

UNIVERSITY NETWORK SYSTEM ANALYSIS: BASIS FOR ENHANCED ACADEMIC AND ADMINISTRATIVE EFFICIENCY

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Abstract- The study examined the network at Nueva Ecija University of Science and Technology (NEUST) to find ways to improve it. The researchers found the network to be mostly accessible and easy to use, but slow speeds were a concern. Other problems included frequent outages, limited bandwidth, and outdated software. People using the network liked that it was easy to use and reliable, but interactivity could be improved. The study suggests upgrades to speed, troubleshooting, login procedures, software/hardware, and user training. The study also recommends focusing on user needs with ongoing feedback and keeping the network secure, adaptable, and reliable. To achieve this, the study suggests regular user surveys, switching to fiber optics, getting a new internet provider, making the recommended improvements, and having better collaboration between IT and the university community. Overall, this research can help universities improve its network to create a more efficient and technologically advanced university environment.

Index Terms: Network System Analysis, Enhanced Academic and Administrative Efficiency, University Network System.

I. INTRODUCTION

In the contemporary educational landscape, the integration of technology plays a pivotal role in fostering efficiency and effectiveness in academic and administrative processes. Nueva Ecija University of Science and Technology (NEUST), recognizing the significance of networked systems, has been leveraging technology to streamline its operations. However, there remains a critical need for an in-depth analysis of the current state of networked systems at NEUST and an exploration of potential areas for improvement. This research embarks on a comprehensive investigation to bridge the existing gap in understanding, aiming to provide insights that can enhance both academic and administrative efficiency. The ubiquity of networked systems has become increasingly integral to the functioning of higher education institutions. According to Van Beek, by leveraging college networking, you have the opportunity to establish connections with prospective employers, engage with individuals in your chosen career path, and cultivate enduring friendships and mentorship bonds. Continue reading to explore the significance of networking during college and strategies for maximizing its effectiveness. [1] Networking additionally provides students with access to a wide array of resources that can bolster their academic, athletic, creative, and professional aspirations. Gaining insights from seasoned individuals with profound expertise in a student's field of interest can enhance their life throughout their high school journey and beyond. [2]

NEUST, as a prominent academic institution, stands at the forefront of technological integration. Despite this, there is a lack of detailed knowledge about the present state of the networked infrastructure and the extent to which it effectively supports academic and administrative processes. Understanding the current landscape is essential for identifying strengths, weaknesses, opportunities, and threats in the university's networked systems.

Moreover, the research problem acknowledges the existence of challenges within the networked systems at NEUST, hindering the overall efficiency of academic and administrative operations. These challenges, if left unaddressed, may impede the university's ability to fully harness the benefits of modern technology for its various functions. By identifying and analyzing these challenges, the study seeks to propose targeted solutions that can lead to a more robust and streamlined network infrastructure.

Stakeholder perception is a critical aspect of this research, as it delves into the experiences and viewpoints of students, faculty, and administrative staff regarding the usability and reliability of the current networked systems. This qualitative dimension adds depth to the analysis, providing a holistic understanding of the user experience and uncovering potential areas for improvement from the end-users' perspectives.

In the final phase of the research, the study aims to propose specific enhancements or optimizations based on the findings. This proactive approach aligns with the broader goal of contributing to enhanced academic and administrative efficiency. The proposed recommendations will serve as a roadmap for NEUST to strategically enhance its networked systems, ensuring they align seamlessly with the institution's goals and provide optimal support for its academic and administrative functions. Overall, this research endeavors to contribute valuable insights that can catalyze positive change within NEUST's technological infrastructure, fostering a more efficient and technologically adept university environment.

LITERATURE REVIEW

Enhancing Trust, Enhancing Schools: Insights from a Social Network Analysis

The utilization of research evidence among educators is currently a subject of global attention in both policy and practice spheres, with numerous governmental bodies emphasizing the significance of research-informed approaches to advancement. As educational systems worldwide undertake substantial structural and instructional reforms, there is a growing expectation for school leaders, teachers, and educators to substantiate their teaching and learning methodologies with evidence and demonstrate the efficacy of interventions before implementation. Consequently, research and evidence are increasingly regarded as essential components for validating educational practices. [3]

According to Brown, et.al, despite the escalating emphasis on utilizing research evidence, there remains a gap between the rhetoric surrounding its importance and its actual integration into classroom practices. Moreover, the development of effective mechanisms for connecting research evidence to practical applications in schools has lagged behind. Given the critical nature of this issue, the lack of substantial progress in this domain, and the renewed interest in research evidence, this paper endeavors to shed light on the intersection of research utilization and school improvement. Specifically, it aims to explore the factors influencing teachers' perceptions regarding: 1) the extent to which their schools encourage the use of research evidence to enhance teaching practices, and 2) whether teachers perceive their schools' improvement strategies as grounded in research and evidence-based best practices. [3]

The Transformative Influence of Technology and Networks on Education

The world has undergone profound transformations in recent decades, largely propelled by the relentless march of technology. Science and technology now wield unprecedented influence over individuals' daily lives, earning this era the moniker of the "technologically powered century."

These shifts have left an indelible mark across all facets of society, including education. Indeed, the educational landscape has witnessed a seismic shift, owing much of its evolution to the omnipresence of technology and networking. This academic discourse endeavors to explore the pivotal roles played by technology and networking within the realm of education.

At its core, technology has fundamentally altered the fabric of society, infusing it with unprecedented dynamism. Within the educational domain, technology's foremost contribution lies in its ability to imbue learning experiences with heightened engagement. Moreover, its influence extends to fostering the acquisition of essential life skills, nurturing individualized learning pathways, fostering collaborative endeavors, expanding horizons with newfound opportunities, facilitating seamless idea exchange, and catalyzing myriad other transformative changes. [4]

The Imperative of Studying Computer Network Systems in Education

The imperative to study computer network systems within the realm of education is paramount. As technology becomes increasingly intertwined with learning environments, a comprehensive understanding of computer networks emerges as a fundamental necessity. Such knowledge equips educators and learners alike with the tools to navigate and harness the vast potential of digital connectivity in educational settings. Moreover, delving into the intricacies of computer network systems not only fosters technical proficiency but also cultivates critical thinking, problem-solving skills, and adaptability in the face of technological advancements.

The computer network represents a novel, intricate, and highly functional technology. As information and communication technology undergoes rapid evolution, advancements in network-related knowledge and technology continue to accelerate. Consequently, educational initiatives must prioritize student learning, knowledge acquisition, and lifelong learning. Understanding information networks serves as the foundation for comprehending communication technology interfaces, a proficiency that can only be effectively assessed within specific experimental contexts. [5]

RESEARCH PROBLEM

Despite the increasing reliance on networked systems for academic and administrative processes, there exists a gap in understanding the current state and potential areas for improvement in the network infrastructure of Nueva Ecija University of Science and Technology. The research aims to address the following questions:

1. Describe the profile of the respondents in terms of;
 - 1.1 Type of respondents
 - 1.2 Age
 - 1.3 Gender
 - 1.4 Level of Education

- 1.5 Year in the university
2. Describe the current state of networked systems infrastructure, and how effectively does it support academic and administrative processes.
3. Describe the existing challenges within the networked systems that hinder the overall efficiency of academic and administrative operations.
4. Describe the perception of MIS personnel, students, faculty, and administrative staff of the current networked system of the university in terms of;
 - 4.1 Usability
 - 4.2 Reliability
5. Base on the result of the study, propose a specific enhancements or optimizations to improve the functionality and performance of networked systems of the university, ultimately contributing to enhanced academic and administrative efficiency.

II. METHODS

The study employed a descriptive research design to comprehensively examine the operations of leisure business establishments, aiming to provide an accurate depiction of their characteristics, behaviors, and phenomena without manipulating variables. Data collection involved surveys, interviews, and observations from a sample of respondents to ensure firsthand and reliable information. Statistical analysis will be used to identify trends, patterns, and relationships within the collected data. According to Simon, descriptive research is essential for obtaining information about the current state of phenomena and offers a systematic approach to gathering empirical data directly from the source, ensuring accuracy and reliability. [6]

The study on the university network system analysis, basis for enhanced academic and administrative efficiency, is situated at Nueva Ecija University of Science and Technology, situated in Cabanatuan City, Nueva Ecija province. NEUST serves as an ideal location for this research owing to its pertinent characteristics and relevance to the research variables.

The selection criteria for participants in this quantitative study on university network system analysis are grounded in the purposive sampling technique, as advocated by Creswell and Creswell. [7] This approach enables the deliberate selection of individuals possessing targeted knowledge and experience pertinent to the research topic. The target population comprises MIS personnel, students, faculty, and administrative staff of the university—individuals with direct involvement and experience using the university's network system. This intentional selection ensures that respondents can provide valuable insights into the nuances of university network system analysis, enriching the depth and relevance of the study.

The researcher's survey questionnaire is employed in the study to address specific inquiries, divided into four sections. Part I aims to gather data on the respondents' profiles. Part II is dedicated to collecting data that delineate the current status of the university's networked systems infrastructure and its effectiveness in supporting academic and administrative processes. Part III seeks to gather data describing the existing challenges within the networked systems that impede overall efficiency in academic and administrative operations. Part IV focuses on gathering data concerning the perceptions of MIS personnel, students, faculty, and administrative staff regarding the university's current networked system.

A four-point Likert scale was used in Part 2, 3 and 4 of the survey questionnaires response mode as follows:

Scale Value	Verbal Description	Quality Indicator
4	Strongly Agree	The respondent strongly agrees to the statement given
3	Agree	The respondent agrees to the statement given
2	Disagree	The respondent disagrees to the statement given
1	Strongly Disagree	The respondent strongly disagrees to the statement given

Based on the study's findings, specific enhancements or optimizations will be proposed to enhance the functionality and performance of the university's networked systems, ultimately contributing to improved academic and administrative efficiency.

The data gathering procedure for the study on the network system analysis, basis for enhanced academic and administrative efficiency followed a systematic process to ensure the collection of relevant and reliable data. The procedure included the preparation of the research instrument, validation of the questionnaire, and the actual data collection process. The flowchart is illustrated in the figure that followed.

Figure 1 Data Gathering Procedure Flowchart



Following data collection, a systematic arrangement was established by developing either a database or spreadsheet. Subsequently, the collected data underwent analysis using descriptive statistical methods. The empirical examination included several techniques such as frequency counts, percentage computations, and the calculation of weighted means. Respondent agreement was gauged utilizing the scale provided below:

Scale Value	Range	Verbal Description	Quality Indicator
4	3.50 - 4.00	Strongly Agree	The respondent strongly agrees to the statement given
3	2.50 - 3.49	Agree	The respondent agrees to the statement given
2	1.50 - 2.49	Disagree	The respondent disagrees to the statement given
1	1.00 - 1.49	Strongly Disagree	The respondent strongly disagrees to the statement given

III. RESULTS AND DISCUSSIONS

1. On the Profile of the Respondents

1.1. Type of Respondents

A total of 207 individuals participated in the survey. The majority of the respondents were students (73.43%). MIS personnel (13.04%), faculty (8.21%), and administrative staff (5.31%) made up the remaining portion of the respondents. The survey was dominated by students, who comprised over three-quarters of the participants. The remaining participants were a mix of administrative staff, faculty, and MIS personnel.

1.2. Age

The largest age group is 20 and below with 111 (53.62%) respondents. The remaining respondents are spread across other age groups, with a smaller proportion in the 21 to 30 years old (32.37%), 31 to 40 years old (9.18%), 41 to 50 years old (3.38%) and 51 to 60 years old (1.45%) age groups. There were no respondents above 60 years old.

1.3. Gender

Males make up 109 (52.66%) of the respondents, followed by females at 90 (43.48%). There are also 8 (3.86%) respondents who identify as LGBTQ+. There is a nearly equal split between males and females, with a slight majority identifying as male. A small number of respondents identify as LGBTQ+.

1.4. Level of Education

The majority (82.61%, 171) are in their college. 2.42% (5) have a high school degree. 6.76% (14) have a Graduate degree. 4.83% (10) have a post-graduate degree. 3.38% (7) have a Doctorate degree. College forms the largest group among the respondents, followed by those with a graduate degree, post-graduate degree, doctorate degree, and high school degree.

1.5. Year/s in the university

The majority, 87.44% (181), spent 4 years or less at the university. 7.73% (16) spent between 5 and 10 years at the university. 3.38% (7) spent between 11 and 20 years at the university. 1.45% (3) spent between 21 and above years at the university.

2. On the Current State of Networked Systems Infrastructure, and how Effectively does it Support Academic and Administrative Processes

Table 1 Current State of Networked Systems Infrastructure

Indicators	Mean	Verbal Description
1. Infrastructure Accessibility: The networked systems at NEUST are easily accessible for both academic and administrative purposes.	3.19	Agree
2. Reliability of Network Connections: The network connections at NEUST are consistently reliable without frequent disruptions.	3.01	Agree
3. Speed of Network Performance: The speed of the networked systems at NEUST is sufficient for timely completion of academic and administrative tasks.	1.96	Disagree
4. Availability of Technical Support: Adequate technical support is available to address issues related to the networked systems at NEUST.	3.20	Agree
5. Ease of System Navigation: Navigating through the networked systems is user-friendly and requires minimal effort.	3.10	Agree
6. Integration with Academic Tools: The networked systems seamlessly integrate with academic tools, enhancing the overall learning experience.	3.13	Agree
7. Data Security Measures: The networked systems at NEUST have robust measures in place to ensure the security of academic and administrative data.	3.21	Agree
8. User-Friendly Administrative Interfaces: Administrative interfaces within the networked systems are designed in a user-friendly manner.	3.22	Agree
9. Efficiency in Academic Processes: The networked systems contribute to the efficiency of academic processes such as registration, course enrollment, and grading.	3.18	Agree
10. Overall Satisfaction: Overall, I am satisfied with the current state of the networked systems at NEUST in supporting academic and administrative activities.	3.21	Agree
Overall Weighted Mean	3.04	Agree
<i>Legend: 3.50 – 4.00 Strongly Agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; and 1.00 – 1.49 Strongly Disagree</i>		

Ten (10) statements were assessed by the respondents that focused on the current state of networked systems infrastructure, and how effectively does it support academic and administrative processes. Based on their assessment, the eighth statement (User-Friendly Administrative Interfaces: Administrative interfaces within the networked systems are designed in a user-friendly manner.) gathered a highest mean of 3.22, which is verbally interpreted as Agree. The third statement (Speed of Network Performance: The speed of the networked systems at NEUST is sufficient for timely completion of academic and administrative tasks.) collected a lowest mean of 1.96, verbally interpreted as Disagree. The majority of the statements' means were verbally interpreted as Agree. The weighted mean of 3.04 implies the overall perception of the effectiveness of NEUST's networked systems in supporting academic and administrative processes leans towards agreement. This indicates a generally positive sentiment among respondents regarding various aspects of the network infrastructure. Specifically, the high mean score for the statement regarding user-friendly administrative interfaces suggests that users find the interfaces easy to navigate and interact with, which is crucial for efficient administrative tasks. On the other hand, the low mean score for network speed indicates a significant concern among respondents, suggesting that the current speed may not be adequate for timely completion of tasks, potentially hindering productivity and efficiency.

The interpretation of the faculty survey on NEUST's network infrastructure aligns with the findings from the study by Esterhuizen et al. (2013) on faculty perceptions during e-learning staff development. Similar to Esterhuizen et al.'s emphasis on identifying both strengths and weaknesses, the analysis highlights positive aspects like user-friendly administrative interfaces (which corresponds to the "looking in" perspective of faculty on the development context in Esterhuizen et al.'s study, where faculty assess the ease of use of the technology). However, it also recognizes areas for improvement, particularly network speed (corresponding to the "looking out" perspective, where faculty consider the realities of using the technology in their work). This reinforces the importance of a balanced approach to faculty development in e-learning environments, where both the affordances of the technology and the existing institutional context are considered. The faculty survey results, mirroring Esterhuizen et al.'s framework, provide valuable insights for NEUST to improve its network infrastructure. By addressing faculty concerns about speed while maintaining user-

friendly interfaces, NEUST can create a more supportive environment for both academic and administrative processes. [8]

Despite the disagreement regarding network speed, the overall weighted mean still falls within the "Agree" range, indicating that, on average, respondents are satisfied with the current state of NEUST's networked systems. However, it's essential to address the identified areas of concern, particularly network speed, to ensure that academic and administrative processes are optimally supported. This could involve investing in infrastructure upgrades or implementing strategies to improve network performance without compromising reliability or accessibility. Overall, this analysis provides valuable insights into areas of strength and areas for improvement in NEUST's networked systems infrastructure, guiding future efforts to enhance support for academic and administrative functions.

3. *On the Existing Challenges within the Networked Systems that Hinder the Overall Efficiency of Academic and Administrative Operations*

Table 2 Existing Challenges within the Networked Systems

Indicators	Mean	Verbal Description
1. Network Downtime Impact: The occurrence of network downtime significantly hinders the efficiency of academic and administrative operations at NEUST.	3.08	Agree
2. Inadequate Bandwidth Capacity: The current bandwidth capacity is inadequate, causing delays and interruptions in accessing online resources and platforms.	3.01	Agree
3. Insufficient System Scalability: The networked systems struggle to handle increased user demand during peak times, affecting overall efficiency.	3.02	Agree
4. Security Vulnerabilities: There are notable security vulnerabilities in the networked systems, posing risks to academic and administrative data.	2.83	Agree
5. Lack of Redundancy Measures: The absence of effective redundancy measures contributes to system failures and operational disruptions.	2.90	Agree
6. Limited Technical Support Availability: Limited availability of technical support exacerbates challenges, as timely assistance is crucial during system issues.	2.89	Agree
7. Compatibility Issues with Devices: Compatibility issues with various devices hinder the seamless use of networked systems for academic and administrative tasks.	2.88	Agree
8. Outdated Software and Hardware: The presence of outdated software and hardware negatively impacts the performance and efficiency of networked systems.	2.88	Agree
9. Complex User Authentication Processes: Complex user authentication processes contribute to delays and frustrations in accessing necessary networked resources.	2.81	Agree
10. Inadequate Training and User Guidance: Insufficient training and guidance for users result in challenges in effectively utilizing the networked systems for academic and administrative tasks.	2.89	Agree
Overall Weighted Mean	2.95	Agree
<i>Legend: 3.50 – 4.00 Strongly Agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; and 1.00 – 1.49 Strongly Disagree</i>		

Ten (10) statements were assessed by the respondents that focused on the existing challenges within the networked systems that hinder the overall efficiency of academic and administrative operation. Based on their assessment, the first statement (Network Downtime Impact: The occurrence of network downtime significantly hinders the efficiency of academic and administrative operations at NEUST.) gathered a highest mean of 3.08, which is verbally interpreted as Agree. The ninth statement (Complex User Authentication Processes: Complex user authentication processes contribute to delays and frustrations in accessing necessary networked resources.) collected a lowest mean of 2.81, verbally interpreted as Agree.

The majority of the statements' means were verbally interpreted as Agree. The weighted mean of 2.95 implies the existence of challenges within NEUST's networked systems that hinder the overall efficiency of academic and administrative operations, though to a slightly lesser extent compared to the overall satisfaction with the system's performance. The highest mean score for the statement regarding the impact of network downtime underscores the significant disruption such events cause to operations, indicating a pressing issue that needs attention. Similarly, concerns about inadequate bandwidth capacity, insufficient system scalability, security vulnerabilities, lack of redundancy

measures, limited technical support availability, compatibility issues with devices, outdated software and hardware, and complex user authentication processes are all reflected in the mean scores, highlighting various aspects contributing to inefficiencies within the networked systems.

A study by Salim supports the interpretation of the survey results on the challenges faced by NEUST's networked systems. Salim's research at the University of Dodoma found that university expansion can strain network infrastructure. [9] This aligns with the finding that NEUST's current system struggles with bandwidth limitations and scalability, likely due to an increase in users and activities.

Salim's study also identified a lack of stakeholder involvement in ICT planning as a key reason for unmet infrastructure goals. This resonates with the various challenges identified at NEUST, such as outdated software, security vulnerabilities, and complex user authentication processes. These issues might indicate a need for improved planning and collaboration between different departments at NEUST to ensure the network infrastructure effectively meets the needs of users. Salim's research reinforces the importance of addressing the identified challenges at NEUST. By investing in upgrades, improving planning, and implementing best practices, NEUST can optimize its network infrastructure to better support its academic and administrative operations.

Despite these challenges, the overall weighted mean still falls within the "Agree" range, suggesting that respondents acknowledge the existence of these issues but do not strongly disagree with their impact on academic and administrative operations. However, it's crucial to address these challenges to improve the overall efficiency and effectiveness of NEUST's networked systems. This may involve investing in infrastructure upgrades to increase bandwidth capacity, enhance system scalability, and implement redundancy measures to mitigate downtime. Additionally, measures such as strengthening security protocols, providing more accessible technical support, ensuring device compatibility, updating software and hardware, simplifying user authentication processes, and offering adequate training and user guidance can all contribute to overcoming these challenges and improving the overall performance of networked systems. By addressing these issues, NEUST can optimize its network infrastructure to better support academic and administrative operations, ultimately enhancing the overall efficiency and effectiveness of its educational and administrative processes.

4. *On the Perception of MIS Personnel, Students, Faculty, and Administrative Staff of the Current Networked System of the University*

Table 2 Usability

Indicators	Mean	Verbal Description
1. User-Friendly Interface: The interface of the current networked system is user-friendly, making it easy for stakeholders to navigate and access information.	3.25	Agree
2. Intuitiveness of System Features: The features of the networked system are intuitive, allowing stakeholders to easily understand and use them without significant guidance.	3.13	Agree
3. Efficiency in Task Completion: Stakeholders find that the current networked system allows for efficient completion of tasks related to academic and administrative processes.	3.15	Agree
4. Consistency in Design Elements: The design elements of the networked system are consistent throughout, contributing to a cohesive and predictable user experience.	3.13	Agree
5. Clarity in Navigation Menus: Navigation menus within the networked system are clear, aiding stakeholders in finding the information or features they need.	3.17	Agree
6. Accessibility for Users with Diverse Abilities: The current networked system is accessible to users with diverse abilities, ensuring inclusivity in its usability.	3.14	Agree
7. User Assistance and Help Features: Stakeholders have access to effective user assistance and help features within the networked system when needed.	3.15	Agree
8. Customization Options for User Preferences: The networked system provides customization options that allow stakeholders to tailor their user experience based on individual preferences.	3.13	Agree
9. User Satisfaction with System Interactivity: Stakeholders are satisfied with the level of interactivity the networked system provides in facilitating their tasks.	3.12	Agree

10. Perceived Ease of Learning: Stakeholders perceive the networked system as easy to learn and adapt to for effective use in academic and administrative contexts.	3.13	Agree
Overall Weighted Mean	3.15	Agree
<i>Legend: 3.50 – 4.00 Strongly Agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; and 1.00 – 1.49 Strongly Disagree</i>		

Ten (10) statements were assessed by the respondents that focused on the perception of mis personnel, students, faculty, and administrative staff of the current networked system of the university in terms of usability. Based on their assessment, the first statement (User-Friendly Interface: The interface of the current networked system is user-friendly, making it easy for stakeholders to navigate and access information.) gathered a highest mean of 3.25, which is verbally interpreted as Agree. The ninth statement (User Satisfaction with System Interactivity: Stakeholders are satisfied with the level of interactivity the networked system provides in facilitating their tasks.) collected a lowest mean of 3.12, verbally interpreted as Agree.

The majority of the statements' means were verbally interpreted as Agree. The weighted mean of 3.15 implies that the perception of MIS personnel, students, faculty, and administrative staff regarding the usability of the current networked system of the university is generally positive. The high mean scores across all indicators suggest that stakeholders find the system to be user-friendly, intuitive, efficient, consistent, clear, accessible, and equipped with adequate user assistance and customization options. These findings indicate that the networked system effectively supports various stakeholders in completing academic and administrative tasks. A study by Ohliati & Abbas supports the positive interpretation of the usability survey results. Their research investigated factors influencing student satisfaction with learning management systems (LMS). While their study focused on LMS, it aligns with the concept of a networked system where user-friendliness and ease of use are crucial for positive user experience. [10]

The highest mean score for the statement regarding the user-friendly interface highlights the importance of an intuitive and easy-to-navigate interface in facilitating stakeholders' interactions with the system. Similarly, the slightly lower mean score for user satisfaction with system interactivity indicates that while stakeholders are generally satisfied with the level of interactivity, there may be some room for improvement in enhancing the system's responsiveness and engagement features. The highest mean score, pertaining to the user-friendly interface, aligns with Ohliati & Abbas' notion that a well-designed interface is a key factor for positive user experience. While user satisfaction with interactivity scored slightly lower, it still reflects a generally positive perception. This aligns with Ohliati & Abbas' perspective that some aspects, like perceived usefulness, might require further improvement.

The overall weighted mean of 3.15 indicates a collective agreement among stakeholders regarding the usability of the networked system. This implies that, on average, stakeholders perceive the system as being conducive to their needs and preferences, contributing to a positive user experience. Such positive feedback is essential for maintaining user satisfaction and fostering continued engagement with the networked system. In the current survey, the high mean scores (averaging 3.15) echo Ohliati & Abbas' findings regarding factors like perceived ease of use being significant for user satisfaction. Similar to Ohliati & Abbas' emphasis on information quality, the networked system's clear and accessible interface contributes to user satisfaction in this study.

However, it's crucial for the university to continually monitor user feedback and address any emerging issues or areas for improvement to ensure that the networked system remains aligned with stakeholders' expectations and evolving needs. By prioritizing usability and user experience, the university can enhance the effectiveness and adoption of the networked system, ultimately supporting the success of academic and administrative processes within the institution.

Table 4 Reliability

Indicators	Mean	Verbal Description
1. Consistent System Uptime: The current networked system exhibits consistent uptime, with minimal instances of downtime or unavailability.	3.00	Agree
2. Reliability in Accessing Online Resources: Stakeholders can reliably access online resources through the networked system without frequent disruptions.	3.04	Agree
3. Timely Resolution of System Issues: System issues are promptly addressed and resolved, ensuring a reliable user experience for stakeholders.	1.95	Disagree
4. Consistent Network Speed: The networked system consistently provides a reliable speed for accessing and transferring data without significant fluctuations.	2.01	Disagree
5. Stability in System Performance: The overall performance of the networked system remains stable, contributing to reliable day-to-day operations.	2.00	Disagree

6. Effectiveness in Handling Concurrent Users: The networked system effectively handles a significant number of concurrent users without a noticeable decline in reliability.	3.00	Agree
7. Reliability of Communication Channels: Communication channels within the networked system are reliable, facilitating seamless communication among stakeholders.	3.13	Agree
8. Secure and Stable Data Storage: The data storage within the networked system is secure and stable, ensuring the reliability of stored information.	3.08	Agree
9. Consistency in System Updates: System updates are consistently applied, contributing to the reliability and security of the networked system.	3.09	Agree
10. User Confidence in System Reliability: Stakeholders have confidence in the overall reliability of the networked system for their academic and administrative needs.	3.15	Agree
Overall Weighted Mean	2.75	Agree
<i>Legend: 3.50 – 4.00 Strongly Agree; 2.50 – 3.49 Agree; 1.50 – 2.49 Disagree; and 1.00 – 1.49 Strongly Disagree</i>		

Ten (10) statements were assessed by the respondents that focused on the perception of mis personnel, students, faculty, and administrative staff of the current networked system of the university in terms of reliability. Based on their assessment, the tenth statement (User Confidence in System Reliability: Stakeholders have confidence in the overall reliability of the networked system for their academic and administrative needs.) gathered a highest mean of 3.15, which is verbally interpreted as Agree. The third statement (Timely Resolution of System Issues: System issues are promptly addressed and resolved, ensuring a reliable user experience for stakeholders.) collected a lowest mean of 3.12, verbally interpreted as Disagree.

The majority of the statements' means were verbally interpreted as Agree. The weighted mean of 2.75 implies that the perception of MIS personnel, students, faculty, and administrative staff regarding the reliability of the current networked system of the university is generally positive, although there are some areas of concern. The high mean scores for most indicators suggest that stakeholders perceive the system as reliable in terms of uptime, accessing online resources, handling concurrent users, reliability of communication channels, secure data storage, consistency in system updates, and overall user confidence in system reliability.

The highest mean score for the statement regarding user confidence in system reliability indicates that stakeholders generally have trust in the networked system to meet their academic and administrative needs, which is crucial for fostering continued usage and engagement. Similarly, the slightly lower mean score for the timely resolution of system issues suggests that stakeholders have some reservations about the promptness with which system issues are addressed and resolved, indicating an area for improvement in ensuring a reliable user experience.

However, the mean scores for statements related to consistent network speed, stability in system performance, and timely resolution of system issues fall within the "Disagree" range. These findings suggest that stakeholders perceive issues with the networked system's performance and responsiveness, highlighting areas where improvements are needed to enhance reliability and ensure a seamless user experience.

The overall weighted mean of 2.75 falls within the "Agree" range, indicating that, on average, stakeholders perceive the networked system as reliable. However, it's essential for the university to address the identified areas of concern to further enhance the reliability of the networked system and maintain stakeholder confidence. This may involve investing in infrastructure upgrades, improving technical support processes, and implementing measures to address performance and stability issues. By prioritizing reliability, the university can ensure that the networked system effectively supports academic and administrative operations, ultimately contributing to the success of its stakeholders. These aligns with the findings of Blundell et al., A reliable network, much like effective online learning environments, hinges on factors like user confidence, technology performance, and ongoing support. By addressing areas for improvement, the university can create a more dependable network that underpins a successful online experience for its entire community. [11]

5. Proposed Enhancements and Optimizations for the Networked Systems of the University

Based on the results of the study, here are specific enhancements and optimizations that can be made to improve the functionality and performance of the university's networked systems, ultimately contributing to enhanced academic and administrative efficiency.

Table 5 Proposed Enhancements and Optimizations

Areas for Improvement	Specific Enhancements and Optimizations
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<p>Network Speed and Stability: The study identified concerns regarding network speed and stability. This can be addressed by:</p>	<ul style="list-style-type: none"> • Upgrading network infrastructure: Investing in higher bandwidth capacity, upgrading network equipment, and optimizing network configuration can improve overall network speed and stability. • Traffic management: Implementing traffic management strategies can prioritize critical applications and data flow, ensuring optimal performance during peak usage times.
<p>Timely Resolution of System Issues: Stakeholders reported dissatisfaction with the timeliness of resolving system issues. This can be improved by:</p>	<ul style="list-style-type: none"> • Enhancing technical support: Increasing technical support staff, improving response times, and implementing remote troubleshooting solutions can expedite issue resolution. • Proactive maintenance: Implementing a preventative maintenance schedule can identify and address potential issues before they disrupt operations.
<p>Complex User Authentication Processes: Simplifying user authentication processes can improve user experience and efficiency. This can be achieved by:</p>	<ul style="list-style-type: none"> • Implementing multi-factor authentication (MFA): MFA adds an extra layer of security without significantly complicating the login process. • Offering single sign-on (SSO): SSO allows users to access multiple applications with a single login, reducing the need for remembering multiple credentials.
<p>Outdated Software and Hardware: Upgrading outdated software and hardware can improve performance, security, and compatibility. This involves:</p>	<ul style="list-style-type: none"> • Developing a hardware and software refresh plan: Regularly evaluating and upgrading outdated equipment ensures compatibility with current applications and security protocols. • Standardizing software: Standardizing on specific software versions across departments can simplify maintenance and troubleshooting.
<p>Limited Training and User Guidance: Providing adequate training and user guidance can empower stakeholders to effectively utilize the networked systems. This can be achieved by:</p>	<ul style="list-style-type: none"> • Developing comprehensive user manuals and tutorials: Clear and accessible documentation guides users on how to navigate the system and utilize its features. • Offering training workshops and seminars: Interactive training sessions can provide hands-on experience and address specific user needs.

The passage outlines a roadmap for improving the university's network systems, aiming for a more efficient and user-friendly experience for everyone. It highlights several key areas identified in a recent study that are hindering optimal performance.

The first concern is network speed and stability. The solution involves a two-pronged approach: upgrading the physical infrastructure with better equipment and bandwidth, and optimizing how data flows on the network to prioritize important tasks during peak usage times.

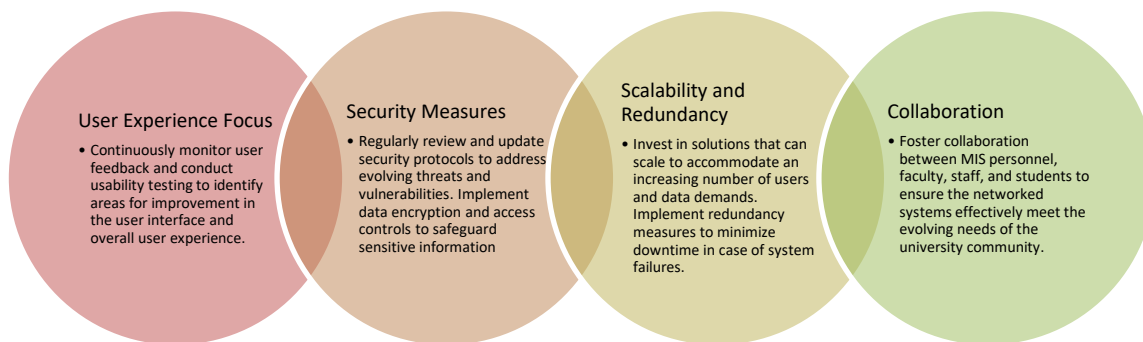
Another pain point is the slow resolution of technical issues. The proposed solution includes bolstering technical support staff, improving response times, and implementing remote troubleshooting tools. Additionally, putting a preventative maintenance plan in place can help identify and address potential problems before they cause disruptions.

Simplifying user login procedures is another area for improvement. The document suggests implementing multi-factor authentication (MFA) for increased security without adding excessive complexity. Additionally, offering single sign-on (SSO) would allow users to access various applications with just one login, eliminating the hassle of remembering multiple credentials.

Outdated software and hardware pose security risks and compatibility issues. The solution involves developing a regular refresh plan to upgrade equipment and standardize on specific software versions across departments. This standardization simplifies maintenance and troubleshooting efforts.

Finally, the passage emphasizes the importance of providing adequate training and user guidance. Clear and accessible user manuals and tutorials will equip faculty, staff, and students with the knowledge to navigate the system effectively. Interactive training sessions can further enhance the learning experience and address specific user needs.

Figure 2 Overall Improvements



Beyond the specific fixes, the passage highlights several overarching improvements for the university network.

Firstly, it emphasizes a focus on user experience. This means continuously gathering feedback and conducting usability tests to identify areas where the interface or overall experience can be improved. A user-friendly system fosters better adoption and reduces frustration.

Secondly, security remains paramount. Regularly reviewing and updating security protocols is crucial to stay ahead of evolving threats. Implementing data encryption and access controls safeguards sensitive information and protects the university from cyberattacks.

Thirdly, the passage emphasizes the need for scalability and redundancy. As the university grows, the network needs to adapt by accommodating more users and data demands. Additionally, implementing redundancy measures ensures minimal downtime in case of failures. This keeps critical operations running smoothly.

Finally, fostering collaboration between different stakeholders is key. Effective communication between IT personnel (MIS), faculty, staff, and students ensure the network systems evolve to meet the university community's ever-changing needs. By working together, they can create a system that truly supports the university's goals.

By adopting and implementing these enhancements and optimizations, the university can create a more robust, reliable, and user-friendly networked system that empowers stakeholders and fosters a more efficient academic and administrative environment.

IV. CONCLUSIONS

Based on the results of the study, the following conclusions are drawn:

- This survey was conducted among a population dominated by students (73.43%). The majority of these students were young adults, with over half falling under the age of 21 (53.62%). There is a near-even gender split among the respondents (52.66% male, 43.48% female), with a small LGBTQ+ population (3.86%). The educational background of the respondents leans towards college degrees (82.61%), with a smaller number holding graduate degrees (6.76%), post-graduate degrees (4.83%), and doctorates (3.38%). Finally, the vast majority of respondents have been in the university for four years or less (87.44%).
- A survey was conducted to assess the current state of NEUST's networked systems infrastructure. While respondents agreed that the network is generally accessible, reliable, and offers user-friendly interfaces, there were concerns regarding speed. The overall sentiment leaned positive, but improvements are needed in network speed to ensure optimal support for academic and administrative processes. By addressing these concerns, NEUST can create a more supportive environment for its users.
- A survey identified several challenges that hinder the efficiency of NEUST's networked systems. These challenges include frequent downtime, insufficient bandwidth, and outdated software. While users acknowledged these limitations, the overall sentiment suggested they did not negate the system's usefulness. Upgrading the network infrastructure, improving planning, and implementing best practices are all crucial steps for NEUST to take to better support its academic and administrative operations.
- A survey assessed the usability of the university's networked system among students, faculty, staff, and MIS personnel. Overall, the perception was positive, with users finding the system user-friendly, efficient, and accessible. While user satisfaction with interactivity was slightly lower, the overall usability remains positive. The university should

continue to monitor user feedback to ensure the system remains aligned with evolving needs. By prioritizing usability, the university can enhance the effectiveness of the network and support academic and administrative processes.

5. A survey assessed the reliability of the university's network system among students, faculty, staff, and MIS personnel. While users expressed confidence in the system overall, there were concerns about speed, stability, and timely resolution of issues. These aspects scored lower than uptime, data storage, and user confidence. The university should prioritize improvements in these areas to enhance network reliability. By addressing these concerns, the university can create a more dependable network that supports its academic and administrative processes.

6. The study identified several areas for improvement in the university's networked systems. These included network speed and stability, timely resolution of technical issues, complex user authentication, outdated software and hardware, and limited user training. The passage proposes specific solutions for each area, such as infrastructure upgrades, enhanced technical support, multi-factor authentication, and user training. Beyond these specific fixes, the passage emphasizes a user-centric approach with ongoing feedback and usability testing. Security is also a priority, with recommendations for updated protocols and data encryption. The importance of scalability, redundancy, and collaboration between IT and the university community is highlighted to ensure the network effectively supports present and future needs. By implementing these enhancements, the university can create a more efficient and user-friendly network that empowers stakeholders and fosters a successful academic environment.

V. RECOMMENDATIONS

Based on the results of the study and conclusions drawn, the following recommendations are offered:

1. It is recommended that the university consider to conduct regular user satisfaction surveys to monitor perceptions of the network system and identify areas for ongoing improvement.
2. It is also recommended that the university undergo a transition to Fiber Optics infrastructure. These enhancements will ensure faster and more reliable data transmission, significantly reducing latency and improving network stability. Additionally, Fiber Optics can accommodate the increasing demands for bandwidth-intensive applications such as online learning platforms, research data exchange, and multimedia streaming. This transition will position the university at the forefront of technological advancement, enhancing its competitiveness and providing a seamless and efficient digital experience for students, faculty, and staff alike.
3. It is strongly recommended that the university add a different Internet Service Provider. This will ensure enhanced reliability, greater bandwidth capacity, and improved connectivity for students, faculty, and staff.
4. It is also strongly recommended to adopt the proposed enhancements and optimizations for the networked systems of the university. These measures will bolster efficiency, streamline operations, and fortify the university's technological infrastructure for seamless performance and future growth.
5. It is strongly recommended that the university consider to foster collaboration between IT personnel (MIS), faculty, staff, and students to ensure the network systems evolve to meet the university community's ever-changing needs.
6. Future researchers may consider this study indispensable for offering a groundbreaking perspective on university network system analysis.

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