Internet Speed Analysis in the Campus Environment Using Speedtest

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Abstract

The internet is one of the main needs for students to access academic information, attend online lectures, and communicate digitally. However, the quality of internet connections in the campus environment often fluctuates which can affect student productivity. This study aims to analyze internet speed in various locations in the campus environment using the Speedtest application. The research methods used include measuring download speed, upload, and latency (ping) at several strategic points on campus. The results showed that there was a significant variation in internet speed depending on location, number of users, and measurement time. This research is expected to provide recommendations for the campus to improve the quality of the internet network to support student academic activities.

***Keywords**: Internet, Speed, Campus, Speedtest, Network*

1. INTRODUCTION

The internet has a very important role in the world of education, especially in supporting academic activities such as online lectures, access to scientific journals, and communication between students and lecturers. Good internet speed is very necessary so that the learning process can run smoothly. However, on many campuses, there are complaints about unstable and slow internet connections, which can hinder student activities.

Good internet connectivity is an essential need in supporting an effective learning ecosystem. However, on many campuses, slow and unstable internet connections are often an obstacle that hinders the teaching and learning process. Factors such as the high number of users, distance from the router, quality of network infrastructure, and signal interference from other electronic devices can affect internet speed.

Some factors that affect internet speed in a campus environment include the number of users, the distance from the router or WiFi access point, and the bandwidth capacity provided by the institution (Kumar et al., 2018). In addition, the use of different devices as well as signal interference from other electronic devices can also affect the quality of the internet connection (Zhang & Lee, 2020).

Along with the increasing need for internet access on campus, many universities are beginning to adopt more advanced network technologies, such as WiFi 6 and fiber optic networks to improve connection quality (Smith et al., 2019). However, optimal network implementation is still a challenge due to infrastructure and budget limitations. Therefore, periodic internet speed analysis is needed to identify obstacles and provide appropriate solutions to improve the user experience in accessing the internet in an academic environment.

According to the research of Kumar et al. (2018), the performance of internet networks in educational settings can vary significantly depending on the available infrastructure and network management applied. Zhang & Lee (2020) also emphasized the importance of efficient bandwidth management to overcome spikes in usage during peak hours.

As the need for online learning increases, especially during the COVID-19 pandemic, many campuses are looking to improve their network infrastructure. However, challenges remain, especially when it comes to ensuring an even distribution of bandwidth across various campus locations, such as libraries, classrooms, canteens, and student dormitories.

In this study, internet speed analysis was carried out at several points on campus using the Speedtest application. Measurements are made by paying attention to download speed, upload, and latency (ping) at certain times to get an idea of the stability of the internet network. The results of this study can be used as a basis for recommendations for campus network managers to improve the quality of internet services to be more optimal for students and academic staff.

In addition, this study also aims to identify factors that affect network performance, such as the number of users, distance from routers, and network infrastructure conditions. The results

of this analysis are expected to help campus managers in designing more effective strategies to improve user experience and support a more optimal learning process.

This study aims to analyze internet speed at various strategic points on campus using the Speedtest application. Measurements are made on download speeds, uploads, and latency at different times to get a comprehensive picture of network performance. The results of this study are expected to provide useful recommendations for campus managers in improving the quality of internet services.

2. METHOD

Location Determination

Measurement locations are selected based on areas with high levels of internet usage, including:

1. Library
2. Classroom
3. Canteen
4. Student residence halls

Data Collection

Measurements were taken in the morning, afternoon, and evening to capture variations in network usage. The Speedtest application is used to measure download speed, upload, and latency.

Data Analysis

The data obtained is analyzed in the form of tables and graphs to identify internet speed patterns in each location. The factors that affect network performance are also analyzed through interviews with users.

3. RESULTS AND DISCUSSION

The results of the study showed that there was a significant difference in internet speed at various points on campus. Some of the key findings in this study are:

1. The library has a higher average download speed compared to other locations due to the smaller number of users and better network infrastructure.
2. Classrooms experience quite high speed fluctuations, especially during lecture hours, due to the number of devices connected at the same time.
3. Canteens and public areas tend to have slower internet speeds due to the large number of users accessing the network at the same time.
4. Student dormitories have unstable internet speeds, especially at night when many students use the internet for entertainment and academic assignments.

Test Results

Table 1. Internet Speed in Multiple Campus Locations (Mbps)

Location	Download (Mbps)	Upload (Mbps)	Ping (ms)
Library	50.5	20.3	10
Classroom	30.2	15.6	20
Canteen	15.4	10.1	30
Boarding house	10.8	8.7	35

Internet Speed Pattern Analysis

1. The library has the best speed due to the smaller number of users and better infrastructure.
2. Classrooms experience high fluctuations during lecture hours.
3. The canteen shows slow speeds due to the large number of connected devices.
4. The dorms have unstable connections at night when internet usage increases.

Influencing Factors

1. User density
2. Distance from router
3. Signal interference from electronic devices
4. Quality of network infrastructure

Recommendations

1. Adding WiFi access points in high-density areas
2. Manage bandwidth usage during peak hours
3. Increase network capacity with fiber optic technology

The results of the analysis also show that the measurement time has an effect on internet speed. In the morning, internet speeds tend to be higher compared to day and night, when the

number of users increases drastically. Other influencing factors are weather conditions and interference from other devices that use wireless networks (Smith et al., 2019).

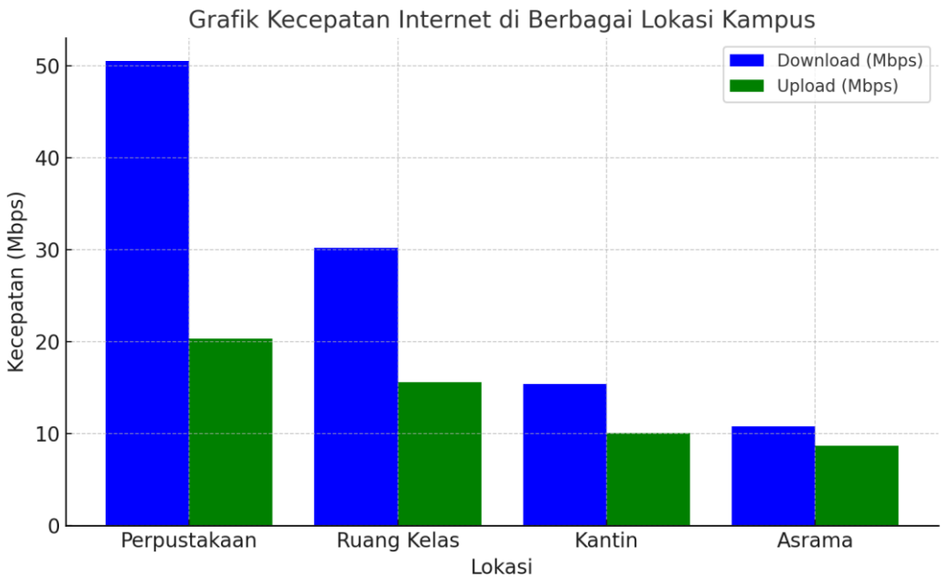

Figure 1. Internet Speed Graphs in Various Campus Locations

Based on the results of this study, it is necessary to increase network capacity and optimize the distribution of WiFi access points so that internet connections are more evenly distributed throughout the campus area. In addition, setting internet usage policies for students can help reduce data traffic density during peak hours.

4. CONCLUSION

1. There are differences in internet speed in various campus locations which are affected by the number of users and network infrastructure.
2. Libraries have the best internet speeds, while student canteens and dormitories experience a decrease in connection quality during peak hours.
3. Measurement time has an effect on internet speed, with the highest speed occurring in the morning and the lowest at night.
4. Recommendations to improve network quality include adding WiFi access points and setting up more efficient bandwidth usage.

ACKNOWLEDGMENTS

Thank you to those who have supported this research, including the campus network management team and students who participated in the data collection.

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