Application of Learning Cloud Computing Technology (Cloud Computing) to Students in Higher Education

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To cite this document:
DOI: https://doi.org/10.34306/ijcitsm.v3i1.121

Abstract

The development of internet-based computing technology is currently more directed at application systems that are easy to use and do not require a lot of energy. With the existence of cloud computing in the current digital era, it has been felt amid society in everyday life, such as by using email and social media. In general, the purpose of this research is to understand the application of cloud computing for students to calculate data from learning materials under the teacher's material so that later it can help build an effective and efficient learning system. The results of this study can later help students understand the application and function of cloud computing technology, especially in learning. This type of research is a case study from a qualitative descriptive approach by specifying interview instruments and also from questionnaires. The results of the research described above prove that most users use cloud computing applications based on all the conveniences that this application proposes compared to conventional learning systems in the classroom. The facilities provided by this cloud computing application have become popular and attractive to students.

Keywords: Technology, Cloud Computing, Learning, Application

1. Introduction

The current increase in internet-based computing technology is more aimed at application systems that are easy and don't require a lot of time and effort[1]. With the existence of cloud computing in the current digital era, it has been felt amid society in everyday life, such as by using email and social media[2]. In September 2016, the marketing agency We are Social published a report on digital developments in several countries, one of which is Indonesia[3]. In the We Are Social report, it can be seen that the growth of active internet users in Indonesia has grown by 21% since March 2015. Followed by several other things, such as the application of social media in Indonesia, which has increased by 19%, the number of Mobile Subscriptions has increased by 6%, and the progress of active users on mobile social by 19%. Digital improvement in Indonesia is still within the general average criteria on a global scale[4]. Still, compared to India, which is classified as a developing country like Indonesia in the field of digital internet, then Indonesia needs to catch up[5].
According to the results of a Microsoft study which was attended by 481 informants from four countries in the Asia Pacific, including 171 from Indonesia, 61% of respondents said they were more honest about their device's shortcomings than the valuable data in it[6]. Now it is becoming less and less necessary, and users understand the importance of keeping personal documents in one place which can be accessed from different devices. This is evidenced by a Microsoft survey, where 92% of those surveyed prefer cloud services that all their devices can use over classic storage sources[7]. By using cloud computing in learning activities, the possibilities and advantages of cloud services can be used to support student learning by providing information to students about subjects and making it easier for teachers to exchange information on learning materials about subjects[8]. Teachers or lecturers have a role as part of the academic community who can provide comfort in learning, practical and keep abreast of technological developments. In general, the purpose of this research is to find out the application of cloud computing for students to computerize learning materials by the material provided by the teacher so that it can help build an effective and efficient learning system[9]. The results of this study help students understand the applications and functions of cloud computing, especially in learning. Expected research contribution:

1. The research results can help students in choosing cloud applications computing which is useful in storing and retrieving material learning.
2. The research results can assist teachers in creating information technology-based learning and storing teaching data to make it more structured.

Cloud computing applications (cloud computing) are an umbrella term for the latest technology trends that can help students[10]. This cloud computing application can facilitate the process of presenting and storing information on student learning materials, as well as sharing information and distributing teacher learning materials in a structured manner[11].
Development of Cloud Computing

By the 1960s, cloud computing had developed parallel with the Internet and the Web[12]. However, due to significant changes in bandwidth technology in the 1990s, the Internet developed earlier than cloud computing. And now, the Internet revolution is the main driver of cloud computing. One rather drastic step was Salesforce.com in 1999, which created the first business applications to work over the Internet[13]. The next development was Amazon Web Services in 2006. Elastic Compute Cloud (EC2) technology commercializes web services that let small businesses and individuals rent computers or servers to run their computing applications[14]. Gartner defines it as "a way of computing in which scalable and flexible IT-based services are provided as a service to customers using Internet technologies." Meanwhile, Forrester defines it as "standard IT capabilities, such as software, application platforms, or infrastructure, provided using Internet technology in a self-service and pay-per-use manner."

The operation of cloud services is transparent, so end users do not need knowledge of or control over cloud service infrastructure technologies to use them to perform their jobs, they only need to know how to access them[15]. Universities in Indonesia are still facing many challenges in adopting new technology to support quality education services. As technology develops, many forms of traditional education services are shifting to online forms[16]. This service requires a reliable IT infrastructure, the right technology, ensures scalability for use by multiple users, has reliable performance and good operational security. Today's students cannot live away from the Internet. Through programs such as Facebook, Twitter, Instagram, and Gmail, students are used to using cloud-computing-based technology services (Ercan, 2010). Therefore, students hope to be able to access digital campus environment services anywhere and anytime, including cloud services that support social media. In addition, there is some research showing that cloud-based solutions are very effective for supporting collaborative and cooperative learning (Thorsteinsson, 2010).

The National Institute of Standards and Technology (NIST) identifies five important characteristics of cloud computing (Mell & Grance, 2009) as follows:

1. Self service when needed (On Demand Self Service).
2. Great network access (Broad Network Access).
5. Measured Service.

Cloud services use very fast and fast servers, which are now offered by many service providers offering media servers[17]. The goal is that universities can minimize resources and places to put the server. Examples of cloud computing-based applications are Dropbox, Google Drive, and iCloud. In education, information technology plays an important role in providing more effective teaching and learning opportunities such as distance learning, electronic learning (e-learning), electronic libraries (e-kirjasto) and multimedia[18]. The role of cloud computing in electronic learning is similar to the presence of e-books. Universities no longer need to use book media to convey education; students only need to download e-books via the internet[19]. In this case, it means that financially students no longer have to ask for money to buy books; they can directly download the book as an e-book on the internet. Other cloud computing services in tertiary institutions, for example, in making online academic systems. You only need to register online as a university user to use this cloud service[20]. The university then receives confirmation from the service provider. After receiving confirmation, the university can directly use the information system functions offered by the service provider. This online system implements the SaaS model so that it does not require purchasing servers, large costs for server maintenance, and creating complex applications because all of this is the service provider's responsibility.
Google Apps for Education (Google Apps for Education) cloud applications now offer educational institutions a “free hosting” solution for managing email, Chat, calendar, sharing documents, and more. Google itself describes this service as an integrated communication and collaboration solution. Although students may know, the advantages of cloud services are as follows:

1. **Sharing Documents and Presentations**
   The internet has revolutionized the way users can collaborate and share things. Services like Google Docs and SkyDrive store files and documents in the cloud to access them from anywhere, and other users can view and modify them. The cloud can also be very useful for dealing with files when traveling alone or using different computers. Bookmarks and settings can be accessed via the cloud. Bookmarks like Delicious or Google Bookmarks save pages of favorites and subscriptions constantly so users can view and edit them anywhere.

2. **Storage Media (Storage Drive)**
   One of the important uses of the cloud is for storage. Networks like Dropbox, Google Drive, and iCloud let you store and access files from anywhere. Many options allow you to store gigabytes of data for free. Cloud storage can be a great way to store files and free up space on your computer. Files, especially music and videos, can take up much space on hard drives and flash drives. By storing files in the cloud, users can view and access them anytime, anywhere. Many people also use the cloud as a data service to keep data secure.

3. **Entertainment Services**
   Some people may not realize how many forms of entertainment use the cloud to reach audiences. Most internet users spend their time watching their favourite TV online. Services that offer television programs and movies that can be watched over the Internet, such as Netflix, iPlayer, or 4oD, use the cloud to make these services available to the general public. Spotify music or websites like internet radio stations like Pandora are also cloud-based services. The gaming industry (online games) is also increasingly dependent on cloud services. Many online games are hosted in the cloud and played over the Internet. In recent years, several cloud gaming services have emerged that can be closely involved in changing the gaming industry. Cloud gaming lets you take advantage of faster processing speeds and better graphics rendering without needing a high-end computer.

4. **Communication**
   One of the easiest ways to use the cloud that you may need to learn about is email. Most web-based email programs such as Hotmail (now Outlook), Gmail and Yahoo Mail are efficient forms of cloud computing. Your emails and contacts are not stored on your local computer but in the cloud so that you can check your emails from anywhere. The cloud is an important part of many forms of internet communication. Skype, video chat, and popular instant messaging services extensively use the cloud to enable millions of users to connect. Other unified communications platforms also utilize the cloud to provide services; for example, Hosted Lync is Microsoft's unified communications platform hosted in the cloud.

5. **Social Networks**
   Many social networking sites reach millions of users and taking advantage of the cloud is a sensible way to keep their services available and reliable. So every time you post on Facebook or compose a tweet you are automatically using the cloud.
2. Research Method

2.1 Method of collecting data
To collect the data and information, two methods of data collection were carried out, namely primary data collection and secondary data collection.

2.2 Research Instruments
In this study the instruments used in data collection included (Susanto, 2003):

1. Interview, the instrument used is a list of questions related to the description of cloud computing.
2. Questionnaire / questionnaire, the instrument used is in the form of detailed questions aimed at students.
3. Observation, the instrument used is research that makes observations of research objects.
4. Documents, the instruments used are researchers by studying documents related to cloud computing.

2.3 Data analysis technique
In analyzing this data, researchers used the following methods:

1. Inductive method, this method draws conclusions based on specific statements or facts that lead to general conclusions. Make general generalizations about certain facts or events.
2. Deductive Method Based on general statements or facts that can be found, this method draws conclusions about specific and concrete questions. So that generalizations with special characteristics are taken from general facts or concrete events.
3. Comparative Method, This method is carried out by combining existing facts with existing theories to complete the necessary explanations.

3. RESULTS AND DISCUSSION
Data collection was carried out through interview techniques and questionnaires at PGRI Indraprasta University on Jalan Nangka No. 58 C Tanjung Barat, Jagakarsa, South Jakarta.

The researcher describes the contents of this conversation in three conversations so that the contents of the conversation are more focused and easy to understand. The description of the contents is:

3.1 Respondent Descriptive Analysis
The information obtained in this study comes from the results of interviews with respondents who were recruited and selected according to the criteria of researchers who represent the research being conducted. The selected respondents are students who use cloud computing as a learning support as many as 10 respondents. To be clearer in the description of research respondents who are students from Indraprasta University PGRI, it can be seen from the description below.

3.2 Descriptive Analysis of Research Results
At this stage, the researcher describes the results of the research material obtained from interviews with respondents and then translates them into descriptive statements. The analysis was based on evidence of the use of cloud computing in student learning in tertiary institutions, which can increase student learning interest and student reactions to the use of cloud computing in student learning.

Cloud computing has been widely used since the spread of media and social networks in society.

As expressed by Nurohman: “Since the widespread use of social networks and the creation of personal accounts requires more storage space. Since then, I have been using cloud computing applications for about 4 years.” (Interview with Nurohman).

This is also supported by Tri Prasetyani Utami's statement: "Initially, from the demands of my
job, I was required to be easily contacted (mobile), while my mobile device had limited
capacity to accommodate data, so I became an active user of cloud computing applications
(cloud computing) because I am also a social media users" (Interview with Tri Prasetyani
Utami).

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Utami).

Cloud computing helps the Indraprasta PGRI University academic community
consisting of lecturers and students in lecture activities. Which application did the student
choose from the many applications used to support learning. This was revealed by Aji Tri
Wijayan: "I still use three cloud computing applications such as Gdrive, iCloud and Dropbox.
Because in my opinion these three applications offer the most benefits for users compared
to other applications." (Interview with Aji Tri Wijayan).

The above statement is supported by Septiana Putri Utami: "I am a user of 3 cloud
computing applications, namely Dropbox, G Drive and Icloud. Drive because the storage
provided is quite large compared to other applications. Also my email is already gmail so it's
easier to sync. I use Icloud because my cellphone is an iPhone brand which already provides
cloud computing services.” (Interview with Septiana Putri Utami).

The function of this cloud computing application can help you understand and
understand the information you want to share with your audience. When students don't
understand the information conveyed by the teacher, they use cloud computing applications
to get a deeper understanding by looking at the notes or modules of the material being taught
by the teacher.

As the opinion expressed by Novianto Wahyudi about the function of cloud computing
applications for himself is: "In my opinion it is very helpful in sharing learning materials, by
delivering material through this application I can study anytime and it is easy to use using the
Dropbox application.” (Interview with Novianto Wahyudi).

The above opinion is supported by Riza Pratama "On average cloud computing
applications have large storage so I can freely share study materials with friends and for my
personal needs." (Interview with Riza Pratama).

From the statement above it can be concluded that the operation of cloud computing
applications is achieved and reasonable, because it is also supported by ease of use, when
users run applications, users can easily carry out operations as needed. The existence of a
cloud computing application makes it easy to get learning material. Even though the lecturer
is not present during lectures, material can still be given to students. It is easy for students to
get learning materials in class when students are unable to attend.

A lecturer will be assisted in the function of distributing material to students so they can
follow the instructions they want to give. When giving material in class, there may be an
explanation that is missed because the number of credits is small. In the end, with the
provision of material modules, students who are unclear about the explanation in the class
earlier can go deeper with the material distributed through cloud computing applications.

From this it can be seen that cloud computing applications provide a positive response
to their use because they provide effective time savings in information dissemination.

As stated by Bambang Sugianto about the motivation for using cloud computing
applications, "I like using Gdrive besides being already connected to my Gmail email, I don't
need to open my laptop anymore, I just need to use my Android phone to be able to spread
information to my friends so saving time." (Interview with Bambang Sugianto).

This is also supported by Saiful Bahri's statement: "With Icloud I can store all files related
to my needs, even if I change cellphones I don't need to change applications, don't bother
syncing to a new cellphone and don't bother opening my laptop to get the data we want, in
my opinion, this application saves time and effort." (Interview with Saiful Bahri).

Students also have positive feedback about using cloud computing applications.
Students have the opportunity to get task information clearly according to the teacher's
instructions, so that students do not experience difficulties in completing the assignments given. Students also don’t need to meet with teachers to turn in assignments, because students can turn in assignments anytime, anywhere by downloading completed assignments. Large capacity makes it easy to share large documents that can’t be sent via email.

As expressed by Nurohman: “The capacity for sending documents in e-mail is only limited to 25 MB, sometimes there are many assignment files and material that must be worked on in groups that exceed the limit for sending e-mails, so this cloud computing application is very helpful.” (Interview with Nurohman) This statement is also supported by Rahmat Fauji: “large documents cannot be stored on my device so if I need them I can take them back (saving memory space). I also store learning materials that I get from outside the campus in Dropbox, so I can easily access them again” (Interview with Rahmat Fauji).

From the results of the interviews conducted, it can be obtained various encouragement of cloud computing application users. In general, respondents feel that they get different benefits from using cloud computing applications compared to the lecture system in class. Students also feel more comfortable using cloud computing applications to submit assignments to faculty rather than wasting time just submitting assignments by coming directly to campus. Lecturers are also very helpful in disseminating material and explanations more easily because they can be given through lecture modules which are distributed to students as well as when the lecturer is unable to attend class.

The results of the analysis above show that most users use cloud applications based on all the conveniences offered by these applications compared to traditional classroom learning systems. The possibilities offered by cloud services applications interest students.

4. Conclusion

The results of the analysis provide a level of understanding of users who apply the material provided more than the material delivered verbally or verbally by the teacher. This is in accordance with the role and function of cloud computing, especially to help students understand learning, and is also supported by the ease of use of applications, so that it will not be difficult for users. The results of observations made show that all the conveniences offered by this cloud computing application are an attraction for its users because it offers various conveniences such as: convenience for students to obtain lecture materials and materials anywhere as long as they are connected to the internet.

From the results of all the research conducted in the interview, the existence of cloud computing applications as a medium that plays a role in obtaining information from lectures cannot be denied. Students can only complete their assignments as instructed by their teacher if they meet in person.

References


