users, not only to the students and working individuals. There are ten (10) benefits of using cloud storage according to Singh (2020). The [usability and accessibility](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#usability), security, cost-efficient, [convenient sharing of files](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#sharing), [Automation](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#automation), [multiple users](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#multiple), [synchronization](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#synchronization), [convenience](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#convenience), [scalable](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#scalable), [disaster recovery](https://cloudacademy.com/blog/10-benefits-of-using-cloud-storage/#recovery). Aside from the benefits/ advantages of cloud storage, users may also experience some problems in using it. The drag and drop, internet dependency, data security and privacy, and expensive cloud storage. Nevertheless, it is way more accessible and manageable especially in today’s time wherein people rely on technology.

In reference to Odun-Ayo et. al (2017) Even data and databases may benefit from the Cloud's vast storage capacity. One of the most important aspects of Cloud computing is data storage. To maintain data security, Cloud storage takes use of the internet, virtualization, encryption, and other technologies. Cloud storage is a functional paradigm that is advancing and making IT usage easier for customers by the day. Cloud computing enables customers with standardized programs that are accessible online and on a regular basis. Such apps can be used by as many people as are allowed within an organization without having to worry about their upkeep. The Cloud also allows users to create and deploy user applications, including storage and databases, without having to worry about the underlying operating system.

Individuals are storing their data on the Internet as cloud services become more popular. (Pottier, et. al, 2016) The described cloud storage service allows customers to organize their data using two different approaches. To begin, users select an approach for storing their files. Before transferring documents to the storage provider, this method divides them into chunks. As a result, the storage provider has no idea how user data is arranged and so is unable to read user documents. Second, the cloud storage service collaborates with many storage providers to keep user data scattered across multiple locations, reducing the risk of data loss or theft from a single storage source.

Cloud computing is a popular aspect these days, and it is gradually becoming significant in all aspects of life. Online cloud storage offers cloud data storage and management; large Internet corporations are disclosing their cloud network disks to the public; users may upload their own files to the cloud and then access them from a variety of devices and areas.

## 1.2 Problem Statement

The purpose of this study is to address the issue of students who are having difficulty storing and accessing data on their gadgets because of a large number of files and limited storage space available to them. Technology played a crucial role in education, however, when the pandemic strikes, students have utilized their devices, not only for the online course but also in downloading documents and other programs. The researchers will create an online chat and storage for students so that they can easily access and share files in school and communicate with their classmates especially this time of pandemic where schools are using the online class method. It is web-based storage, it doesn't need to be downloaded, and this is accessible in any browser available on their devices. Not every student has access to a high-end device with enough memory to store files with up to 32 gigabytes of storage capacity. Students will benefit from developing cloud-based storage since it will allow them to save space on their devices' storage and avoid their devices from experiencing performance issues such as screen freezing.

## 1.3 Objectives

### 1.3.1 General Objectives

To design, develop, and evaluate the Diversified Online Chat and Storage for Students (DOCSS) of BTVTE of Technological University of Philippines – TUP Taguig.

### 1.3.2 Specific Objectives

Specifically, this study sought to:

**1.3.2.1** Determine the demographic profile of the respondents in terms of:

**1.3.2.1.1.** Age

**1.3.2.1.2.** Sex

**1.3.2.1.3.** Year and Specialization (for Students)

**1.3.2.1.4.** Professional Expertise (for Technical)

**1.3.2.2** To evaluate the design and development of DOCSS by computer experts in terms of:

**1.3.2.2.1** Design

**1.3.2.2.2** Content

**1.3.2.2.3** Functionality

**1.3.2.2.4** Reliability

**1.3.2.2.5** Competency

**1.3.2.3** To evaluate the design and development of DOCSS by the students in terms of:

**1.3.2.3**.1 Design

**1.3.2.3.2** Content

**1.3.2.3.3** Functionality

**1.3.2.3.4** Reliability

**1.3.2.3.5** Competency

**1.3.2.4** To evaluate the design and development of DOCSS by the teachers in terms of:

**1.3.2.4.1** Design

**1.3.2.4.2** Content

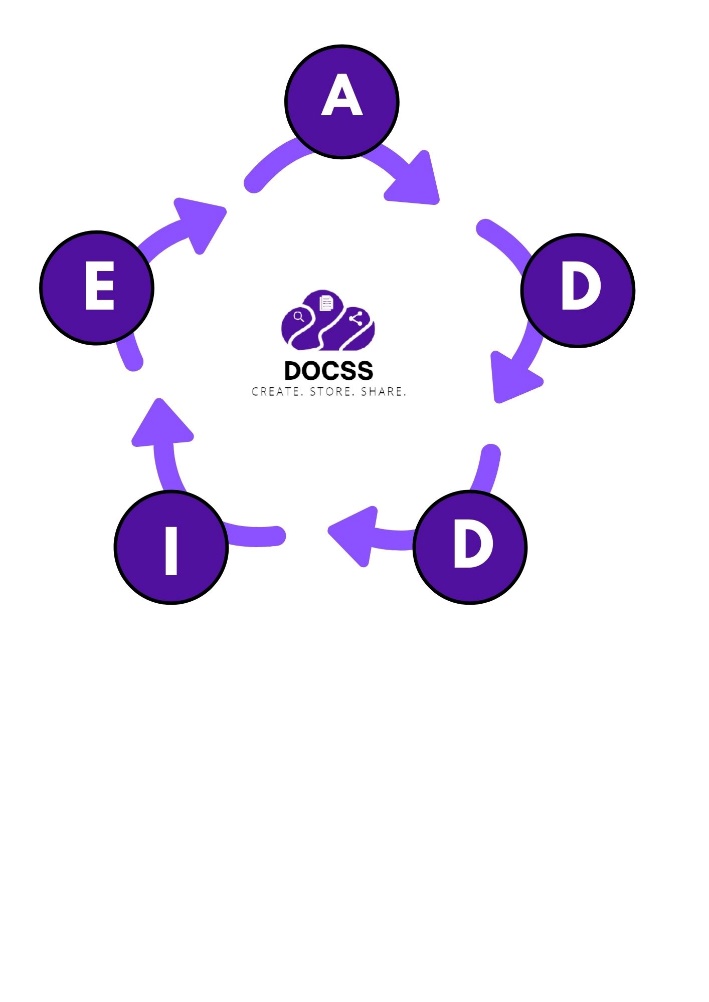
**1.3.2.4.3** Functionality

**1.3.2.4.4** Reliability

**1.3.2.4.5** Competency

**1.3.2.5** What are the new and unique features of Diversified Online Chat and Storage for Students that differs from other online storage?

## Conceptual Framework

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**Figure 1.4.1. ADDIE Model**

The ADDIE Model (Analyze, Design, Develop, Implement and Evaluate) is the "Goal-Setting Stage" of the design process, the Analysis phase, in which the developer focuses on the intended audience. It is also that perhaps the application fits each student's or participant's degree of competence and intelligence. The researchers used ADDIE Model in the reason that the framework includes a consistent structure, allowing educators to understand exactly what to do next after each step. The evaluation section gives outcome to the instructor and suggests areas where the guide areas that need improvement.

There are issues that cloud storage encounters when the user utilizes it. The issues are as follows: the need of extra storage, unorganized files, and weak security for the users, and large number of possible viewers. These issues are detected while using the ADDIE Model. The participants include students and faculty of TUP-T.

The researcher’s design will last for 2 – 3-month duration in order for us to think thoroughly and enhance our website. The exercises that we would conduct is Surveys, Trial and Error, and Gantt chart. The researcher’s objective is to create an online cloud storage that will enable students and faculty to use this website as their back-up storage for educational purposes. The website would also provide the best platform for saving of files and data.

Graphical user interface, application

Description automatically generatedMock-Up Design:

**Figure 1.4.2. Website Log-In Page**

Graphical user interface, application

Description automatically generated

**Figure 1.4.3. Website Dashboard Page**

To implement this application, the researchers would evaluate the effectiveness and efficiency of the cloud storage. In addition, the researchers will test whether the files can be stored in databases.

The process of evaluating will be monitoring whether there are bugs and errors and improve the errors. The researchers will keep in check for up-to-date cloud system based on the latest trends and needs.

## 1.5 Significance of the Study

While there is a sudden shift of classroom settings from traditional to conducting online classes, it is inevitable for students to worry about the clump of activities that are yet to be stored in their personal devices since we use digital documents. Not only these bunch of documents makes the device go slow, but also the videos, images that takes up the space in computers. Online storage is one of the solutions to these since it is free to upload file online while retaining and retrieving it anytime, this would be beneficial to them. With the enhanced design of the user interface, students would not have a hard time using it. This helpful online cloud storage is useful and comes in handy because in some instance if the connection may disappear any moment, it will be on hold and will resume once it is connected to the internet.

**Students.** Recipients will benefit for less risk of losing files, easy access of notes to retrieve anytime, and to share across several devices.

**University**. This technology research can be implemented in school system because it has a storage capacity of 15GB that helps the faculty in storing large data as well as it can be used as a back-up online storage.

**Future Researchers.** This will benefit future researchers who would take interest for further improvement of cloud storage that will serve as there additional springboard. This study will serve as a useful reference for researchers who will conduct similar studies.

## 1.6 Scope and Limitations

This research aims to create an online cloud storage that involves time, computers, computer software application, and number of personnel needed for the research to be completed. The estimated time range of the research from planning and designing to the final outcome of the software ranges from two to three months depending on the availability of the personnel and the stability of the internet.

Computers such as personal computer or laptop is needed for the creation of the online cloud storage as well as computer software application such as MySQL, PHP, JavaScript, and other related software. The research is limited only for the students and teachers at Technological University of the Philippines - Taguig Campus for the reason that it is still under development.

**Graphical user interface, application, map

Description automatically generatedFigure 1.6.1 Technological University of the Philippines-Taguig**

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## Definition of Terms

For clarity of interpretation, the researchers offer the following definitions of term.

ADDIE - (Analyze, Design, Develop, Implement and Evaluate) is the "Goal-Setting Stage" of the design process, the Analysis phase, in which the developer focuses on the intended audience. In this study, ADDIE is used as a method for the researchers to follow the steps in developing the DOCSS.

Chat – It is a communication between the sender and the receiver over the internet. In this study, chat is used to communicate online with other people that can be also access on the website.

Cloud Storage – It is a type of storage that stores data using the internet. In this study, cloud storage is used to access and store the data of the users online.

Competency - It is the ability to do something successfully or efficiently. In this study, competency is used whether the system runs efficiently and do all of its functions.

Content - It is the things that are held or included in something. In this study, content is used as an information made available by a website or other electronic medium.

Data – It is an information that was stored and processed by the computer. In this study, data is the files, documents, images, videos, and audios of the users that can be stored in the cloud storage.

Data Privacy – It is a data protection that manages sensitive and personal information of the users. In this study, data privacy is used to manage the online cloud storage to know how data is collected, used, and shared to other devices.

Design - It is a plan or drawing produced to show the look and function or workings of a building, garment, or other object before it is built or made. In this study, design is used as a plan on making the system and its user interface.

Device – It is a tool and equipment that is used to process a data from user’s input to perform a certain task. In this study, device is an electronic equipment that is used to access the cloud storage.

Diversified - It is to make or become more diverse or varied. In this study, diversified is used as a term to offer not only one service but different services to users.

DOCSS - Diversified Online Chat and Storage for Students. In this study, DOCSS is a system that provides storage and chat to students.

File – It is a folder in a particular order for preservation and easy reference. In this study, file is used to locate and separate the file of the user in the cloud storage easily.

Functionality - It is the quality of being suited to serve a purpose well; practicality. In this study, functionality is used to the range of operations that can be run on a computer or other electronic system.

Internet – It is a network system that allows the users to connect with the computer. In this study, internet is used to access the cloud storage on the website.

Online - It is that a computer or a device is connected to a network. In this study, online is used as a medium such to upload files on the internet.

Reliability - It is the quality of being trustworthy or of performing consistently well. In this study, reliability is used whether the system performs according to its specification

Security – It is the protection of computer systems and information from harm, theft, and unauthorized use. In this study, security is used to protect the data of the users in the cloud storage.

Sorting – It is a process that is used to organize data in a particular order. In this study, sorting is used to organize the data of the user in the cloud storage to find the information easily.

Storage - It is the action or method of storing something for future use. In this study, storage is used as a space available for storing files or documents.

Students - It is a person who is studying at a school or college. In this study, student is used as a beneficiary of the system.

Website – It is a collection of numerous web pages that can be accessed online by using a browser. In this study, website is used to access the cloud storage without using the device storage.

Chapter II

# REVIEW OF RELATED LITERATURE

This chapter discusses literature and research work found relevant to the topic on hand. It is divided into related literature and related studies. The latter is further divided into studies with local and foreign setting.

## 2.1 Related Literature

**2.1.1 Cloud Storage**

A paper entitled a “Study on Cloud Storage” pp. 967-968 according to M. Lakshmi Neelima and M. Padma, both assistant professor at CSE. Dept, GPREC, Cloud storage is a service that retains data, manages and backs it up remotely, and makes it available to customers through a network (via the internet). There are 3 types of cloud services, mainly Software as a Service, Platform as a Service, and Infrastructure as a Service. All the services are based upon the “Pay-per-use” model. Software as a Service (SaaS) is a service provider hosts an application, which a customer subsequently accesses over the internet. It is mostly aimed at end users. Because the software is controlled centrally, customers may use the program at any time and from any location; all they need is a web browser. Platform as a Service: With these kinds of services, one may run an application without having to install the software on the local computer; software can be delivered on cloud infrastructure. The key advantage of PaaS is that developers do not have to worry about platform changes or storage. PaaS providers take use of these advantages. Infrastructure as a Service (IaaS) IaaS, unlike SaaS and PaaS, offers hardware as a service. Memory, servers, networking devices, and computing power are among the resources. The application is implemented using these. Virtual machines allow many users to access infrastructure. When the client can store and manage data at a cheap cost through the use of cloud, the notion of cloud storage is not worth it. Therefore, the cloud should be structured in such a manner that it is cost effective, autonomous, multi-tenant, scalable, available, control, and efficient. Cloud storage is now arising as it has several benefits, namely disaster recovery wherein one can retrieve files if accidentally deleted, application may be accessed easily, low cost of maintenance, flexibility and such.

The study “Cloud Storage” pg. 8 & pg. 13 as reported by Md. Adib Ibne Yousuf and Md. Atiqul Haque, a masters of Business Administration from Bangladesh University of Professionals (BUP), a cloud storage service's primary job in this procedure is to manage a pool of storage spread across several locations. It's a simpler and easier way to retain data on a cloud storage since the control techniques and management control are significantly superior to any other storing method. They have hundreds of different servers that are mutually connected in a grid structure in cloud storage. As an individual directory, this is how the entire system operates. The great thing about Cloud Storage is that users' employees and customers may access the data without risking handling personal information over the internet. Data sharing has never been easier thanks to cloud storage. Thousands of emails are no longer required. Simply upload the files to the cloud and distribute the URL with as many people as you desire. The document can be checked out and downloaded at any time by the receivers. This serves the essential goal, and your data remains safe and secure under your administration.

For individuals who want to focus on the security of their data, cloud storage is always a preferable option. The cloud's mobility benefits are constantly growing for organizations of any size. Anyone can work (and play) whenever and wherever users choose in today's connected society. Anyone can still work – and work productively – while waiting for a flight at the airport or at home with a sick child.

In accordance with the paper entitled “A Literature Review on Cloud Computing Adoption Issues in Enterprises” pg. 215 by Rania El-Gazzar a professor from Department of Strategy and Finance PhD in Information Systems, the metaphor "cloud" was around before it was initially used as an analogy for the Network in diagrams, which is a "old idea whose (finally) time has come." Cloud computing is a new strategy for IT service sourcing that creates benefits for embracing enterprises, in line with the concept of shared services. Cloud storage is sometimes referred to as "Network cloud computing provider." Hold the potential to modify what organizations obtain and maintain internet resources in the best possible and expense manner. Cloud is already around old times however cloud is only now arising. With the emerging technologies, cloud storage is beneficial as it maintains the potential to change how corporations get and manage internet resources in the most efficient and cost-effective manner. Having this software, organizations can easily retrieve and access their files anytime and at any location.

Based on the Cloud-Based Storage for Education pp. 78-79 by Sushma Satpute, and Dr. Barat Singh Deora an assistant professor, the following aspects of the cloud storage are relevant and can be used for educational institutions and among the students and faculty.

1. Data Sharing:

The first is transfer of data among multiple components. Cloud storage is quite beneficial when it comes to exchanging data and information. The cloud storage service provides capabilities for sharing the data in the account. The hosting account user may choose what data is shared and publicize URLs for some to view the files.

1. Data Synchronization:

Data Synchronization is one of the most essential properties of cloud storage. A certain file saved to cloud storages in schools may be immediately synced across all devices, including computers, laptops, and devices. For instance, if a file is saved to a cloud-based storage account from a desktop, the file may be accessed and changed on other devices such as a mobile, laptop, or any other device with internet connection, since it is stored on the cloud-based storage account. Other devices synced to the same storage account will see the modifications made to the document.

1. Collaboration:

Collaboration is made easier with cloud storage. Consider a situation in which a group of students is cooperating on a project. The project demands the sharing and distribution of a collection of documents within the project team. The files must be kept in a central location that is accessible to all project team members.

1. Data Backup:

In cloud computing, data backup is kept at a cheap cost. The difference between cloud backup and normal backup is that the procedure is considerably easier, and the data is sent to a host via the online rather than cloned to a local server. The data is directly removed from the site, which is a benefit.

The role of data storage can indeed be emphasized, and with the rising utilization technologies by the school-aged population, it is critical for educational institutions to implement cloud-based storage. With all the advantages that are stated, online storage with chat will be more beneficial as it acts as all in one system. Where they can collaborate, share, upload and store files and lastly is to communicate with others via chat.

An article entitled “Mental Models for Cloud-Storage Systems” by Raluca Budiu from Nielsen Norman Group, a World Leaders in Research-Based User Experience. States Why People Use Cloud Storage? Participants in the survey gave many key reasons for adopting these systems, which are given below in order of frequency:

* Sharing information with others
* Access to documents from everywhere
* Transferring and syncing information across devices
* Collaborating on documents and other files with others
* Extended storage and backup or file archival

Because of their integrations with Google Docs/Google Sheets and Microsoft Office 365, Google Drive and OneDrive were the most popular options for collaboration. Dropbox also provides a document co-creation and collaboration service called Paper, but none of the users had heard of it. While all these cloud providers offer cloud storages, the amount of gigabytes differ from each other. The largest gigabytes that offers free storage is Google Drive. In this study, researchers are planning to surpass the amount of free storage of Google Drive. And if not, at least offer a decent amount for storage and include chat as means of communication without having separate Gmail of users.

**2.1.2 Cloud Computing**

A study entitled “Cloud computing vs grid computing” pp. 188-193 written by Seyyed Mohsen Hashemi, Dean of the Software Engineering and Artificial Intelligence Department, Science and Research Branch, Islamic Azad University, Tehran, IRAN and Amid Khatibi Bardsiri from Computer Engineering Department, Bardsir Branch, Islamic Azad University, Kerman stated that Cloud computing is a concept for providing on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that may be swiftly supplied and released with minimal administrative effort or service provider contact. Cloud computing emerges as one of the hottest topics in field of information technology. Cloud computing is based on several other computing research areas such as HPC, virtualization, utility computing and grid computing. According to them, Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), and Software-as-a-Service (SaaS) are the 3 most important forms of cloud computing services. All kinds of companies are providing all kinds of cloud computing service, from software application to net storage and mail filter. They believed that cloud computing will become the main technology in our information life. Cloud has owned all the conditions.

As indicated in the paper “Cloud Computing Trends: A Literature Review” pp. 91-101 written by Dr. Nasser Taleb, Doctor of Philosophy, and an associate professor in the Faculty of Management, Canadian University Dubai and another author which is Elfadil Abdalla Mohamed, Ph.D. in Computer science, M.Sc. in Computer Science, and B.Sc. Honour in Computer Sciences and Statistics. He is currently working as an Assistant Professor at College of Information Technology, Ajman University, United Arab Emirates. As stated in their paper, Cloud computing is a type of dynamic application and storage that makes use of Internet technologies. On-demand self-service, broad network access, resource pooling, quick flexibility, and measured service are five main characteristics of cloud computing (Armbrust, Fox, Griffith, Joseph, Katz, Konwinski, & Zaharia, 2010). In addition, there are three key categories of cloud computing services, and those are: Infrastructure as a Service, Platform as a Service, and Software as a Service (Mell & Grance, 2011). Furthermore, cloud computing can be used in four different ways: public cloud, private cloud, community cloud, and hybrid cloud.

The benefits of cloud computing include increased processing power, storage, flexibility, scalability, and lower IT infrastructure overhead costs (Rajaraman, 2014). Startup companies were able to benefit from moving to a cloud environment by redirecting capital expenditures into operating expenditures, making cloud computing desirable while cutting IT expenses. The smallest businesses are the most likely to use cloud computing, whereas medium-sized businesses have lower prices, and businesses with less than a hundred employees have the lowest prices (Bloom & Pierri, 2018). Larger organizations have enough processing capacity in-house. Cloud computing, on the other hand, has several drawbacks (Ashari & Setiawan, 2011), such as the need for Internet access, speed, and direct access to resources. As a result, organizations may find it untrustworthy to rely solely on cloud-computing service providers. Any disruption in cloud services should cause businesses significant harm (Grigoriou, Retana, & Rothaermel, 2012). The main benefits, according to Karkonasasi, Baharudin, Esparham, and Mousavi (2016), are cost savings, security, privacy, and reliability. Stakeholders anticipate that the issues with cloud computing adoption will be lessened or eliminated in the near future.

Cloud computing has become a valuable asset for businesses looking to better serve their customers and stay competitive. Their mastery of data storage efficiency and effectiveness has created a demand for more storage space. As a result, service providers must seek to expand online data center capacity. According to Cisco (2018), the cloud stored 547EB of data in 2018. Firms benefit when more storage space becomes accessible, allowing them to store higher amounts of data. Companies can store, analyze, and gather useful information about customers' information, desires, and actions using these massive data caches (Duan, Fu, Zhou, Sun, Narendra, & Hu, 2015).

“Detailed Literature Review on Cloud Computing” pp. 35-43 written by Archana Srivastava, a Sr. Lecturer. She Completed Bachelor of Science in 1996 and Master of Computer Application in 2005. She had completed her M.Tech in 2010 and currently pursuing Ph.D, and currently working as Associate Professor, School of Computer Applications, Babu Banarsi Das University, Lucknow, India since 2005. According to this paper, Cloud computing is an architecture for providing computing services over the internet on demand and on a pay-per-use basis to a group of shared resources, such as networks, storage, servers, services, and applications, without physically acquiring them. Cloud DBMS is a distributed database that provides computing as a service. It is the network-wide sharing of web infrastructure for resources, software, and information. The cloud is used for storage, and databases can be accessed and computed from any location. In this paper, I discussed the cloud and its applications. How we can implement cloud for improved performance, as well as the various benefits and drawbacks of cloud that we can improve in the future.

Web-based network management based on databases presents a viable mode for network information processing and has the characteristics of wide distribution, full interactivity, real-time dynamic, and so on in the application; and is beneficial to timely network performance adjustment and rapid fault recovery. A cloud database management system is critical for this purpose. Cloud computing is a broad term that refers to a new type of network-based computing that occurs over the Internet. Cloud Computing is a natural progression from Utility Computing. It is a collection/group of integrated and networked hardware, software, and Internet infrastructure, which provides hardware, software, and networking services to clients via the Internet. The advantage of this is that these platforms hide the underlying infrastructure's complexity and details from users and applications by providing a very simple graphical interface or API (Applications Programming Interface).

A significant distinctive feature of a thriving information technology (IT) sector is its capacity to contribute to cyberinfrastructure in an accurate, valuable, and cost-effective manner. Cloud computing is a broad term for a type of network-based computing in which a program or application runs on a linked server or servers rather than on a local computing device like a PC, tablet, or smartphone. Cloud computing is a distributed architecture for providing on-demand computer resources and services by centralizing server resources on a scalable platform. It is a shared Pool of configuration computing.

A paper titled “Review Paper on Cloud Computing” written by Priyanshu Srivastava, an Assistant System Engineer Tata Consultancy Services Limited and Dr. Rizwan Khan, B.Tech (CSE) from BIT, M.Tech (CSE) from IETE and Ph.D (CSE) from Jamia Millia Islamia. Currently working as Professor & HOD (CSE) at ABES Institute of Technology, Ghaziabad (UP), India. Based on their paper, in cloud computing, the phrase "cloud" refers to a cluster of networks. The user has unrestricted access to cloud computing modalities at any time. Users typically prefer a middleman provider for internet service in cloud computing over setting up their own physical infrastructure. Users must only pay for the services that they have used. The networks that make up the cloud handle the load of services, which is why the demand on local computers isn't too high when operating an application. As a result, user hardware and software requirements are reduced. To use cloud computing, all we need is a web browser.

Cloud computing offers three services: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) [1]. Facebook, YouTube, Dropbox, and Gmail are some of the most common examples of cloud computing that people use on a daily basis. It provides scalability, flexibility, agility, and simplicity, which is why its use in enterprises is rapidly increasing.

**2.1.3 Chat**

As stated in the paper entitled "Implementing a Proactive Chat Widget in an Academic Library" by Lydia Pyburn page 14 of a publication. If digital users request support on a regular basis, they must be addressed. This is more challenging for people using the internet since they cannot be reached by in-person cues when they want an assistant. Proactive chat widgets, typically slide out of the interface and solicit the user for help, to overcome this problem. Students seeking help thru chat while using the university's services, according to statistics, must be able to see a proactive chat widget. This section will describe the benefits and drawbacks of incorporating a proactive chat widget on the library's Web site, catalog, and databases, including an assessment of proactive chat software, participation between library sectors to evaluate and generate the widget, chat record viewpoint for scope and acquiring knowledge, and the numerous additional organizations that oversee the web based.

According to NONAKA & TAKEUCHI (1995), the majority of knowledge management is derived via human interactions. In order to enhance productivity, people frequently utilize other people's answers. Individuals communicate via synchronous (e.g., message exchange in a chat), asynchronous (e.g., electronic mailing lists or forums), direct (e.g., two individuals conversing), and indirect (e.g., two people discussing) interactions. Recommender systems are preemptive tools in that they may provide answers without the need for users to seek, question, or hunt for them. People may not need to seek information since a software system will select whether to suggest. This type of system is extremely beneficial when there are a lot of alternatives to pick from and people don't know much about them. This paper provides a recommender system for persons utilizing a Web chat for knowledge exchange. Throughout an online debate, the system sets standards contextual to the textual communication that takes place during the conversation among participants. The system employs an ontology and a Digital Library to select what to propose. The chat works in the same way as traditional online conversations. The distinction is that it was built specifically for this system and is only accessible to active accounts. Users must be authorized in order to utilize the system. The number of people interacting at the same time has no limit. There is currently just one chat channel available. As a result, a context covers all messages delivered during the day. This limitation will be lifted in the meantime. The Recommender Module's objective is to provide conversation parties with electronic documents kept in the Digital Library. Only objects categorized in the idea described within mail are approved by the program, which utilizes a knowledge approach. This module performs after it receives a suggestion from the Text Mining Module. The program then searches the Digital Library for items with the same topic. The Text Mining Module transmits an idea to the Recommender Module every time it recognizes one in a message. Similarly, the searches take place online, or as soon as the Recommender Module gets a thought. Since the forum is simultaneous, proposals should not disrupt the conversation. As a result, instructions are presented in a separate frame rather than within the chat window. Every user's recommendations are unique. Therefore as result, each visitor on certain website sees a different set of ideas. The Recommender Module makes use of a Profile Base to record information about every other user's demographics and network history, such as things browsed from, posted to, or downloaded from the Digital Library. This paper developed a recommendation system for analytical thinking and dissemination in a Web chat conversation. People are given proposals for electronic materials without having to search the digital library, allowing for preemptive data acquisition. The system's key benefit is that it relieves the user of the stress of searching for information during an online debate. To obtain database entries, users do not have to specify qualities or needs from a menu of possibilities. How much and what information to propose to the user is decided by the program. Non-experienced users who receive hits regarding what to read in a given subject will benefit from this comprehensive approach. The technology automatically detects the sender's information required during the chat.

According to Manuel B. Garcia, a Ph.D. in Information Technology at the University of the East, who wrote the research "E-Learning Technology Adoption in the Philippines: An Investigation of Factors Affecting Filipino College Students' Acceptance of Learning Management Systems. When education and technology are joined, they may create dynamic teaching and learning experiences that are specifically designed to grow and change the educators and learners needed to power the digital economy. However, for different reasons, a considerable segment of the public, notably students, remains resistant to educational technology advancement. The goal of this research is to determine which factors impact students' use of e-learning technologies in the Philippines, namely Learning Management Systems (LMS). The Technology Acceptance Model now includes new predictor variables such as Internet Connectivity Experience (ICE), Social Media Influence (SMI), Integrated Multimedia Instruction (IMI), System Interactivity (SI), and Perceived Quality Work of Life (PQWL) (TAM). The constructs were determined using the three-tier usage model (3-TUM), which was designed to investigate users' attitudes toward technology on three levels. The study's target group was Filipino students from colleges who are seen as champions of e-learning integration in the Philippine educational system. The AMOS-based structural equation modeling (SEM) approach was used to analyze empirical data of 629 Filipino college students. Finally, a channel model was established to evaluate the relationships seen between variables that illustrate students' acquisition of e-learning platforms from the standpoint of knowledge management reception. Consequently, it presented practical and technical implications that might aid educational leaders, educational technologists, educators, and learners in the creation, deployment, and adoption of e-learning technology like LMS in local and global school contexts.

The study used the TAM with additional predictor variables (internet connectivity experience, social media influence, integrated multimedia teaching, system interactivity, and perceived quality of work-life) to model the behavioral intention to utilize e-learning technology of Filipino college students. Apart from the assessed improvement of work, the foregoing new predictors, together with the original TAM predictors, play a vital role in Filipino college students' adaptation to e-learning platforms in the Philippines. While the study was effective in identifying characteristics that may influence Filipino college students' behavioral intention to use LMS, it does have certain limitations. To begin, an online questionnaire was used to collect self-reported data from various colleges and institutions. In terms of sample and variables, the current study was conducted in the setting of the Philippines (Filipino college students), hence the findings' application and generalizability are restricted. Nonetheless, future researchers might use the same proposed paradigm in primary and secondary education to confirm the findings of this study. Furthermore, the extra predictors introduced specifically for the Philippine setting expand future study opportunities. Findings might be explored through a comparative analysis if comparable research is duplicated in other countries for further inquiry. Other elements, such as group impact, cultural lineage, and other effects, might be investigated to overcome the drawback of not utilizing cross-sectional data. The findings are also intended to be one of the first to provide information on e-learning acceptability in the Philippines.

**2.1.4 File Management**

In a paper entitled Design and Implementation of an Electronic Document Management System pp. 9-17, according toA. Ismael & I. Okumus, both professors in Kahramanmaras Sutcu Umam University, to manage and organize the increasing number of electronic files stored on servers, an electronic document management system (EDMS) is used. An organization needs to have a document management system for storing, managing, and securing files. This paper explores the development of a document management system that includes features for storing, securing, searching, and managing files. Researchers evaluated the performance of users while using two file management systems: traditional document management systems and electronic document management systems. Due to the features and benefits, some organizations have switched from traditional to electronic document management systems. Businesses and educational institutions must implement an electronic document management system to organize files and improve work performance.

In accordance with the study entitled Electronic Document Management System for Kırıkkale University, according to M. Basibuyuk & A. Erguzen, both professors in Kırıkkale University**.** At this time, Universities tend to create files that can be accessed and shared easily and efficiently with other people depending on what documents they need. They are using document management to access files that can be used in learning, preparing, and planning. An Electronic Document Management system is used to efficiently access, store and organize the documents of the university.

A study entitled Investigation of Document Management Systems in Small Size Construction Companies in Jordan pp. 3-9, according to H. S. Ahmad, I. M. Bazlamit & M. D. Ayoush, professors in Al-Zaytoonah University of Jordan, there are many functions of Document Management like storing, organizing, controlling, and retrieving information and documents. Having an effective Document Management system will help companies and educational institutions to have efficient and successful work, facilitate and access stored documents, reduce the cost, and improve the quality of work.

In accordance with the paper entitled Electronic Document and Records Management System (EDRMS) by A. Ab Aziz, Z. Yusof, & U. Mokhtar, Faculty at the University of Kebangsaan, an electronic document management and record management systems (EDRMS) is an effective method for handling large volumes of documents (EDRMS). This system organizes the operations of the organizations and other educational institutions by managing documents and records. This system offers numerous benefits to the organizations and institutions by generating accurate, fast, and accessible servers at lower operating costs such as providing strong security to the organizations and institutions to protect the confidential documents from the unauthorized person who wants to use the other person’s personal information.

A paper entitled Document Management System pp. 2026-2028, according to P. Chawan, A. Jadhav, K. More, & A. Gote, a Bachelor of Engineering and Information Technology from Vidyalankar Institute of Technology of India, a document management system is an essential part of educational institutions in managing, storing, updating, searching, and retrieving electronic documents due to the volume of data increases over time. This system is created to address all the issues in managing documents. This system will help users in storing documents on a secure server, which requires users to enter their personal generated passwords before accessing the server. This feature will help users effectively protect their personal information as well as their electronic documents.

“Analysis of the Effect of Electronic Document Management System, Organizational Commitment and Work Satisfaction on Employee Performance PT.” Graha Fortuna Purnama pp. 955-954, according to R. Andriansyah, a planning, evaluation & monitoring specialist & F. Elmi, a lecturer at Mercu Buana University, the main problem of this study is the lack of knowledge of PT. employees in using Electronic Document Management System properly at Graha Fortuna Purnama. It is important that the organization have proper training in utilizing EDMS and seminars on the significance of managing and utilizing EDMS to improve employee performance. Electronic Document Management System (EDMS) helps businesses to reduce the cost of materials and facilities, increase the performance of the employee, and store documents effectively. It shows that EDMS has a significant impact on employee performance.

In a paper entitled EndNote as document manager for summative assessment pp. 124-125 by Dr. A. Kali & Dr. S. Srirangaraj, both Professor in the Department of Microbiology, a summative assessment is an essential part of every educational institution that is necessary to have a reliable and secure document management system. EndNote offers affordable prices for educational institutions to store documents in EndNote libraries (ENL). This system can be used as a document management system for summative assessment. In conducting a summative assessment, it is important to have a document management system that can easily store documents, protect documents from unauthorized persons, and upload files.

In accordance with the paper entitled Document Management System Based on Paperless by Susanty, W., Thamrin, T., Erlangga, & Cucus, A., faculty of Computer Science in Bandar Lampung University, the possibility of losing a paper documents and expensive storage costs are the major issues for many organization. To address these issues, the researchers proposed an effective solution which is the Document Management System. In this system, the paper documents will be converted into electronic documents and saved in the server that can be access easily with only those who are authorized to maintain the safety of the documents. With the help of this system, the organizations and educational institutions can reduce their paper documents to reduce the cost and space for the storage.

According to the paper entitled The Reality of the Application of Electronic Document Management System in Governmental Institutions pp. 1-14 by M. Al Shobaki, S. Abu Naser, & M. K. Kassab, a faculty at Al-Azhar University, the purpose of this study is to assess the impact of Electronic Document Management Systems (EDMS) in the Palestinian Pension Agency. This system helps the organization manage and organize confidential documents. This system helps the organization manage and organize confidential documents. It demonstrates that the system's goal is to organize, store, monitor, and secure documents. It shows that the purpose of this system is to organize, store, monitor, and secure documents. EDMS assists users in securing their confidential documents, which is essential in a cloud storage environment. Organizations and students must use EDMS to protect their privacy and electronic documents from document loss or unauthorized access.

“Opportunities and Challenges in Implementing Electronic Document Management Systems” pp. 36-39 by A.Haider, B. Aryati, & B. Mahadi, Faculty of Computing in Malaysia, information and communication technology (ICT) has a significant impact on how we communicate, learn, and work in our daily lives. Organizations use the Electronic Document Management System (EDMS) to effectively manage documents. The transition from paper-based documents to electronic documents changed the way users use and organize documents. EDMS helps organizations to manage documents, operations, file transfers, and locate files easier to make the employee perform effectively. EDMS benefits not only organizations but also other users such as students. Students can easily utilize EDMS to store and manage their files in school effectively.

**2.1.5 File Sharing**

As stated by Lance Whitney (2021), uploading the file to a cloud storage provider for the other person to access and download from their device is a simple option. People can use a third-party file transfer website instead of using email. Upload the file to send and fill in the name, email address, and recipient's name and address. The site stores the file online and sends a download link to a specific recipient.

To send data, file sharing relies on computers establishing networks. Each computer (or node) on the network can agree to share certain files and file sharing software enables users to search for and download files from other computers on the network. Clients are nodes that request information; servers are nodes that fulfill requests, and peers are nodes that do both.

ICT provides users with the opportunity to electronically upload, access, and share files all over the world. This thing can increase the productivity of people's file sharing, it can handle the file in a good manner means it needs confidentiality and it is all about people's privacy so doing such a technology is the good way because cloud computing has various security mechanisms in place, such as user authorization, only authorized individuals may access or share Cloud structures can be applied to permit statistics sharing capabilities, that could deliver numerous benefits to the user. There is currently pressure for IT companies to improve their statistics sharing efforts. Cloud computing technologies offer the potential to improve constructivist and cooperative learning instructional approaches. Cloud-based application capabilities such as file sharing and online publishing are encouraging education departments across the country to adopt these technologies.

According to an essay written by Frances Grodzinsky and Herman Tavani entitled Online File Sharing: Resolving the Tensions Between Privacy and Property, P2P users have a reasonable expectation of privacy, which is based in part on the fact that Privacy policies and distributed architectures that were established in part to protect clients' anonymity. IP addresses that permit file sharing among clients are appropriate to those involved in the sharing process, according to appropriateness rules. In some highly dispersed configurations, these address strings are further randomized to guarantee anonymity, even among users sharing files. Email accounts and upgrades concerning P2P services are available to individuals who wish to create accounts and subscribe to the services, according to distribution criteria; these are utilized purely within the P2P service and are not shared with third parties.

There is a vast diversity of instructional technology tools available today. These tools have altered how teachers educate and students learn. Online collaboration tools are among the various educational technology applications that are gaining popularity. Online collaboration tools are web-based applications that enable people to work together online on tasks such as chatting, file sharing, and evaluation. However, when new instructional technology is introduced into the classroom, its impacts must be assessed, as this is a necessary component of evaluation. Having the instrument is not enough; it must be evaluated in order to be more successful.

**2.1.6 Design**

According to "A Literature Review: Website Design and User Engagement" pg. 2 and pg. 4 by Renee Garett, MS, LCSW, Jason Chiu, MS, Ly Zhang, and Sean D. Young, all PHd, Little study has been done to determine the exact characteristics that make up good website design. Usability is one of the most important design criteria. Usability is defined by the International Standardized Organization (ISO) as the degree to which consumers can accomplish assigned duties (e.g., access preferred information or place an order) in just a system with efficiency (task completion and accuracy), efficiency (work time being spent), and satisfaction (consumer experience).

Navigation (62.86 percent), graphical representation (60 percent), organization (42.86 percent), content utility (37.14 percent), purpose (31.43 percent), simplicity (31.43 percent), and readability (31.43 percent) are its seven website design components most frequently discussed in relation to user engagement in the reviewed studies (31.43 percent). The identified factors have been included in a small selection of website design features to operationalize good website design since they met the criteria of 30% representation in the literature.Website Design varies on each organizations and different objectives. For example, e-commerce seeks to design websites that radiates loyalty and profit. However, in this study, the website must give off simplicity and user-friendly interface to users.

"Website Development Using Modern Design Features and Future Web Trends" from pp. 11-12 by Ishan Raj Regmi, who conducted a bachelor's thesis in Degree Programme in Information Technology states that the webpage must cater towards its target market, and engagement is essential. Users read all the time, but that doesn't imply they're paying close attention to what they're reading. It's important to be able to develop the website and create the information in such a way that they make an impression and pay attention.

The following points were gathered as main points regarding future web trends.

* Single page web design
* Emphasis on typography/ Minimalist design
* Mobile ready version/ touch screen version
* Responsive Web design
* Fixed headers

Other online trends were always thought to be far off in the long term. One of most essential trends, according to most experts, are responsive web design and simple web design.

**2.1.7 Content**

A related study by Meinald T. Thielsch and Gerrit Hirschfeld of the Department of Psychology, University of Münster, Germany, and the Faculty of Business Management and Social Sciences, University of Applied Sciences Osnabrück, Germany, entitled "Facets of the website content," pp.1,4-40. Content is of primary importance on the World Wide Web. In particular, subjective perceptions of content are known to influence a variety of user evaluations thereby altering attitudes and behavioral outcomes. As a result, it's critical that personally significant information aspects be properly appraised. In a series of seven studies we create, validate, and benchmark a measure for users’ subjective views on web content. In the first six studies, a total of 3,106 participants evaluated a sum of 60 websites. The Web-CLIC questionnaire is a 12-item test derived from previous content management research. It encloses four main facets of users’ content experience: clarity, likeability, informativeness, and credibility – jointly representing a general factor of subjective content perception. Overall, the results of this study demonstrate that the Web-CLIC is a reliable indicator of subjective content perceptions including both theoretically and practically advantages.

The Internet has now become an inseparable part of everyone's life. Most of the time, we use it to search for and receive specific pieces of information (Dinet, Chevalier, & Tricot, 2012; Koch & Frees, 2016). The information is perceived, i.e. web content, is a primary factor for website success (Agarwal & Venkatesh, 2002; Palmer, 2002; Thielsch, Blotenberg & Jaron, 2014). The contents are the most significant aspect of this webpage. If the users comprehend, presume, and value the information supplied will they be willing and able to implement it, potentially increasing their chances of quitting smoking (see Lehto & Oinas-Kukkonen, 2011). There are various methods for investigating web users' judgments of accessibility and appearance, but no formalized method for measuring content management perspectives. You'll have no trouble obtaining high-quality equipment to test each of these features from the visitors' perspective to guarantee that your webpage is as productive as possible. The substance, however, is the most significant aspect of this website. Only if readers comprehend, presume, and value the information offered will they be able and willing to implement it, potentially increasing their chances of quitting smoking (see Lehto & Oinas-Kukkonen, 2011). However, establishing a practical measure that is trustworthy, precisely adapted to assess users' opinions of web material, and appropriately verified would be a huge challenge. The reason for this is that content is sometimes only addressed as a minor factor in instruments designed to assess website quality in general – or is simply assessed using single-dimensional items and unverified ad hoc measures (see below). As a result, the purpose of this article is to gather more information that evaluates users' subjective evaluations of online content. Such a measure can help researchers and practitioners to a) improve the understanding of a website's content impact on users’ behaviors, b) optimize websites for specific target groups and deliver the best services possible, and c) analyze the interplay among content, usability, and design evaluations. Subjective perceptions of digital content are defined as users' perceptions and experiences, sentiments, and assessments as a result of interacting with a website's offered content objects.

The study focuses on subjectively content management assessments and how to quantify them using the newly designed Web-CLIC. Clarity, likeability, informativeness, and credibility are four metrics that together describe a generic component, the subjective assessment of material. An extensive quality tests, the Web-CLIC showed high reliability and construct validity. Particularly, as shown in an experimental validation, Web-CLIC scales are sensitive to corresponding changes in the website content. In addition, the Web-CLIC can anticipate user intentions and behavior. As a result, we strongly encourage similar studies to utilize its scale, and we've supplied further analysis aids like ideal cut points and benchmarks to make it easier to apply in practice. In conclusion, the Web-CLIC is a reliable and valuable metric that allows for a precise assessment of users' interpretive content impressions.

Zhao Pu et.al (2020) stated that the content distribution based on cloud storage, as opposed to traditional access networks (CDNs), provides the advantage of lowering storage requirements while offering improved data protection. There has also been a lot of research on digital distribution systems, although it is rarely employed in cloud storage based CDNs. This research investigates cloud storage accounting and delivery mechanisms, as well as a reliable network design and resource availability. A better content delivery method optimization algorithm in cloud storage is presented, which successfully decreases the content delivery cost, based on the findings of emerging heuristic algorithms such as subscriber greedy and host greedy. The advantage of a cloud storage-based CDN is that it may provide an expanded number of different hosts for streaming internet companies, allowing us to expand coverage without spending a lot of money on facilities. Current CDN digital distribution system research, on the other hand, overlooks cloud storage's network design and pricing mechanism, making it more difficult to adapt to cloud storage based CDNs.

**2.1.8 Functionality**

A study entitled “Cloud Computing Trends: A Literature Review” pp. 91-93 written by Nasser Taleb, Doctor of Philosophy, and an associate professor in the Faculty of Management, Canadian University Dubai and another author which is Elfadil Abdalla Mohamed, Ph.D. in Computer science, M.Sc. in Computer Science, and B.Sc. Honour in Computer Sciences and Statistics. He is currently working as an Assistant Professor at College of Information Technology, Ajman University, United Arab Emirates. On their published paper, they have stated different functionalities of cloud computing in different aspects. According to the researchers, Cloud computing was established by companies to give safe data storage and processing capacity to businesses and individuals. Cloud storage is used by a wide range of businesses (Mei, Li, & Li, 2017). Cloud computing, or just computing, is a type of dynamic application and storage that makes use of Internet technologies. On-demand self-service, broad network access, resource pooling, quick flexibility, and measured service are five main characteristics of cloud computing (Armbrust, Fox, Griffith, Joseph, Katz, Konwinski, & Zaharia, 2010). In addition, there are three key categories of cloud computing services: Infrastructure as a Service, Platform as a Service, and Software as a Service (Mell & Grance, 2011). Furthermore, cloud computing can be used in four different ways: public cloud, private cloud, community cloud, and hybrid cloud.

Cloud computing advances will meet businesses' current and future needs. Because businesses rely so much on technology, cloud computing allows them to store and access data at any time. Cloud storage has exploded in popularity as a result of this feature. Over time, service providers hope to grow the number of services they offer, which is likely to include better analytics. There are several advantages to using cloud computing and cloud storage services. More businesses will keep their data in the cloud and pay service providers to perform cloud-based data analytics as time goes on. Even more significant is the fact that firms will have no choice in the future. but to keep their data in the cloud. Data security and the ability to exchange and access data will be key factors in business competition. Organizations are likely to become more intertwined in the future. Businesses require a dependable cloud computing environment that satisfies their requirements. Ideally, worldwide corporations will devise a strategy to optimize their cloud computing usage.

**2.1.9 Reliability**

A paper entitled Efficient and Reliable Secure Cloud Storage Schema of Block Chain for Data De-duplication in Cloud pp. 1547-1556, according to K. V. Panduranga Rao, a research scholar, & Dr. V. K. Reddy, a professor in CSE Department, de-duplication in cloud computing pertains to huge amounts of data stored on the server. Cloud storage is becoming more difficult to reduce data, increase storage capacity, and improve security. Secure de-duplication employing convergent encryption detects duplicate data in multiple users' data. To address the issue of having a huge amount of data in the system, a Novel Block Chain Based Secure De-Duplication Authentication Scheme (NBSDAS) with high reliability and confidentiality is used. The files are transferred to different servers and recorded on a time-stamped block chain in this system. It shows that this system improves data and storage reliability and security by allowing users to manage and organize data.

According to the paper entitled Proactive replica checking to assure reliability of data in cloud storage with minimum by D. Murarka & G. Uma Maheswari, associate professor in Department of Computer Applications of Vellore Institute of Technology University, data reliability and storage costs are the main issues in cloud storage. The multi-replication method is used to ensure data reliability protection. This paper proposed a Proactive Replica Checking for Reliability (PRCR) method that offers affordable cost for data reliability and reduces cloud storage consumption by reducing the huge amount of replicas from users' data. It shows that this system allows the users to access reliable cloud storage for a lower cost to protect their data and reduce the consumption of the cloud storage space due to the number of data replicas.

In accordance with paper entitled Spectral Expansion Method for Cloud Reliability Analysis pp. 1-7, according to K. Kotteswari, a Sr. Faculty in Information Technology at Vels Institute of Science Technology & Advanced Studies, & Bharathi – a professor in Information technology at Bannari Amman Institute of Technology, cloud computing is a collection of interconnected systems that provide users with data storage, file storage, and application services. Considering the availability, reliability, usability, security, responsiveness, and elasticity can improve cloud services. The reliability evaluation is required for this multitier cloud system to maintain the model's capacity. A multitier cloud system's reliability is assessed using the spectral expansion method (SPM). Reliability that ensure the cloud is safe and secure from software and hardware vulnerabilities that lower the system performance. Reliability measurement is used to maximize the performance and availability of cloud services.

“Cloud Storage Reliability for Big Data Applications: A State of the Art Survey” pp. 35-47, by R. Nachiappan, B. Javadi, R. Calherios, & K. Matawie, PhD in Western Sydney University, a cloud storage can manage and organize a huge amount of data known as big data by handling and solving vulnerabilities when managing big data and provides availability for storing big data. One of the difficulties in implementing big data on cloud computing is improving reliability while improving and maintaining efficiency in system performance. To manage and organize data failure in cloud storage, numerous data redundancy methods are used. The most common methods of redundancy are replication and erasure coding. Replication is a method of copying and storing the same data in several cloud storage, it is used to protect the data from failure while erasure coding reduces the hardware requirements for storage while keeping costs low improves storage reliability and availability, and expands the advantages of this method, the researchers propose a hybrid method where the replication and erasure coding is combined. The hybrid method is the combination of replication and erasure coding that improved the reliability of the system. It is important to understand the advantages of those methods to improve the reliability of the system at a lower cost.

A paper entitled Cloud Computing Reliability - Failure is an option pp. 4-5, according to M. Yousif, a PhD in computer engineering from Pennsylvania State University and editor-in-Chief of IEEE Cloud Computing, the measurement of cloud reliability is based on the function and availability for which it was designed. Cloud services may also contain deficiencies in hardware and software. The cloud services must have the necessary resources, designs, processes, and procedures in place to ensure that they are secure from attack and that system errors are avoided. Interaction between applications and cloud connectivity is another source of failure that can lead to inefficiencies. Cloud service failures from the storage and implementation should be managed and organized to calculate the cloud service reliability. One of the methods of improving cloud service reliability is Artificial Intelligence (AI). By using this method, the organization can collect and analyze the data from any device to improve reliability, availability, efficiency, and security.

A study entitled “The influence of dependability in cloud computing adoption” by C. Song & Y. Sohn, both PhD in Pohang University of Science and Technology, cloud computing offers numerous benefits. It is important to consider the factors and dependability in cloud computing that differs depending on the type of field and service. Cloud computing dependability is a collection of attributes that include availability, reliability, security, and maintainability. Improving these attributes ensures the dependability and the perception of the users and organizations to adopt cloud computing. The purpose of this study is to examine the impact of cloud computing dependability on the users and organizational intent. In this study, the proposed model is validated by structural equation modeling and multi-group analysis. The functionality of cloud computing is unaffected, but the ease of use is. The continuity of appropriate services in the system to which a technology responds consistently and functions accurately is referred to as reliability. The proposed perceived reliability is concerned with cloud computing service delivery reliability and fault tolerance against failures.

Reliability and high availability in cloud computing environments: a reference roadmap pp. 1-31, according to M Mesbahi, A. M. Rahmani, & M. Hosseinzadeh, PhD in Islamic Azad University, providing highly available and reliable cloud computing services is critical for maintaining customer trust and satisfaction while avoiding operating losses. This paper presented a 'Reference Roadmap' for cloud computing reliability and high availability. Reliability refers to the system that operates without any failures. One of the most important things is to identify the system's failure. This study aims to develop a comprehensive strategy for ensuring high availability and reliability in cloud computing while minimizing performance degradation. A hierarchical model with Markov chains, stochastic Petri Nets, and a reliability block diagram was used to evaluate this study. It shows that implementing redundancy could reduce the probability of failure-related delays. This paper provided a reference roadmap for high availability and reliability problems in cloud computing systems.

In a paper entitled Data Validation And Reliability Proof In Cloud Storage pp. 278-280 by P. Srinivas, B. SC from Pragathi Degree College, & Dr. R. V. Krishnaiah, a PhD rom JNTU Anantapur, cloud storage has issues with data validation, reliability, and outsourcing encrypted data. This system keeps a single cryptographic key and do not save any data. Before storing the file in the documents, the system processes it and adds some metadata to it before storing it in the filing system. Metadata is used to validate the data during the verification process. The data reliability procedure checks the data's reliability if it has been illegitimately modified or deleted. Researchers developed a scheme to reduce the storage overhead and to assist the client in obtaining proof of data reliability. As a result, the storage space available to the client is reduced.

The paper “Cloud Computing: Security and Reliability Issues” by F. Ahamed, S. Shahrestani, & A. Ginige, professors at the University of Western Sydney, cloud computing security and reliability continue to be significant issues due to its widespread adoption, and the numerous benefits of cloud computing are perceived as the root causes of its increased risks and vulnerabilities. To address the issue of security, the provision of public key infrastructure for protecting confidentiality, authentication, and privacy that are critical for establishing trust and satisfaction between cloud providers and their clients. The purpose of this study is to improve the security and reliability in cloud computing.

According to the paper entitled Cloud Computing Reliability, Availability and Serviceability (RAS): Issues and Challenges pp. 13-23 by Farzad Sabahi, a PhD in Computer and Electrical engineering, the major problem of this system is associated with cloud computing's reliability, availability, and security (RAS). Cloud computing is an effective technology that can reduce costs while increasing flexibility and scalability. Security, reliability, and availability are the most important issues in cloud computing and these three issues are related to cloud usage. The issue in the system is that the excessive use of a virtual machine and a physical server has an impact on availability and reliability. As a result of these issues, cloud systems are vulnerable to both traditional and new attacks.

**2.1.10 Competency**

According to an article written by Lisa Caldwell (2022), it's a cliché, but the previous two years have been fantastic. We've witnessed a decade's worth of transformation in only 24 months, much of it driven by new technologies like data analytics, AI, blockchain, and Web 3.0. Meanwhile, speech recognition, neural networks, and cognitive systems, all of which have been discussed since the 1980s, now have the computational power and storage costs necessary to realize their full inventive potential. The potential for such centers to transform how manufacturing organizations embrace growth possibilities and mitigate risk is enormous — and exciting. However, in order to fully incorporate innovation into their culture, businesses must stop perceiving it as a solution. They must view innovation as a collaborative and exploratory process rather than aiming for the one big, hot idea that will drive growth and increase performance. A continuous series of steps in which progress is made, risks are taken, and mistakes are made but not repeated.

As mentioned by Baharuddin, Dina Ampera, Hesti Fibriasari, Muhammad Aulia Rahman Sembiring, Abdul Hamid (2021), using cloud computing for e-learning has various advantages, including: (1) Training providers such as training centers of educational services in this model manage educational resources while assuring educational quality becomes more effective and efficient. (2) The task of lecturers in an online learning system based on cloud computing is to fill in online learning system content based on student requests, evaluate the learning process, prepare to learn performance reports, share information and knowledge with other teachers to improve skills and interact with students, parents and the community. (3) The core idea of cloud education character is students as a learning center. Students have the option of organizing their own learning experience. in terms of time and learning resources provided by the curriculum, as well as the circumstances and standards established by the education provider agency. (4) Cloud computing will make it easier for parents to keep track of their children's growth. In a simple method of their child's learning process with this ease, parents will be more involved in assisting the learning process to improve. (5) The public will readily control the progress of education at the educational institution using an internet-based technology, such as cloud computing. (6) Infrastructure and service centralization Cloud computing technology can virtually share the use of infrastructure, so that it is sufficient to build a cloud computing architecture at the center, while other users such as educators, students, parents, and the general public only use the application with all of its conveniences at the web level. (7) Resource effectiveness research: The majority of the learning process takes place in the cloud. Cloud computing, the learning evaluation process, reporting on student learning progress, and information exchange with other instructors all contain learning resource assets. (8) E-learning cooperation and sharing: This technology facilitates collaboration between institutions, engagement and sharing among educational stakeholders, and assessment because all work is carefully documented. (9) Rationality of navigation arrangements: The use of cloud computing in a learning system necessitates an interface with a clear and easy-to-understand module structure so that the application is simple to use and learn, rather than complicated, because this is the essence of using cloud computing technology (Rumetna, 2018).

## 2.2 Related Studies

**2.2.1** **Foreign Setting**

**2.2.1.1 Cloud Storage**

The study named "Cloud Storage Services in Higher Education – Results of a Preliminary Study in the Context of the Sync&Share-Project in Germany" by Christian Meske, Stefan Stieglitz, Dominik Rudolph, Ayten Öksüz from University of Muenster, Department of Information Systems, Germany and Raimund Vogl from University of Muenster, ZIV-Centre for Applied Information Technology, Germany, 2,704 students at University of Muenster participated on their online survey. Their research design is Quantitative Research.

According to the survey, 85 percent of the students presently utilize least one cloud service, with Dropbox (79%) and Google Drive being the most popular (17%). The majority of the respondents became aware of cloud services as a result of recommendations from their circle of acquaintances, such as friends, family, or coworkers (students: 81%). Cloud services are now used by students for project work (83 percent) and educational materials (78%). Cloud services are also utilized for private photos (54%) and other sensitive information (58%). The majority of students claim to consume between 1,1 and 4,9 GB of study-related data (30%). Others (21%) say its amount is between 5 and 10 GB.

The majority of participants currently utilize cloud services like Dropbox or Google Drive, which keep their data mostly on servers in the United States. The goal is to not only compare the findings among universities, but also to draw conclusions about the target user groups' cloud service acceptance rate and necessary average storage amount. Furthermore, a thorough examination of the open-ended questions (factors influencing users' confidence in cloud computing providers) would aid in the development of a broad notion of cloud computing user trust.

"A STUDY OF DOCUMENT SHARING AND MANAGING BEHAVIORS IN CLOUD STORAGE" by Yu-Hsuan Chang from Degree of Master of Science in Information Science studied how the users use their cloud storage and their purposes on using it. The participants were SIL;s master students and other university students who participated in a Quantitative Survey. The system design and participants' prior experiences appear to impact people' actions and choice. Because learning to use a new technology takes time and effort, most individuals prefer to engage by something acquainted to speed up the learning process.

1. *The impact from system and interface design in cloud storage.*

Even while both Dropbox and Google Drive supplied cloud storage, they performed quite distinct roles in the study, with very different interfaces to connect with users. Participants explored Dropbox's functionalities because of the familiarity of the interface, however Google Drive's interface had more confusion.

*2. The impact from collaborating with others in cloud storage*

A few of the features of cloud storage is how it allows users to collaborate and share content. People likely utilized emails to send co-edited files in the past.

*3. Interface vs. interaction: which one might be stronger to influence users most?*

As researchers want to discover how much a new technology may influence users' habits, it's an intriguing question in this behavioral study. Working in collaboration with cloud services looks to be a trend in the future, and cooperative learning, specifically for consecutive projects and programs, still requires administration. This study shows how the features of cloud storage impact the users. The paper stated that working collaboratively can possibly be the new trend since technology are arising for the upcoming years. Students may find it difficult to go to another platform to be able to communicate. With this being said, the researcher's study will try to develop a chat alongside a cloud storage for dual use.

**2.2.1.2 Cloud Computing**

A study entitled “Study Literature of Critical Success Factors of Cloud Computing in Organizations written and published by Lola Yorita Astri, a lecturer at STIKOM Dinamika Bangsa Jambi. She’s teaching data communication and networking. Based on the researcher’s study, Institutions have embraced cloud computing because of its dynamism, scalability, and availability of resources, allowing users to use it virtually. Cloud computing, according to another source, is a new IT technology that is changing the way the internet and information systems operate around the world4. The original idea behind cloud computing was to make software and hardware resources available to both businesses and individuals.

Cloud computing, as the next phase of data center, includes virtual services such as hardware, user interface, and logic applications, as well as a number of QoS (Quality of Service) options based on the customer's needs. The internet6 can help distribute these services. Cloud computing may be the next generation of data storage for businesses. Data management software is one of the cloud computing services. This program will lower the company's hardware maintenance costs in the office.

Cloud computing is a group of configurable computer networks (such as, networks, servers, storage, applications, and services) that may be accessed as an on-demand network with little effort or contact from service providers13,11. Cloud computing, according to another article, is "virtual and distributed computing through the internet using web and software services 14. The utilization of computing resources as a service across a network17 is also referred to as cloud computing. Tenants should be responsible for paying for services they use. The author might conclude that cloud computing is on-demand computing with services that can be accessible via the internet based on the aforementioned definitions.

After investigating the mentioned papers/studies from different authors, the author of this study found that there are eight factors that can be a reason why organizations use cloud computing in their business processes. Those eight factors are:

* Cost Reducing

The profits that cloud computing providers get is from the cost which is paid by the consumers for accessing these services. In other hand, consumers, such as enterprise, are enamored by the chance to reduce costs because of the cloud computing providers reserve “in-house” provision of these services.

* Flexible

Flexibility of cloud computing services can be achieved by proving ability to access its services of any kind of device. It does not matter what kind of hardware and software that providers use.

* Redundancy and reliability

By placing their infrastructures around the world, the cloud computing providers would be able to avoid site failures and provide redundancy also to ensure reliability. Dividing the workload to multiple clouds in many places can save time and more reliable from consumer perspective.

* Scalability

Scalability can be achieved by expanding computing infrastructure. As a center of platform, the application-content makes user can adapt between content items and their needs.

* Collaboration

Another aspect of collaboration is a homogenous manner of management of computer resources from different cloud computing providers. From the consumer side, with proper application, members of group that cloud computing services can share their documents without afraid of outsiders who can access their documents and discuss any topic in that group.

* Efficiency

Using email services that are provided by email providers such as yahoo.com, MSN Hotmail, Windows Live Hotmail and Gmail are an example of efficiency of cloud computing. For receiving professional mail, the company can count on mail providers, with the result that the company do not need to buy equipment to provide mail server for their employees. Moreover, the company does not need to buy a software to create mail server. Those are done by cloud mail system providers. Efficiency can be achieved because of users can access all services everywhere without considering the computer type and its storage, etc.

* Virtually

Using VMs (Virtual Machines), consumers are able to install their own application in their devices. Any application run by the consumer have to be virtual towards computation, storage, and communication model to cover up the implementation of cloud computing infrastructure2. Another fact of virtual of cloud computing is user do not need any background of the services because all of the resources are virtual that can be shared by the users.

* Availability

The providers have control over the contents of cloud computing services in any aspect of study and available to the consumers whenever they requested. To access these contents, a new application is created by the application developers. Many kinds of services are cloud-based applications and can be accessed by the consumers like social network, file sharing, website, and online video viewers. A large cloud computing providers with data centers scattered around the world have the ability to provide a high level of fault tolerance by replicating data across vast geographic distances.

The author found that cost reducing, flexible, virtually, availability, collaboration, scalability, efficiency, and redundancy and reliability as critical success factors the impact of the use of cloud computing for organizations in their business processes. The most critical success factor is cost reducing and the less critical success factor is redundancy and reliability. Further research can be conducted to validate this finding by developing an instrument and take a survey of organizations

According to the study entitled “A Systematic Literature Review on Cloud Computing Security: Threats and Mitigation Strategies” written by Bader Alouffi, he received the Ph.D. degree. He is currently an Assistant Professor with the College of Computer and IT, Taif University, Muhammad Hasnain, he received M.S. degree in software engineering from Abasyn University, Pakistan, in 2016, Abdullah Alharbi he received the Ph.D. degree from the University of Technology Sydney, Australia. He is currently an Assistant Professor with the Information Technology Department, Taif University, Wael Alosaimi, He received the B.Sc. degree in computer engineering from King Abdulaziz University, in 2002, and the M.Sc. degree in computer systems security and the Ph.D. degree in cloud security from the University of South Wales, in 2011 and November 2016, respectively. He served as a Trainer for Technical and Vocational Training Corporation (TVTC), until 2008. He joined Taif University, as a Teaching Assistant. It provides him with a scholarship to pursue his studies in the U.K. Since 2017, he has been an Assistant Professor with the Computer Engineering Department, Taif University, Hashem Alyami received the bachelor’s degree in computer science from Taif University, Saudi Arabia, in 2007, the master’s degree in secure computer system from the University of Hertfordshire, U.K., and the Ph.D. degree from the University of Reading, U.K. He is currently an Assistant Professor with the Computer and Information Technology College, Taif University, Muhammad Ayaz received the B.S. and M.S. degrees in computer science. He is currently pursuing the Ph.D. degree with the School of IT, Monash University, Australia. As stated in their study, Cloud computing contributions are brought via statistics facilities placed all around the world. Cloud computing offerings consist of Microsoft SharePoint and Google apps, to call a few. One of their focuses is on the Security, because security is critical to the widespread adoption of cloud computing services. The existing literature focuses on various security solutions, such as technology and security policy implementation. The latter study introduced new criminological attacks on the cloud environment. The proposed solution to these recent attacks is based on criminal theories for cloud security. A study discovered several security issues affecting cloud computing characteristics. The same study proposes solutions to the identified problems with cloud security. This research resulted in the development of a security guide, which allows cloud user organizations to be aware of security vulnerabilities and approaches to infiltrate them.

Information security is divided into three main goals: integrity, confidentiality, and availability. Long-term confidentiality issues are a security threat to these security goals because current and past encryption schema are not secure. Another concern is the vulnerability to information leakage as data is outsourced. Data tampering also threatens data confidentiality.

The security and availability of cloud services are largely dependent on APIs that handle data access and encryption. More research may be done to ensure that these APIs and network interfaces are secure. New security ideas can address the issues of protecting services against malicious and unintentional attacks, as well as terms of service violations.

Stated in their study are the graphs that will show the relation of each variable. Fig. 5(Identified cloud computing security threats) in the paper shows the seven identified types of cloud computing security concerns in research studies. Data tampering and leakage are the deepest valued concerns for both clients and cloud computing service providers. These types of cloud computing security issues encompass cloud computing users who cannot access cloud computing resources. They are either attackers, hackers, or users who attempt to access the cloud computing services for which they are not registered. Although data intrusion threat has a close resemblance with the earlier types of data tampering and leakage, intruders use different means of entering the data clouds.

A survey study found that the top five cloud providers, including Amazon, Azure, Adobe, Google cloud platform, and VMWare, are efficient in their cloud services’ data security feature. Reliability and performance are among other features. To measure the cloud providers’ trustworthiness is still an issue for researchers, and a customer cannot judge it without appropriate tools.

The researchers provided two survey papers [SP25] and [SP31] have been published recently on blockchain technology with cloud computing topics. The former survey paper is a short conference paper that does not show a detailed discussion on blockchain technology’s role in overcoming cloud computing security issues. The latter survey paper is a combined effort of researchers on fog computing and blockchain technology. Since several papers have been published on blockchain technology with cloud computing, we present a brief posture of blockchain technology’s role in cloud computing.

A systematic literature review (SLR) as a research study method is used to evaluate and interpret the research topic’s available literature. A systematic literature analysis is an alternative to an SLR.

The main objective of this research is to examine the security concerns regarding cloud computing services. This research also focuses on risk mitigation strategies from significant existing research studies.

Studies’ analysis is based on the proposed questions, and if a study answers Yes, then 2 points are awarded to that study. If the answer is No, then 0 points are awarded and if the answer is partially then 1 point is allocated to that study. Initially, we gathered 1500 research studies, and next, we applied QAC criteria to sort out studies that were suited to answer the research questions. By application of QAC, 71 studies were found to be answering the research questions. Hence, we retained (5%) of total studies suitable for this systematic literature review.

**2.2.1.3 Chat**

“Research on Effectiveness Modelling of the Online Chat Group” authored by Hua-Fei Zhang, Li-Gang Dong, Jia-Wei Sun, and Ying Li from Information Management Center, Training Department, Information Engineering University, Zhengzhou, 450002, China with the respondents from online chat users stated that as online social networks grow in popularity, a new type of small-scale platform the online chat group On online social networks, an online chat group is an extension of a social group. As a result, they are identical. The scale of an online chat group, for example, corresponds to Dunbar's Number it collects individuals by locale, interest, or job, and there is some human connection or social relationship among group members. Furthermore, there are differences between online chat groups and other kinds of groups. Online chat groups, unlike groups in the actual offline world, are arranged in the virtual world, rather than sitting face-to-face. The following are some of the benefits. Members from varied backgrounds can converse without being limited by geography. It is simple to exchange information. It makes archiving and recovering old discussions much easier. Chats are open to the public, and everyone has an equal opportunity to speak. Consequently, producers of online chat group services are worried about the number of active users since more active people equals more advertising money. Information acquisition is an issue for group owners and members, and its relevance for members of online groups has been highlighted in the literature. Finally, the online chat groups we're looking at are synchronous, whereas much previous research on online groups, such as Usenet newsgroups, Yahoo groups, Google groups, and so on, has focused on asynchronous communication.

If all other factors stay constant, more group members imply more active members, but the length of each group member's active state and members' information acquisition efficiency will both suffer. Instead, the group's effectiveness disintegrates, consequently having countless participants in a group may not be ideal. Shortening the time spent idle can considerably increase the efficacy of a group service provider. As a result, we urge that group network operators provide appealing information on a regular basis to entice inactive members to return to the active condition. The group administrators should absorb members with more common topics to guarantee that the group has a greater activity level. Participants should increase their understanding to acquire information. The organization will become more engaged as an outcome.

In a study entitled "Conversation of virtual learning communities: discourse and survey analyses of moderated online synchronous discussions," Hwe Ling Lim, this proposed study used the approach of discourse analysis, which is defined as a word-based analysis approach for analyzing "texts and talk in social practice" (Hepburn and Potter, 2004, p.180), to examine the effectiveness of student chat communication present in the G1 and G4 dissections. The transcripts, which reflected dialogic engagement in critical debates, were analyzed using an improved ESA approach, which builds on Cox et al. The hierarchical arrangement of conventional conversational exchanges is replicated in chat interaction, which includes initial planning turn and a response turn, completed by a need of two individuals. Whereas the duration of a person's speech generally constitutes a turn for spoken discussion, "a carriage return successfully brings awareness and efficiently describes a turn" in chat discourse.

This research examines an inventive online synchronous (chat) interactive educational application in a distant Information Technology (IT) undergraduate course. While chat interaction has mostly been studied for its usefulness in facilitating social-emotional components of learning, this study examines its impact on two online tutorial groups' knowledge production processes from a socially constructed viewpoint. The said paper presents the findings of an online questionnaire and a modified Exchange Structure Analysis (ESA) approach that was used to evaluate the performance of innovative pedagogical chat dialogues, along with participants' perceptions of constructive collaborative learning and the training courses that were developed. In the end, the study's implications for the pedagogical designing of an interactive synchronous effective educational environment that enables comprehensive group understanding through digital learning communities' discussions are highlighted. Virtual learning communities are developed in web-based education to facilitate engagement and achieve specific educational aims, with CMC technology supporting the majority of the contact. Because the sociocultural constructivist approach holds that knowledge is built through dialogic contact, little is known about the influence of online synchronous (chat) interaction on knowledge formation, but online asynchronous interaction has been studied more extensively. Additionally, Instructional Computer-Mediated Discourse (CMD) analytical frameworks that is designed for asynchronous discussions are typically insensitive to online discussions. The influence of chat interactions on supporting knowledge production processes in two tutorial groups is investigated in this article. From a sociocultural constructivist approach, this study examined the example of two digital learning communities to get an understanding of the impact of web-based synchronous relationships on facilitating information exchange systems. Information exchange procedures were summarized in the VLE of chat classes using a COI model that incorporated cognition, sociological, and pedagogical existence. Multiple methodologies and viewpoints were used to investigate the computer-mediated interactions during the instructional talks. The researcher was capable of interpreting interconnections from chat transcripts using ESA measures after conceptualizing educational chat discourse as a hierarchical model of exchanges, turns, and proceeds. This was further guided by the student participants' self-reports on their learning activities, which were acquired via a web survey.

Chat portals were the first real-time CMC tools for teaching methods, as indicated by Marie-Nolle Lamy and Regine Hampel's paper "Online Communication in Language Learning and Teaching: Synchronous Chat" published by Palgrave Macmillan UK. Instant messaging (IM), a medium used by certain CMCL instructors, is widespread in the learners' surroundings outside of the educational context (Godwin-Jones, 2005). Chat and instant messaging are valuable for studying written text conversations because they are easily reported and provide researchers with rapid records. Regardless of their differences, for the sake of this section of the study, we shall treat them as one. The conversation is transferred, but only in towards the proximate end of this scale ranging from the native tongue of near to the dialect of location. As a result, synchronous conversation has been suggested as an excellent approach for establishing textual active participation in contexts wherein conveyance is a prime objective. As a result, since the mid-1990s, several studies on chatting have been done to investigate the use of synchronous textual online communication for negotiation. A significant emphasis of real-time chat studies has been participants' co-construction of context. Researchers such as Thorne have recently begun to concentrate on the mediating role of synchronous communication technologies and their influence on students’ engagement.

**2.2.1.4 File Management**

In a paper entitled A Secure electronic document management system using public key encryption: a case of Strathmore University by S. B. Momanyi (2018), a faculty of Information Technology, there are 500 employees of Strathmore University were interviewed and took part in an online survey to provide feedback on the system's functioning and usability and purposive sampling was used due to limited time. The research design is applied research to address the challenges that administrators face when it comes to document management. The questionnaires are used to collect data from respondents in order to evaluate the effectiveness and usability of the system. It is vital in any educational institution to ensure the accuracy of academic records and security measures must be in place to ensure the authenticity of the documents. The best way to secure and manage documents is with a document management system. Users can store documents with this system by using authenticated keys and certificates. Upon submission to the system, a user's authenticated keys and certificates were generated. Users must enter a password to complete the process. The system's functionality and usability in managing electronic files were tested, and the results show that the system is recognized as valid for effectively managing electronic files.

In accordance with the paper entitled Effects of Computer File Management Competence and Use on Information Service Delivery by V. C. Nwokedi, G. I. Nwokedi, S. A. Amkpa & J. Ogugua (2017) from the University of Maiduguri, there are 189 respondents participated in the study, and the survey research design is used for research design. The researchers examine the effect of a file management system in the University Libraries in the South East Zone of Nigeria. It was suggested that librarians keep their file management up to date to be able to locate the files easily. File management is essential because files must be properly organized, stored, and backed up. Having file management in the library will help the librarians to view, locate, and deliver the service effectively. It shows that File management has a positive impact on librarians' service delivery at the university libraries in the South-East Zone of Nigeria.

As indicated in Electronic Document Management System in Middle East Technical University, according to A. Karagoz (2013), a master in Middle East Technical University, there are 28 respondents participated in the study. Electronic files are stored in a document management system to organize, locate, and secure documents. The implementation of an electronic document management system (EDMS) is not required in government agencies in Turkey but, the government is still considering making this approach mandatory in order to save money and speed up document distribution. The findings and outcomes of this study contribute to the usability research of EDMS.

According to the paper entitled An Implementation Process for a Revised Document Management System, according to M. Maaranen (2017), master's degree in Helsinki Metropolia University, the purpose of this study is to revise and implement the Document Management System. There are 56 participants that is part of this study and was gathered using qualitative methods. The researchers discovered that DMS can be improved to perform more specific and concise functions. As the research design, a case study was chosen. It shows that the number of usages increased after the system was organized.

**2.2.1.5 File Sharing**

Södertörn University, Sweden (2013), "sharing" has developed into one in every of our virtual, networked age's maximum revealing pleasures. However, as virtual literacy involves all creativity and deviance, it allows for sharing and copying in quite disparate ways. Nowadays, sharing manifests itself in approaches which are each out of control and uncompromising, in addition to compliant and business-friendly.

According to a study conducted at the University of Nebraska - Lincoln titled Awareness and Usage of Cloud Computing Application among LIS Professionals: A Case Study of 17 Indian University Libraries, approximately 85. 7 percent of respondents from all university libraries studied are familiar with the term cloud computing. The vast majority of responders exclusively use cloud computing for personal reasons. Cloud computing is increasingly being used for professional applications, such as collaborating with library users and providing reference services to users. Cloud computing is a new technology that allows them to avoid hosting many servers and equipment locally and regularly manage hardware failures, software failures, updates and compatibility issues. Cloud computing has the potential to streamline procedures while also saving time and money.

A study entitled Transforming Universities in Interactive Digital Platform: Case of City University of Science and Information Technology written by Muhammad Nauman Habib, Waseef Jamal, Uzma Khalil and Zunnoorain Khan. This study is conducted at the City University of Science and Information Technology (CUSIT), Peshawar, Pakistan on 2020. The researchers used a case study-based approach and doctoral dissertations. They found out that the most powerful instruments for any management activity are digital platforms. It simplifies the monitoring procedure at all levels, including academic. Starting with class teacher or lecturer, then department head, and finally administrative posts like registrar and vice chancellor. It becomes much easier for us to make decisions as a result of this. Furthermore, any Higher Education Institutes (HEI) must offer security, maintain discipline, and provide academics. These fundamental qualities of higher education are met by digital solutions. The complete monitoring and decision-making process becomes more efficient and effective as a result of digitalization. According to the code, one of the purposes in developing an ICT system was transparency. All of the activities, as well as the date and time of the activity, can be easily tracked, making things more transparent. It also helps to regulate academic activities because the LMS and MIS keep track of data in a logical order that can be searched with a single click. Furthermore, the data is saved in a backup that can be used for many purposes’ reasons. Overall, the aim and goals of the LMS and IMS are to advance towards automation, ease of monitoring, ease of decision-making, transparency, and real-time information, security, going paperless, academic improvements, and establishing discipline. This answers the question as to why CUSIT adopted digitalization and LMS. A study entitled The Professional Development Needs for the Use of Educational Technology: A Survey of the Hong Kong Academic Community written by Kam-Cheong Li and Billy Tak-Ming Wong (2019). The goal of this study was to determine the educational technology professional development needs of academics in Hong Kong higher education. In 2017, 374 academics from Hong Kong's higher education institutions participated in an online survey. The poll inquired about their attitudes toward the usage of educational technology in professional activities, as well as their professional development requirements. The findings revealed that academics had a generally good view of online learning with the use of technology, which is seen as a useful complement to face-to-face learning. Their use of educational technology, on the other hand, was limited to the basic’s web applications like document, and video sharing facilities, as well as e-learning platforms. Academics said that among the various professional development needs, those related to the use of specific instructional tools and the sharing of practical examples were the most wanted. Furthermore, academics in lecturer roles used more online applications and had a greater need for professional development than those with more teaching experience.

The paper “Peer-to-Peer Networks and File Sharing” written by Larry Daniel and Lars Daniel (2012). On chapter 36, the author explains how peer-to-peer networking works. Some of the privacy issues surrounding peer-to-peer file sharing are also covered, as well as how evidence is acquired utilizing information made public by file-sharing software. According to them, for peer-to-peer file sharing, no "server" is required. Each computer on the network can serve as both a server and a workstation. The main idea behind peer-to-peer file-sharing networks is to allow people who want to share files on their computer to connect with others who want to do the same other people who share their interests without having to understand how the network works or anything about the other computers on the network. The first section of this chapter includes examples of file sharing programs to better understand this type of software. From the user's perspective, peer-to-peer file sharing is no more complicated than finding and installing a software application.

**2.2.1.6 Design**

"User Experience Studies of Personal Cloud Storage Services" by Parisa Pour Rezaei a Master of Science thesis from Tampere University of Technology. The thesis takes a qualitative and quantitative research method. The researchers employed user-centered design (UCD) as a design process, which entails active user engagement for a clear grasp of user and task needs, iterative design and assessment, and a cross approach (Vredenburg et al., 2002). The ten participants had some experience with the cloud storage service they wanted. 4 of the respondents were mostly working people, two were learners, and 4 were both working people and students who engaged in the web and face-to-face interviews.

Social aspects appear in many cloud services: Cloud services are generally connection and social services, as evidenced in the research by Väänänen-Vainio-Mattila et al. (2011), where people relate with everyone directly (e.g. email, message) or via media material (e.g. content sharing, social media commenting). CSSs, on the other hand, have a restricted proposal in this area. The researchers concluded that increasing cooperation using CSS might improve from a variety of features, however the research authors indicate that Dropbox users, in particular, are skeptical about the benefits of including such elements into the CSS. However, because UX is often determined by material provided through other users rather than the services themselves, designers may improve UX by strengthening synchronization procedures in collaborative settings and improving document management.

**2.2.1.7 Content**

As studied by Amany Elsayed, of King Abdulaziz University titled “Web content strategy in higher education institutions”, college and university websites play a vital role in presenting a university's identity and accomplishments, as well as helping possible student recruitment and giving information to local students. They are a vital source of information and the university's primary means of communicating with internal and external audiences. As a result, one of the university's key tasks is to treat its unique and helpful website material as a crucial asset by being strategic with it. The goal of this study was to look at the existing state of online content on the Abdulaziz University (KAU) website and come up with a web content plan to implement. The study has three phases: (1) a survey of KAU website coordinators, which revealed that 97 percent of them are not solely responsible for website issues, 35 percent have qualifications in fields unrelated to website design, 65 percent believe usability testing is the best way to assess an audience's needs and usage behavior, and none of the respondents have or are working on a web content strategy; (2) an assessment of internal and external environments. This strategy will help KAU achieve its vision in terms of teaching, research, innovation, and communication by guiding the design, development, and control of web content in keeping with the university's strategic goals.

As indicated by Ph.D. Caroline Chepkoech Kiptoo of Institutions of Higher Learning, University of Nairobi in a study entitled “Technical, Usability, Content, and Other Factors (TUCO) Framework for Higher Education Institution”. The study has used the Design Science Research (DSR) approach, which is derived from a pragmatic worldview that perceives the reality as changeable via the use of interventions. The Design Science Research approach is a problem-solving paradigm that sees research as having the authority to influence change through the use of improved artifacts that address social concerns. The TUCO Framework emerged from the research, which divided the components into four categories: technology, usability, content, and additional aspects. The variables were analytically combined and arranged under the TUCO framework themes, which were then followed by a framework lens intervention and updated instructions. The TUCO framework's components include technical, usability, content, and other lenses. The lenses are connected by a hinge, indicating that the upgrade may be examined separately from each lens and by combining numerous lenses at once if necessary. There are numerous similarities in the content of HEI websites. The variations are common in the presentation of the material. The framework's content lens discusses how distinct types of components should be addressed during an update. Static content is made up of institutional elements that seldom or never change. This covers information about the institution's history as well as addresses. This sort of material must be moved and upgraded as applicable during an upgrade. The domains must be updated and authenticated as working. Dynamic content is upgraded in a timely manner and has a high moisture content. This includes, among other things, announcements, events, news, and reminders. This sort of item must only be moved if it is currently active. The improvement of a website presents an opportunity to define or examine the standards that are required of various content classifications. During the transition of contents to the new website, the required standards must be implemented. Content meta-data, content size, and display time periods are elements of standards.

**2.2.1.8 Reliability**

In a thesis paper entitled Enhancing Performance of Cloud Computing Services through Improving Reliability and Taming Latency by Y. Xiang (2015), a PhD in George Washington University (2015), researchers are conducting more studies to improve cloud services performance with a high-quality services at a low cost. This study focuses on reliability and service latency in cloud services. The researchers proposed a novel probabilistic scheduling policy and developed an analytic upper bound on average service delay of erasure-coded storage with any number of files to improve service latency performance in cloud storage. The researchers use erasure code to reduce latency and costs while increasing storage system reliability. By collectively erasure code, chunk placement, and scheduling policy, a joint latency and cost minimization is formed. To solve the problem of minimization, the algorithm with convergence is used. It shows that cloud service levels can be improved to provide elastic reliability while minimizing service latency at a low cost to users.

In accordance with the paper entitled Cost-effective Replication-based Storage for Reliability Assurance of Big Data in the Cloud by W. Li (2014), a master's degree in Shandong University, to manage and organize the numerous amounts of data that can be redundant in the cloud, data reliability must be considered. To store large amounts of data, a large storage space capacity is required, which is costly. To address the issue of cloud storage, researchers propose a novel approach for Cloud storage service providers to provide cost-effective data storage while meeting data reliability requirements throughout the Cloud data lifecycle.

In a paper entitled Tools and Techniques for Evaluating the Reliability of Cloud Computing Systems by B. Snyder (2013), graduate faculty for the Master of Science Degree in Engineering, this study presents an practical method for determining the reliability of a cloud computing system (CCS). This method can assess the reliability while managing the user expansion due to the rapid adoption of CCS. This study proposed a novel method for assessing the reliability of cloud computing systems, which is a non-sequential Monte Carlo simulation, with sampling based on random numbers from a uniform distribution. It shows that MCS provides an effective method for determining the reliability of a CCS.

**2.2.1.9 Competency**

A study entitled Librarians’ Perceptions, Information Technology Competencies and Use of Cloud-Based Storage Systems in Academic Libraries in South-West Nigeria, written by Victoria Adeola Olukayode, Olayinka Babayemi Makinde Dr and Ibidapo Oketunji. Their study is conducted at Adeleke University (2022), the study's target population included all professional librarians in Southwestern part of Nigeria. There are 400 librarians at all universities in Nigeria's southwest. Under their introduction part, Wong (2020) defines competences as task-oriented factors that govern an individual's performance. The execution of a task is used to assess performance. Larzen (2006) emphasizes the importance of competence. A blend of theoretical knowledge and actual experience that distinguishes individual abilities in taking the appropriate action when carrying out a task. Ferreira and colleagues concur (2007) highlights the importance of information, skills, talents, experience, habits, and attitudes gained by education and training. They found out that the IT skills of librarians have a considerable impact on the utilization of the CBS system in Nigerian academic institutions. Libraries, statistically significant at the 0.05 level. The findings support the study question that librarians' IT skills have a considerable impact on the adoption of Cloud-Based Systems in academic libraries in SouthWest Nigeria. This simply means that librarians must increase their IT abilities as a result of research from the literature that revealed a mixed picture of low and high levels of librarian competency. However, the current study's findings are consistent with those of Okusaga et al. (2021), who reported that ICT academic librarians' competencies in Nigeria have grown and are increasingly associated with their understanding of cloud-based information resources and services.

A paper titled Creation of a Unified Educational Space within a SLA University Classroom Using Cloud Storage and on-line Application by Kamilya Zhumartovna Karabayeva from the Kazakh University of International Relations and World Languages. This study consists of 75 students and 3 teachers from that university. He found out that the application of cloud technologies is a new trend in computer technology. It is still developing, but we can already specify the special advantages of their use in education, their perspectives, and didactic potential, which consist in the fact that, first and foremost, cloud services provide researchers and scientists with the ability to instantly process vast amounts of information with low cost computing resources, instantaneous dissemination of information, and sharing analysis findings with other researchers worldwide. Second, cloud technologies enable continuous learning by leveraging mobile technology and social networking services to assist and enhance learning; students can access course materials anytime and from anywhere the internet is available. Simultaneously, cloud technologies enable instructors to provide interactive online student counseling while also receiving prompt responses to their concerns. They allow the storage of data in the cloud without the need for it to be transported from one device to another; as a result, the user is free of hardware limits. Finally, cloud technologies enable teachers at educational institutions to perform independent testing utilizing current cloud services or to construct their own tests.

**2.2.2 Local Setting**

**2.2.2.1 Cloud Storage**

Jerwin Baquin Tubay, a student from De Lasalle Univerisity of Manila, studied the "Students’ use of Cloud Storage in their Studies: A Case of a Private University in the Philippines". His purpose was to know the determinants of students’ decisions to adopt or not adopt cloud-based storage using UTAUT (Unified Theory of Acceptance and Use of Technology (UTAUT). The study showed that significant and positive performance expectancy indicates that students are more inclined to adopt a cloud storage system if they think their homework, whether individual or group, can be handled and done successfully and efficiently using cloud storage. Furthermore, a large and positive social effect shows that because students' classmates and professors utilize cloud storage and expect them to do so as well, they are more inclined to use it. They may effortlessly save, access, retrieve, and exchange documents online using the system, allowing them to maintain smooth working routines and connections.

As a result, it is advised that the University keep its present membership to one of the cloud storage solutions. This allows the community to become more productive by providing an easy and effective means to offer lectures, share academic papers, and collaborate with groups at any time and from any location. Furthermore, active training for all members of the community should be implemented so that the majority of members would embrace the usage and become brand ambassadors, persuading others who are not yet inclined to use. This manner, organizations may encourage everyone to utilize the system, enhancing productivity while also maximizing the fixed cost of a cloud storage system subscription.

**2.2.2.2 File Management**

E. del Rosario, J. del Rosario, M. Nieva, T. Tan & M. Tangkeko, a De La Salle University student, presented the Portal with Electronic Document Management System for De La Salle University's Information Technology Department at the DLSU Research Congress in 2016. The purpose of this study is to develop a portal that will make it easier to track and complete the thesis cycle. During the development process, time was a major issue. The researchers ran a test during the development stage, and the results were positive. This system was successful in resolving the stated problem. The electronic document management system (EDMS) is used to store and organize documents. The users can manage their electronic files with this system effectively. This system enables the users to set a consultation time for their thesis. It will send a notification regarding the consultation time and a reminder for the deadlines of the paper. Students can upload several chapters of their paper which the adviser can review, critique, and keep track of the progress.

G. Albacite, D. R. Macua, A. J. Diolata & N. Sobejana, students from Southern Philippines Agri-business and Marine and Aquatic School of Technology developed an Android-based File Management System for the SPAMAST-Digos Campus. The purpose of the study is to store and organize electronic documents. This system also serves as a means of communication. The users will receive notifications of the messages through the notification features. A file management system is used to store, secure, locate, and manage files in the system. The android-based file management system was tested for its functionality, reliability, usability, maintainability, efficiency, and portability. It shows that the system passed with satisfactory performance by the file management professionals.

P. J. Dizon, M. J. Jacob, J. Ko, J. J. Reyes, M. J. Domingo & E. Rodriguez created a Medicine Document Management System (MDMS) for the University of Santo Tomas. The purpose of this study is to address the issue of managing the documents. To address this issue, the researchers developed a MDMS to make the process fast, easier, and successful. In conclusion, MDMS can be used to pass every memo, store, upload, and manage the document using their account, with this process the Faculty of Medicine and Surgery will reduce the use of paper. Documents are now available in a variety of formats, including text, image, video, and recordings, thanks to the advent of computer and other electronic technology.

P. J. Estrera, a student of the University of Science and Technology of Southern Philippines developed an Electronic Document Management System for Higher Education Institutions. The purpose of this study is to develop an Electronic Document Management System to support the Capitol University’s Quality Management System. In most organizations, a document is essential. It is used as proof in transactions and as a record of written contracts. It exists to assure the proper execution of specified duties and procedures. File tracking, transfer, and monitoring are all part of these roles and procedures. It becomes a problem if the task is not adequately managed. Managing records, for example, necessitates concentration. To maintain records in order, important documents must be watched and verified. Retrieval of these papers is done repeatedly if they are lost or misplaced owing to an error in handling. These vital records must be closely checked, especially in large universities. In conclusion, the Capitol University's three colleges have found benefits in functionality that proves that EDMS is effective.

**2.2.2.3 File Sharing**

There’s a research paper written by Ivy Tarun, a researcher from Isabela State University entitled The Effectiveness of a Customized Online Collaboration Tool for Teaching and Learning. The purpose of her study is to determine the perceived efficacy of the customized online collaboration tool; and determine the efficacy of employing Usability Metrics for Effectiveness. She found out that the customized online collaboration tool was deemed especially beneficial for collaboration, teaching, and learning, which are all important. However, there is a considerable distinction on the subject. Students' perceptions are based on their courses and year levels. The personalized. The effectiveness of an online collaboration tool in terms of application performance is due to flaws in the design interaction. The tailored online collaboration tool, on the other hand, has a high completion rate.

Chapter III

# METHODOLOGY

This chapter discusses the Purpose Statement, Research Design, Population and Sampling Techniques, Instrumentation, Data Gathering Procedure, and Statistical Treatment.

## 3.1 Purpose Statement

The purpose of this study is to give students who have difficulty keeping documents with an easily accessible cloud storage system. Files such as papers, PDFs, PowerPoint presentations, video recordings, and other sorts of files are difficult to keep on a device with a limited amount of storage space. The goal of the research is to develop a cloud-based storage system that can store, exchange, and organize files in a way that is more user-friendly for students.

## Diagram Description automatically generated3.2 Research Design

Diagram

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As reported by McCombes (2021), a research design is a method for using empirical data to answer your research questions. A well-thought-out research design ensures that procedures are appropriate for the study goals so the data analysis is appropriate. Developmental studies will be the research design that the researchers will use. This research is focused on the development of cloud-based storage that will be utilized by students to manage their educational materials. It seeks to determine whether the application is easy to use and effective, as well as to identify any functions that should be added or improved. The researchers will conduct their study on Diversified Online Chat and Storage for Students (DOCSS) using the Project (Curriculum Design). It is used to create and design applications that address specific issues. This enables students to keep and manage their files and documents without depleting their device's storage space.

## 3.3 Population, Sampling Size and Sampling Techniques

The respondents of the study are the students and professors from Technological University of the Philippines - Taguig Campus specifically the students and professors under the Basic Arts and Science Department. In addition, the researchers will conduct a survey to the IT experts. The study employed a proportional sampling technique for it to draw a sample wherein in each sampling unit had a fixed number of respondents.

### 3.3.1 Determining Sample Size

Text

Description automatically generatedThe researchers used this formula to get the sample size:

Where:

z ɑ/22 = z-score

p = Standard Deviation

MOE = Margin of Error

The researchers chose a 95% confidence level which corresponds to a z-score of 1.96, 0.25 as our standard deviation and a margin of error of ± 5% that is equivalent to 0.05. By using the formula and the given, the researchers get a total of 96 respondents that are needed and becomes the sample size.

Table 1 contains the respondents that is assigned for sampling, the BTVTE students under Technological University of the Philippines - Taguig.

**Table 3.3.1 Summary of Respondents in TUP – Taguig**

|  |  |  |
| --- | --- | --- |
| **RESPONDENTS** | **FREQUENCY** | **SAMPLE** |
| BTVTE 1ST Year | 131 | 23 |
| BTVTE 1ST Year | 129 | 23 |
| BTVTE 1ST Year | 123 | 22 |
| BTVTE 1ST Year | 115 | 22 |
| BASD Professors | 10 | 3 |
| IT Experts | 5 | 3 |
| **Total** | 513 | 96 |

The researcher’s used MOE to compute the total population and sample of the BASD students at Technological University of the Philippines-Taguig. Upon calculation, the researchers got a total of 513 population and 96 as sample population.

## 3.4 Instrumentation

The procedure used in this paper are modified survey questionnaires approved by Sir Pangan. The instruments will be the one that will help researchers gather the information that is needed in the research topic. Using Google Forms, the questionnaires will be distributed to the respondents as it is one of the most widespread web-based survey tools in use in various fields of academic and non-academic researches. The researchers will also use Likert Scale to determine the respondent’s opinion about the design, content, functionality, reliability, and competency of DOCSS. After gathering the data, the researchers will analyze and summarize the main points that are collected. In line with this, the researchers will conclude whether the results met the idea proposed at the beginning of the research.

## 3.5 Data Gathering Procedure

The following are the steps taken by the researchers in gathering the data for this study. The researcher will seek first for the approval of the Department Head of Basic Arts and Sciences Department (BASD), to conduct a study and to distribute questionnaires. After the approval, a request letter for conducting a study and for gathering the needed data of the study with an inclusive dates and time and to the selected locale of the study will be presented to the Department Head of BASD. The instruments and questionnaires will be checked first for reliability and validity before it will be distributed.

The researcher’s respondents will be informed about the nature of the study to ensure their freedom of choice and to provide an avenue for voluntarily consent or to decline to participate in the study. The confidentiality of the respondent’s response will be secured by the researchers. The respondents will be asked to answer the survey/questionnaires only for their free time and will be given enough time in answering and they are permitted to ask questions and clarifications regarding to the research topic questions. Once the respondents done answering, the researcher will collect and compile the results for the analysis and interpretation.

## 3.6 Statistical Treatment

### 3.6.1 Likert Scale

In order to collect data from the respondents, the researcher utilized a questionnaire. The information recorded was organized using a quantitative method and expressed using a Likert scale, which will measure the number of respondents to the questionnaire and evaluate the participants' expectation. The questionnaire results will be identified in five categories with data points and analyzed using the Likert scale:

**Table 3.5.1. Likert Scale**

|  |  |  |
| --- | --- | --- |
| **Weights** | **Limit** | **Verbal Interpretations** |
| 1 | 1.00 – 1.50 | Strongly Agree |
| 2 | 1.51 – 2.50 | Agree |
| 3 | 2.51 – 3.50 | Neutral |
| 4 | 3.51 – 4.50 | Disagree |
| 5 | 4.51 – 5.00 | Strongly Disagree |

### 3.6.2 Frequency

The researchers will use the formula of frequency to obtain the number of participants who answered the survey questionnaire.

F / N x 100

Where:

F = frequency

N = total number of responses

### 3.6.3 Weighted Mean

The researchers will use the following formula:

Where:

x = each result

x̄ = mean

n = total number

### 3.6.4 Correlation Coefficient

Table

Description automatically generatedThe researchers will use correlation coefficient as a scale for understanding the value of a relation between two variables.

Table 3.5.4 Correlation Coefficient

Chapter IV

# RESULTS AND DISCUSSION

This chapter presents the analysis that answers the specific objectives.

Chapter V

# CONCLUSION AND RECOMMENDATIONS

On this chapter, conclusion and recommendations of this study is presented.

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# APPENDIX A: GANTT CHART

Chart

Description automatically generated with medium confidence**Figure 1. Gantt Chart for Chapter 1**

**Graphical user interface, application

Description automatically generatedFigure 2. Gantt Chart for Chapter 2**

**Figure 3. Gantt Chart for Chapter 3**

# APPENDIX B: SURVEY / RESEARCH INSTRUMENT

**Part I. Demographic Profile**

**Direction:** Fill out the form below honestly.

**Name (Optional):** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

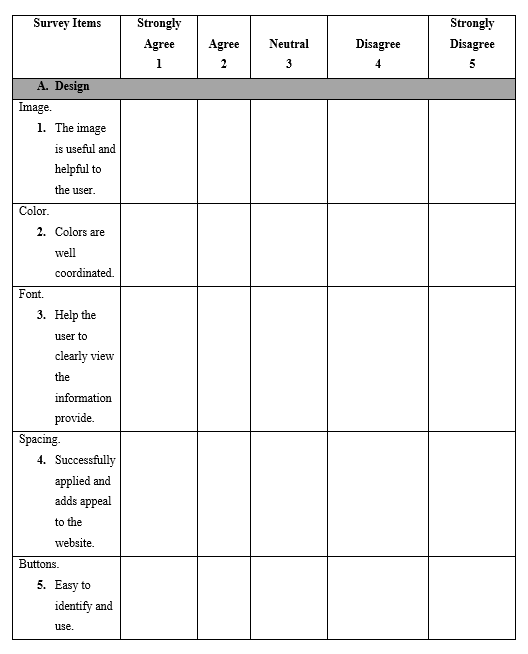
* Age: \_\_\_\_\_\_
* Sex: \_\_\_\_\_\_
* Year & Specialization (For STUDENTS): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Professional Expertise (For TECHNICAL): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part II. Survey Questionnaire:**

1. What can you say about the features of Diversified Online Chat and Storage for Students (DOCSS)?

2. What are the possible improvements and additions in DOCSS?

3. What features in the future you think that DOCSS must have?

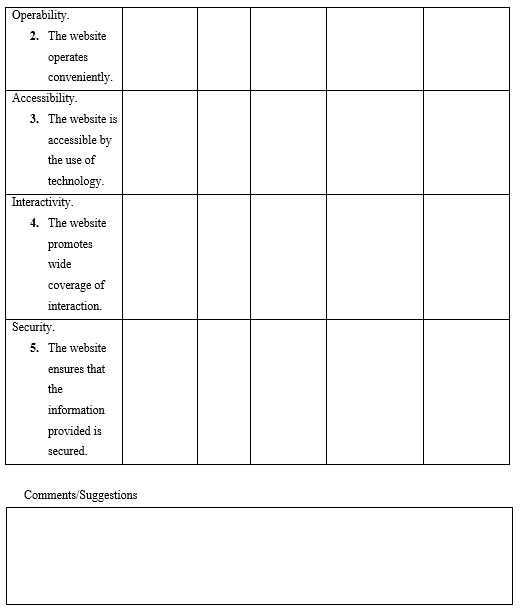
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