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Student Perceptions of Andalas University Payakumbuh Campus Against the Speed of Access to Academic Information Systems

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ABSTRACT

The need for information continues to grow rapidly such as the need for an Academic Information System, where Academic Information System is an innovation of technology and information. This happens because of the demands of the times that require information to be transferred quickly. To find out how fast information reaches users who are the main goal, the parameters used are bandwidth and signal strength. The access speed of an information system network is one of the dimensions that is very important for users of the information system. The results of the study state that the Academic Information System of Andalas University access is quite good at normal usage times, but often hangs or errors at peak usage times, both access is done with a computer or laptop or with a smartphone.

Keywords: *academic information system, response times, information*

Introduction

Technology has penetrated every aspect of human life. Information technology is one of these technologies. In government, the term e-government is known as the use of information technology in government activities. Every country now needs to cope with continuous technological change and focus on the right technology to support government progress in delivering public services [1]. Many information systems are available upon request of all government agencies. The government spends a lot of money to use the information system. With the use of this system, it is hoped that information and services will serve the community better, provide complete and accurate information, and provide fast and satisfying services. Large investments in purchasing and using government services require post-implementation review.

Colleges today rely on a wealth of information to provide quality services and gain a competitive advantage over their competitors in the market. In addition, a lot of investment has been made in the system to increase the time to achieve short term and long term business goals. In some cases, the focus is on the continuous analysis of information to determine its effect on the entire organization and its employees [2]. This project was motivated by the knowledge that file system failure is a major problem that can be time consuming and costly. It can also cause organizations to lose their competitive edge in today's highly competitive world.

This is influenced by the recent rapid growth of the internet, which has an impact on the number of users and users accessing services offered online. This sometimes causes the server to increase the number of service providers as the number of customers increases [3]. This will affect the hefty demand for server equipment. In addition, many types of web-based services are now increasing service access on the Internet. E-learning, e-business, e-government, e-commerce, e-news, etc. are types of web-based services available [4], [5].

Of course, this will become a big problem when a situation occurs where the client's access to server services increases and the server is unable to work. Usually this is caused because the running service has stopped due to an overload received by a server. Some sites are even reported to have received hundreds of thousands of simultaneous connections from customers [6]. Service interruption is the effect of the service provider's server going down. A server is not working. longer recommended when the number of users accessing a server is high.

Andalas Information System (SIA) used by Andalas University, which is an information system that uses information and communication technology, making it easier to manage information management for all departments in the administration of Andalas University. This system has been used at Andalas University since 1994/1995. Using Academic Information Systems on high-spec computer equipment will increase response times, but the real question is how fast they are.

Access speed is a major issue in the use of SIA in providing the information needed by users and the reliability of interactions with users. Access time is another issue to consider, where there are many problems in service delivery, especially the number and length of queues and the long waiting time for documents to be processed. Based on the current problems, it is necessary to focus on the speed of access to the Andalas University Academic Information System in order to improve the quality of academic administration services for its users.

Research Methods

This research uses qualitative methods using a phenomenological approach. Phenomenology is an approach that focuses more on the concept of a particular phenomenon and the form of its study to see and understand the meaning of an experience related to a particular phenomenon [7]. [8] Explained that qualitative research is more descriptive in nature. The data collected is filled with text or images, so it doesn't emphasize numbers. Then explain the data collected after analysis so that other people can easily understand it. Survey is a place where research is conducted to get required information from informants. This approach uses simple triangulation methods such as interviews, observations, and documents.

Results and Discussion

Speed of access is one characteristic of a good information system. If the speed of access to the information system is good, it can be said that the quality of the information is also good. Quick access will allow users to quickly obtain information. Access speed is the speed of data transfer when using the Internet. The access speed is the number of files sent from one computer to another. The units are bits per second or bps. There are two ways to access speed, namely upload and download. Upstream access speed refers to the speed at which data is sent from your computer to the server. Whereas, downstream speed is the speed at which data is received from the server to the computer. When you browse or search, search engines, etc. you have to go. This activity includes Internet downstream speed.

The unit of access speed, both upstream and downstream, is bps or Bits Per Second. Therefore, access speed is calculated every second when data or information is transferred from server to computer and vice versa. Access speed can be calculated in units of time or the amount of data transferred or sent in seconds. If you send 1 kb of data per second, it's the same as sending 1000 bytes of data. Since 1 byte is 8 bits, data transfer can be written as 8000 bits or 8 kbps or thousands of bits per second. Higher internet speeds can use Mbps or megabits per second, which means 1000 kbps. Many factors from internet connection usage and different service providers can affect how fast or slow the internet connection is. Some of the factors that affect the speed of internet use are as follows [9]:

Computer Unit Used

Computer hardware such as the hard disk, Random Access Memory (RAM), and Processor play an important role in determining the speed of access to the Internet, because they play an important role in determining how the computer functions. If the hard drive, memory and system are low, Internet usage will affect access speed. Hard disks are used to store magnetic data. The larger the hard disk capacity, the more data it can store.

RAM is the computer's temporary memory. Memory or RAM is used to assist the processor in transferring data "super fast". For that, the ability to work is the most important thing in memory. That is, the larger the capacity, the more data it can store and process, which makes the processor run faster. Data supplied to RAM comes from the hard disk, which is a device that stores data permanently.

The processor is the main core or brain of the laptop/computer. Processor is in the middle of the motherboard. The processor plays an important role in the operation of computing devices because every instruction starts from the processor. Therefore, it is very important for users to choose the best processor to support working with a computer or laptop. Typing, answering emails, surfing the web, playing games, working with photos, etc. Such simple tasks can be done with a computer or laptop. The main task of the processor is to process incoming commands and then pour them into output form, namely issuing commands.

Figure 1. Processor

Modem

Modem is a device that has a big impact on internet speed. Each modem has a different speed. Modem is one of the supporting high-speed internet. The faster the modem, the faster access will be obtained. Modems are used to convert analog signals to digital and transfer data as electromagnetic waves from one computer to another. The higher the modem speed, the faster the data transfer. For example, the unit for modem speed is 2 Mbps (megabytes per second), which means that 2,000 characters of data can be sent in one second.

Figure 2. Modem

Communication Network Used for Internet Access

Access to Internet-enabled media such as telephone, CDMA, GPRS and satellite. Each of these media has a different access speed. Using the telephone line is the slowest way of access.

1) Fiber, fiber optics is the fastest internet technology available today. This machine uses fiber optic cables, so it can download faster in less time. Unfortunately, fiber optic internet has not been widely used due to the high cost of building network infrastructure and its limited availability. Most fiber internet services, including Google Fiber, offer download speeds of up to 1000 Mbps or 1 Gbps. With this speed, you can download a hit Netflix series in 6 seconds. Even the heavy game World of Warcraft can be downloaded in 2.7 minutes.
2) Cable, This type of high-speed internet is still one of the most popular. The average download speed for cable types is 4-20 Mbps. This figure is more than enough to meet your digital needs at any time. It should be noted that internet usage can sometimes be intermittent when using multiple networks simultaneously. However, cable internet would be the best option for families as they can get TV and internet.
3) Mobile (Cellular), This is a type of high-speed internet that almost everyone uses today. Naturally, surfing the Internet with a GSM or CDMA signal from your cell phone allows you to access the Internet anytime, anywhere. Another advantage is that using the Internet on a cell phone is already using the

latest cellular technologies such as 3G, 4G and 5G (coming soon). With an average download speed of up to 9.8 Mbps (depending on the service provider), you can get better and faster internet with a 4G network. This network even has safety, security, and privacy.

4) Wireless (WiFi), As the name suggests, WiFi does not use cables or wires to connect to the internet. In contrast, WiFi uses radio frequencies that are passed through the router to provide a high-speed internet connection. WiFi can provide internet speeds of up to 20Mbps when connected to a device. In addition, WiFi connection is usually unlimited, so convenient to use, as long as you connect a WiFi modem, you can use the Internet anytime, anywhere.

Big Bandwidth

Bandwidth greatly affects internet speed. Bandwidth functions to set the frequency width or bandwidth width. The greater the bandwidth provided, the faster the internet. Bandwidth is the capacity that can be used on an Ethernet cable so that packets can pass at maximum speed. Another definition of internet bandwidth is the amount of data transferred in bits per second or bps. Thus, internet bandwidth is the maximum capacity of communication lines to send and receive information in a few seconds. There is also the term analog bandwidth. Here, this analog bandwidth represents the difference between the lowest and highest frequencies that can be measured in hertz (Hz) units to find out how much information or data can be sent at one time [10], [11].

In general, bandwidth is similar to the width of a highway. Therefore, the fewer cars, the better the traffic. At the same time, if there are many vehicles on the road, the traffic will be more dense, which will affect the operation of other vehicles. The wider the road (bandwidth), the more vehicles that can pass through it. So, if bandwidth is important for many internet network users, there's nothing wrong with that. Because the greater the bandwidth, the faster the data exchange. In addition, more data can pass through the bandwidth at the same time.

Number of Users Accessing The Server Concurrently

Internet speed is also affected by the number of users. Speeds will be higher with normal or light use, but slower if many users are browsing the web at the same time.

Figure 3. Users accessing the server concurrently

Access speed is one of the factors that determine the success or failure of an information system. The success of the information system can be appreciated by users. The following is the opinion of the informant about the access speed of the Academic Information System, namely the opinion of Informant-3 giving his opinion about the access speed of the SIA that he had done, stating that: strong signal fast loading process, and vice versa." (Interview, 9 Mei 2023);

SIA's access speed depends on the strength of the internet signal when accessing it, if the signal is good or strong then the access can run smoothly, but if the signal is weak the SIA access will also experience a slowdown. This condition also makes students feel disturbed, because their activities cannot run well and smoothly. The same opinion was also expressed by informant-5, where the informant was generally dissatisfied with the current SIA access speed. The following is the opinion of informant-5, who said that:

"The access speed of the Academic Information System does not support user activity, because the loading and downloading process is quite long." (Interview, 9 Mei 2023);

The process of downloading and loading the available menus in the SIA did not meet the expectations of the informants as users. Process well. The download and loading process takes quite a long time, thus disturbing the user's comfort. Another opinion was expressed by informant-9, who argued as follows: "System access is not a problem if a few users access it, but if there are quite a number of users the system will experience problems, such as slowing down, hangs and even errors." (Interview, 8 Mei 2023);

Informant-9 also supported the statement from the previous informant, because this informant also experienced the same problem when accessing the system at peak times, such as when filling out the Student Study Plan Card. In this condition the system often slows down, and the system often experiences errors. The same opinion was also expressed by informant-15, where the informant said that: "Access to the system will be problematic if it is used by many users simultaneously, the download process is also problematic at that time, so the system will be slow or slow." (Interview, 3 Mei 2023);

The same condition was experienced by these 15 informants, where this informant experienced problems accessing the system during peak usage times, this peak usage time occurred during academic administration registration activities or better known as the time to fill in the Student Study Plan Card. The same opinion was also expressed by informant-21, where this informant supported the statement from the previous informant above. The following is the statement of informant-21, who said that: "The speed of access to the links available at SIA is not fast, because access at the same time does not support loading and downloading speeds." (Interview, 5 Mei 2023);

The opinions of the informants above can be described as follows, namely that the SIA access process is still weak at times of peak use. Peak use occurs during student registration activities or filling out the Study Plan Card, where students are given a deadline to fill in the KRS or have limited time. So that there is a queue to enter the system and result in slowdowns or hangs or errors in the system.

This problem has occurred repeatedly in every student academic registration activity and continues every semester. It seems this lack of attention from the relevant leadership. In the future this needs to be considered, so that the same thing does not happen again, so that the relevant leaders need to sit together with other leaders at Andalas University to get the right solution. With this solution, it is hoped that SIA Andalas University users can enjoy internet access according to their expectations.

Access speed (Response times) is a dimension that shows the accuracy of the system in accessing or providing data and information. Generally, users want fast access to educational information. Access speed is the time between terminal operators completing inquiries and receiving responses. Response time includes the time it takes to send a query, process it by the computer, and send a response back to the terminal. Response time is often used as a measure of interactive system performance, whether using a wired or wireless network.

With the increasing behavior of Internet users to reach the desired content, it requires organizations to ensure the security and speed of internet access. In some cases, the growth of users in many tertiary institutions is not matched by an increase in Internet bandwidth capacity. The reason is because of cost considerations by related institutions. The growth of Internet users without a connection to increase bandwidth can be a problem for users. The problem is with internet speed which according to users takes a long time to access.

The faster Internet access is provided, the faster information can be obtained. Therefore, ISP providers compete to provide attractive services to users. Just because we have our router up and running doesn't mean we're done, because this router is a backbone router. In fact, most ISPs monitor routers 24 hours a day to make sure they are in good working order and ensure there are no problems, so that if a problem arises it can quickly prevent the network from working properly [12].

It is important to understand the management as well as the internet speed provided. If the internet speed provided is not in accordance with internet management, there will be a lack of access received by users, which means users are frustrated with slow internet, especially if all access is done wirelessly or commonly known as wifi. Hotspot (Wi-Fi) is an area where you can connect to the internet wirelessly. Wi-Fi (Wireless Fidelity) communication is another easy-to-use technology in the office. Hotspot (Wi-Fi) is also a type of technology used in public places, some of which are free to access, such as parks, libraries, restaurants, colleges, or airports [13] [14], [15].

According to [16], fast access can be interpreted as access, that is, users can access the Academic Information System (SIA) anytime and anywhere, thereby shortening the user's time to carry out academic administrative activities. Speed determines whether or not the system is accepted [17]. Quick access needed by users will make users interested in using SIA so that users want to use SIA. Conversely, if the user is dissatisfied with the system, this will reduce the user's interest in using the SIA. The results of [18] research

said that system user satisfaction is positively related to access speed. Research conducted by [19], [20] and [21] showed different results, where they said that access speed had no effect on system usage activities.

According to [22], said in his research, that QoS parameters which include bandwidth, throughput, latency, and packet loss are analyzed and many factors affect throughput, latency, and packet loss. Factors that affect delay include the distance to the target server. This example analyzes the delay between the websites facebook.com and detik.com with different servers, where the two servers are located differently, where the detik.com server is in Indonesia and facebook.com and facebook.com servers are in the United States. Computer hardware also affects delay because if the hardware used on the computer is old technology, then the delay results will be different from computer hardware using new technology. The most important thing is the connection from the network itself, even though the bandwidth is large, it is not guaranteed to be free from delay if the network connection is not good. One of the factors that affect packet loss is congestion. Congestion can be understood as traffic caused by all internet users using the internet at the same time, so there will be congestion.

Local internet access may be slower (jammed) than high speed connection. These slowdowns occur when many people try to connect to the internet at the same time, and usually occur at busy times, such as when students come home from school and connect to websites. Access speed cannot be determined because many factors can affect it. Factors that directly affect access speed, eg:

1) The number of users, a large number of users at the same time, the response to learning materials is slow. This often occurs during peak hours because the number of users is above average, which can result in poor performance of the training materials.
2) 2) Data transfer speed. The speed also depends on internet speed, which is under the authority of the Academic Information System manager, in the case of DPTIK Andalas University.
3) 3) Mode of transmission, for example internet transmission used by Andalas University. The use of fiber optics can facilitate access to the internet and this depends on the collaboration between Andalas University and internet service providers.

Access speed is one of the factors that determine user satisfaction with the Andalas University Academic Information System service. The results of interviews with students as SIA users, where users still complain about the speed in accessing the Academic Information System, especially during the maximum duration or peak usage. Access speed is very influential during rush hours, so that users cannot take full advantage of information from the Academic Information System. This situation does not meet the expectations of Academic Information System users.

The Andalas University Academic Information System Manager has been working intensively to improve user services that depend on access speed. This is done by increasing the capacity of the internet network and renewing network access using fiber optic networks.

Fiber optic cable is a cable made of glass or very smooth plastic. This cable can transmit optical signals from one place to another at high speed. The speed produced by fiber optic cable is because this cable uses light refraction as its function. The light source used in fiber optic cables is usually a laser or LED. Reporting from the Binus.ac.id website, fiber optic cable has a special working principle, because it does not use an electric current, but the flow of light is replaced by an electric current, so it is not affected by electromagnetic waves.

In general, the performance of fiber optic cables is not much different from other cables. With this cable, you can connect one computer to another. The most important differences between fiber optic cable types are the access speed and data transfer capabilities. This type of fiber optic cable has high access speed and data transfer capability. These lines can transfer up to several gigabytes in less than 1 second.

Another advantage is that it is stable during data transmission because it is not affected by electromagnetic interference. Now you know the advantages of using fiber optic cables. For this reason, large companies or telecommunications operators more often use fiber optic cables. In addition, many WiFi service providers already use fiber optic cables to provide stable and fast connections.

The use of fiber optic networks has not been able to solve the problem of the loading process during heavy use by the manager of the Andalas University Academic Information System. User complaints should be resolved by the maintainer, where system access rights are enforced which can change access times, for example normal or peak times. The use of SIA access rights during busy times or peak use of the manager applies the time for access rights, such as when students carry out academic registration. At this peak time, the SIA manager should divide the visiting time into two, such as the difference between visiting times, namely differentiating access times between the Faculty of Social Sciences and the Faculty of Exact Sciences.

Access speed is one indicator of the quality of information systems. If access to the information system has optimal speed, it is fair to say that the applied information system is of good quality. Access speed will increase user satisfaction in using the Academic Information System. By distinguishing the access time of the Academic Information System, it can assist organizations in managing information more effectively and efficiently. These benefits are very important for Academic Information Systems, because they can increase operational efficiency, improve decision making, improve coordination and collaboration, reduce costs, improve service quality, and reduce risk.

Conclusion

Access speed of an information system network is a very important dimension for users of the information system. Access to the Andalas University Academic Information System (SIA) is quite good during normal use, but it often hangs or crashes during peak usage. This incident is repeated every time the student registration activity escapes the attention of the Academic Information System manager, so this incident occurs regularly every semester. The speed of accessing web pages is influenced by many factors and it is very difficult to work on because the factors that influence it can be many factors such as software, hardware, brain software and even the media itself used to access the Academic Information System. Overcoming the problem of hangs and errors during peak usage, the administrator provides fast access by (a) increasing the bandwidth capacity of SIA access from 50 mbps to 300mbps and (b) dividing SIA access time with peak usage time, thus limiting the difference in login times between social faculties and faculties exact.

References

[1] P. Mittal, "A multi-criterion decision analysis based on PCA for analyzing the digital technology skills in the effectiveness of government services," in *2020 International Conference on Decision Aid Sciences and Application (DASA)*, 2020, pp. 490–494.

[2] G. G. Gable, D. Sedera, and T. Chan, "Re-conceptualizing information system success: The IS-impact measurement model," *J. Assoc. Inf. Syst.*, vol. 9, no. 7, p. 18, 2008.

[3] T. R. Fakhrurrasi, A. Adriansyah, S. Budiyanto, J. Andika, S. Haryanti, and U. A. Rachmawati, "Load balance optimization in peer classifier robin method as hybrid from peer connection classifier and round robin methods," *J. Eng. Sci. Technol.*, vol. 16, no. 3, pp. 2528–2543, 2021.

[4] X. Shuping, Y. Hongqing, Y. Fan, and W. Yajuan, "The Design of Remote Control System Based on the Embedded Web Server," *Int. J. Adv. Network, Monit. Control.*, vol. 6, no. 1, pp. 41–49, 2021.

[5] A. E. Khedr, A. M. Idrees, and R. Salem, "Enhancing the e-learning system based on a novel tasks' classification load-balancing algorithm," *PeerJ Comput. Sci.*, vol. 7, p. e669, 2021.

[6] A. Vichare and S. Verma, "Embedded web server for home appliances," *Int. J. Eng. Res. Appl.*, pp. 190–193, 2012.

[7] J. W. Creswell, *Educational research: Planning, conductiong, and evaluationg quantitative and qualitative research*, 4th ed. Boston: Pearson Education, Inc, 2012.

[8] J. Cohen, *Statistical power analysis for the behavioral sciences*. New York: Lawrence Erlbaum Associates, 1988.

[9] A. S. Bahri, K. Saefullah, and M. Anwar, "The effect of firm size and leverage on financial performance and their impact on firm value in food and beverage sector companies listed on the indonesia stock exchange," *J. Bus. Stud. Manag. Rev.*, vol. 5, no. 2, pp. 208–214, 2022.

[10] F. Pohan, I. Saputra, and R. Tua, "Scheduling Preventive Maintenance to Determine Maintenance Actions on Screw Press Machine," *J. Ris. Ilmu Tek.*, vol. 1, no. 1, pp. 1–12, 2023.

[11] I. N. Permadi and D. B. Nisa, "A Model Experiment Design Using the Taguchi Method: A Case Study Of Making Concrete Roof," *J. Ris. Ilmu Tek.*, vol. 1, no. 1, pp. 36–44, 2023.

[12] E. A. Kadir, S. L. Rosa, A. Syukur, M. Othman, and H. Daud, "Forest fire spreading and carbon concentration identification in tropical region Indonesia," *Alexandria Eng. J.*, vol. 61, no. 2, pp. 1551–1561, 2022.

[13] D. Kandris, C. Nakas, D. Vomvas, and G. Koulouras, "Applications of wireless sensor networks: an up-to-date survey," *Appl. Syst. Innov.*, vol. 3, no. 1, p. 14, 2020.

[14] G. Filhaq, S. Aprianto, and H. Alfianto, "Design of Smart Locker Door Using Quality Function Deployment Based on ATMega 2560 Microcontroller," *J. Ris. Ilmu Tek.*, vol. 1, no. 1, pp. 25–35, 2023.

[15] T. M. Sari and W. Dini, "Risk Assessment and Mitigation Strategy in The Halal Broiler Supply Chain," *J. Ris. Ilmu Tek.*, vol. 1, no. 1, pp. 13–24, 2023.

[16] T. Hu, N. Chitnis, D. Monos, and A. Dinh, "Next-generation sequencing technologies: An overview," *Hum. Immunol.*, vol. 82, no. 11, pp. 801–811, 2021.
[17] A. Fuller, Z. Fan, C. Day, and C. Barlow, "Digital twin: Enabling technologies, challenges and open research," *IEEE access*, vol. 8, pp. 108952–108971, 2020.
[18] C. Bai, P. Dallasega, G. Orzes, and J. Sarkis, "Industry 4.0 technologies assessment: A sustainability perspective," *Int. J. Prod. Econ.*, vol. 229, p. 107776, 2020.
[19] W. D. Hoyer, M. Kroschke, B. Schmitt, K. Kraume, and V. Shankar, "Transforming the customer experience through new technologies," *J. Interact. Mark.*, vol. 51, no. 1, pp. 57–71, 2020.
[20] A. A. Abdullayev, "System of information and communication technologies in the education," *Sci. world Int. Sci. J.*, vol. 2, pp. 19–21, 2020.
[21] N. Mostoli, M. Rostamy- Malkhalifeh, A. Shahverani, and M. H. Behzadi, "Using the Malmquist Index in Evaluation Process to Enhance Mathematical Literacy in High School Students," *Int. J. Assess. Tools Educ.*, vol. 6, no. 4, pp. 636–655, 2019, doi: 10.21449/ijate.623080.
[22] D. S. Holcomb and G. F. Cunningham, *The Vision of the Future of Obstetrics & Gynecology, An Issue of Obstetrics and Gynecology Clinics, E-Book*, vol. 48, no. 4. Elsevier Health Sciences, 2021.