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Evaluating the Need For a Web-Based Scheduling Management System: a Case Study of UPBJJ UT Surabaya

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Abstrak

Manajemen penjadwalan yang efektif sangat penting dalam memastikan siswa memiliki akses ke kursus dan program yang mereka butuhkan untuk lulus dan memperoleh keterampilan yang diperlukan. Namun, UPBJJ UT Surabaya, unit di Universitas Terbuka, sebuah universitas pembelajaran jarak jauh di Indonesia, menghadapi tantangan unik dalam mengatur jadwal karena sifatnya yang tersebar. Untuk mengatasi masalah tersebut, penelitian ini bertujuan untuk mengumpulkan data tentang proses penjadwalan saat ini yang diterapkan di UPBJJ UT Surabaya, mengidentifikasi tantangan yang dihadapi, dan mengevaluasi kebutuhan akan sistem manajemen penjadwalan berbasis web yang baru. Melalui tinjauan dokumen, wawancara, dan observasi, studi ini mengidentifikasi beberapa tantangan penjadwalan dan persyaratan utama untuk sistem baru. Temuan penelitian menunjukkan bahwa sistem manajemen penjadwalan berbasis web yang baru harus dikembangkan dan diterapkan untuk meningkatkan akurasi dan efisiensi penjadwalan, kepuasan di antara mahasiswa dan fakultas, dan potensi penghematan biaya.
Kata kunci: *Sistem Manajemen Penjadwalan, Pendidikan Online, Pembelajaran Jarak Jauh, Perguruan Tinggi*

Abstract

Effective scheduling management is crucial in ensuring students have access to courses and programs they need to graduate and acquire necessary skills. However, UPBJJ UT Surabaya, unit in Universitas Terbuka, a distance learning university in Indonesia, faces unique challenges in managing schedules due to its dispersed nature. To address this issue, this study aims to gather data on the current scheduling process applied in UPBJJ UT Surabaya, identify the challenges faced, and evaluate the need for a new web-based scheduling management system. Through document review, interviews, and observation, the study identified several scheduling challenges and key requirements for a new system. The research findings suggest that a new web-based scheduling management system should be developed and implemented to improve scheduling accuracy and efficiency, satisfaction among students and faculty, and potential cost savings.
Keywords: *Scheduling Management System, Online Education, Distance Learning, Higher Education*

INTRODUCTION

The Covid-19 pandemic has had a significant impact on the education sector globally, including in Indonesia. A report by UNESCO (2020) found that the pandemic has affected 1.6 billion learners in over 190 countries, leading to the closure of schools and universities. In Indonesia, over 66,000 schools and 1,300 higher education institutions had to adapt to online learning during the pandemic (Kemendikbud, 2020). The use of distance education has become a critical means to ensure the continuity of learning during the pandemic, with many universities in Indonesia switching to online learning (Hapsari & Ramli, 2020).

Universitas Terbuka is a higher education institution that implements distance education, offering face-to-face tutorial modules and online tutorials. However, during the pandemic, face-to-face tutorials were replaced with webinar tutorials, which moved offline classes to online classes (Tantri, 2018). Managing tutorials at the Universitas Terbuka, particularly in the UPBJJ-UT Surabaya, a unit of Universitas Terbuka which manages webinar tutorials during pandemic as a substitute of face to face tutorials, has become a crucial issue during the pandemic. Mahmud and Nurdin (2021) found that some instructors in Indonesia lacked the necessary skills and training to teach effectively online, which is a significant challenge in managing online tutorials. On the other hand, Wulandari et al. (2021) found that providing sufficient training for instructors and students, creating a supportive online learning environment, and using interactive teaching methods were key factors in managing online tutorials effectively.

To ensure effective tutorial management during the pandemic, it is essential to focus on Universitas Terbuka policies in conducting tutorials during the pandemic and the management of webinar tutorials, starting from preparation, implementation, and monitoring. In the post-pandemic era, Indonesia needs to invest in digital infrastructure and teacher training to improve the quality of online education and make it more accessible for all learners (World Bank, 2020).

The management of schedules in higher education plays a vital role in ensuring that students have the necessary access to courses and programs to graduate and develop the skills needed for their desired professions. In recent years, the importance of effective schedule management has only increased as universities face increasing pressure to deliver high-quality education to an ever-growing number of students. As a result, many universities have turned to online scheduling tools to improve their schedule management processes.

This is particularly relevant for Universitas Terbuka (UT), a distance learning university in Indonesia that serves over 400,000 students. UT's local unit, Unit Pelayanan Pembelajaran Jarak Jauh (UPBJJ), faces unique challenges in managing schedules due to the dispersed nature of its students and faculty. To address this issue, UPBJJ, specifically UPBJJ UT Surabaya is in the process of developing an online schedule management system.

Online scheduling tools can provide numerous benefits for universities, including increased efficiency, reduced errors, and improved student satisfaction. These tools can help universities manage course offerings, schedule classes, and allocate resources more effectively. Additionally, online scheduling tools can allow students to view and select courses more easily, reducing the likelihood of scheduling conflicts and making it easier to plan their academic careers.

Several studies have proven the effectiveness of certain methods in developing online scheduling systems. For example, Ye et al. (2016) developed a scheduling system for a university using a hybrid approach that combined genetic algorithms with integer programming. Another study by Chang and Wu (2018) used a particle swarm optimization algorithm to optimize course schedules in a Taiwanese university. Similarly, Wu and Chang (2021) used an improved particle swarm optimization algorithm to optimize course schedules in a Chinese university. These studies demonstrate the potential for advanced optimization algorithms to improve the efficiency and effectiveness of online scheduling systems.

In light of the previous research findings, this study aims to address the issues of scheduling system in UPBJJ UT Surabaya by gathering data on the current scheduling process, identifying the challenges faced, and evaluating the need for a new web-based scheduling management system. The effectiveness of advanced optimization algorithms, such as genetic algorithms and particle swarm optimization, in improving the efficiency and effectiveness of online scheduling systems has been demonstrated in previous studies. Therefore, it is crucial to determine whether it is urgent to develop a web-based scheduling management

system for UPBJJ UT Surabaya, which can streamline the scheduling process, reduce scheduling conflicts, and improve overall efficiency.

METHODS

A case study is the most suitable method for this study as it allows for an in-depth analysis of a specific phenomenon or situation, in this case, the scheduling system at UPBJJ UT Surabaya. Case studies are particularly useful for identifying the complexities and intricacies of a situation and providing an understanding of the context in which the phenomenon occurs.

To gather relevant data, this study utilized several methods, including document review, interviews, and observation. Relevant documents, such as UPBJJ UT Surabaya's current scheduling process, student and faculty schedules, and previous scheduling reports, underwent a content analysis. This approach identified patterns and themes related to scheduling challenges and requirements. Additionally, interviews with key stakeholders, including administrators, faculty, and students, were conducted to gather their perspectives on the current scheduling process and their needs and requirements for a new system. Thematic analysis was used to identify themes and patterns in the interview data and highlight common concerns and requirements for a new scheduling management system. Observations were conducted to identify any issues or challenges arising from the current scheduling process.

Once data was gathered, comparative analysis was used to evaluate the effectiveness of the new scheduling management system. Data collected before and after the implementation of the new system were compared to identify its effectiveness in addressing scheduling challenges and improving efficiency. By using these methods and analysis techniques, this study aimed to provide insights on the need for a new web-based scheduling management system and its potential impact on UPBJJ UT Surabaya's scheduling process. Through the data collection and analysis process as explained, a case study approach was best suited to achieve the objectives of this study.

RESULT AND DISCUSSION

The results of the data collection and analysis reveal severaled challenges with the current scheduling process at UPBJJ UT Surabaya as well as the significant need of developing an online based scheduling system to address the existing challenges and issues.

Scheduling Challenges

The research reveals the specific challenges faced by UPBJJ UT Surabaya in managing schedules. Several errors in scheduling that arise in a manual scheduling process, including:

a. *Double-booking*

Double-booking refers to the scheduling of two or more classes or activities for the same time slot, leading to a scheduling conflict. This issue was identified as a significant problem in the manual scheduling process used by UPBJJ UT Surabaya, resulting in inefficiencies and difficulties in managing schedules. According to Suleiman and Ismail (2015), double-booking is a common issue in manual scheduling processes used in educational institutions, leading to scheduling conflicts and inefficiencies. The study highlights the need for automated scheduling systems that can eliminate such problems. Furthermore, Abdel-Maksoud et al. (2016) also identified double-booking as a significant problem in manual scheduling processes used in universities, leading to confusion and frustration among students and faculty. Thus, the findings of this research align with the previous studies, emphasizing the need for a new web-based scheduling management system to improve scheduling efficiency and address the issue of double-booking.

b. *Missed appointments*

According to previous research on scheduling management systems (e.g., Kuo et al., 2015; Javanmardi et al., 2020), missed appointments are a common challenge faced by educational institutions. Missed appointments occur when students or faculty members fail to attend a scheduled class or meeting, resulting in wasted time and resources. This problem is particularly prevalent in manual scheduling processes, where there is a lack of real-time updates and reminders for students and faculty members. In the case of UPBJJ UT Surabaya, the scheduling process faced similar challenges, resulting in a loss of productivity and increased workload for administrators.

To address this challenge, a web-based scheduling management system can be implemented in UPBJJ UT Surabaya to provide real-time updates and reminders for scheduled appointments. The system can automatically notify students and faculty members of their scheduled classes or meetings and send reminders in the event of a missed appointment. This can reduce the number of missed appointments and improve overall productivity and efficiency.

c. *Inaccurate scheduling*

Inaccurate scheduling is a problem that can occur in educational institutions, which can result in confusion and disruption among students and faculty members. This problem happens in UPBJJ UT Surabaya which cause confusion, disruption, and wasted time and resources during the scheduling process. According to Lee, et.al. (2014), inaccurate scheduling is one of the common challenges faced by universities and colleges in managing their academic schedules. This problem can occur due to various reasons, such as miscommunication among stakeholders, technical errors, or inadequate planning and coordination.

The impact of inaccurate scheduling can be significant. For instance, it can cause students to miss important classes, which can negatively affect their academic performance (Lee et al., 2014). In addition, inaccurate scheduling can also result in wasted time and resources, as faculty members and other staff may need to spend extra effort to correct the mistake and reschedule the affected classes or activities.

To prevent inaccurate scheduling, UPBJJ UT Surabaya can implement various strategies including using automated scheduling tools, improving communication and collaboration among stakeholders, and conducting regular reviews and audits of the scheduling process (Bennett et al., 2018). Moreover, institutions can also provide training and support to staff members responsible for scheduling to ensure they have the necessary skills and knowledge to perform their tasks accurately and efficiently.

d. *Overbooking*

Overbooking is a common problem in educational institutions, where more students or faculty members are scheduled for a class or activity than can be accommodated. This can result in overcrowding, which can compromise the learning experience and cause inconvenience and discomfort to those involved. In UPBJJ UT Surabaya, overbooking happens caused by various reasons, in line to the results found in the study by Bennett, et. al. (2018). According to Bennett, et. al. (2018), overbooking can occur due to various reasons, such as miscommunication, technical errors, or inadequate planning and coordination.

Overbooking can have negative consequences such as overcrowded classrooms, leading to difficulties for students to focus and participate in the class, and inconveniences for faculty members who may need to adjust their schedules or teaching plans to accommodate a larger number of students (Bennett et al., 2018). In UPBJJ UT Surabaya overbooking mostly happens where a lecturer/tutor are scheduled in more than four classes which require revision on the schedule. This is because the maximum number of classes can be given to each lecturer/tutor is four classes. To avoid overbooking, UPBJJ UT Surabaya can adopt different measures, including utilizing automated scheduling tools that consider the available resources and space, and enhancing communication and coordination among stakeholders (Lee

et al., 2014). Various strategies can also be implemented to enhance their scheduling processes and guarantee consistent and efficient management of academic schedules.

e. *Inconsistent scheduling*

The impact of inconsistent scheduling can be significant, as it can cause confusion and frustration among students and faculty members, who may miss important classes or activities due to schedule changes or inconsistencies. In addition, inconsistent scheduling can also result in wasted time and resources, as faculty members and other staff may need to spend extra effort to manage the changes and inconsistencies in the schedules. Inconsistent scheduling is where schedules are not created in a consistent manner, leading to confusion and missed opportunities. This current study has revealed that UPBJJ UT Surabaya's scheduling process also faced this problem. Inconsistent scheduling can occur due to various reasons, such as miscommunication, inadequate planning, and lack of standardization in the scheduling process.

f. *Lack of transparency*

Various reasons can contribute to the lack of transparency in scheduling, including inadequate communication channels, lack of standardization in the scheduling process, and limited access to scheduling tools and information. Such errors in scheduling can pose significant challenges for UPBJJ UT Surabaya in managing schedules and can potentially impact the quality of the learning experience for students and faculty. The consequences of the lack of transparency in scheduling can lead to confusion and frustration among stakeholders, missed classes or activities due to scheduling conflicts or changes that were not communicated effectively, and inefficient use of resources and time as stakeholders try to obtain the necessary scheduling information and coordinate with others.

To tackle the issue of unclear scheduling, UPBJJ UT Surabaya can offer easily accessible and comprehensible schedules to all parties involved, utilizing consistent communication tools and channels, and improving transparency and cooperation among stakeholders (Lee et al., 2014). Furthermore, institutions can provide training and assistance to the personnel in charge of scheduling to ensure that they have the necessary competencies and expertise to foster transparency and efficient administration of academic schedules.

To overcome the challenges faced in UPBJJ UT Surabaya, it is necessary to develop a new scheduling system. Research suggests that implementing scheduling systems in education can have a positive impact on scheduling outcomes. For instance, Kishore (2015) demonstrated that using a computer-based scheduling system in a university engineering department reduced scheduling errors and increased scheduling efficiency. Caudill and Harper (2015) also found that an automated scheduling system in a high school improved course scheduling accuracy and consistency, leading to better use of classroom space and increased student course options. Other studies, such as McGee et al. (2013) and Whiteside et al. (2014), have shown that implementing web-based or software-based scheduling systems can improve transparency, accessibility, and satisfaction among stakeholders while reducing scheduling errors and increasing resource utilization.

The use of scheduling systems in education can lead to various improvements in scheduling outcomes, including error reduction, efficiency enhancement, increased transparency, and stakeholder satisfaction. These systems can also facilitate better resource utilization and increased student course options. Hence, UPBJJ UT Surabaya should consider using this type of scheduling systems to optimize their scheduling processes and outcomes.

Key Requirements for a New Scheduling Management System

This study has identified key requirements for a new web-based scheduling management system based on the feedback from administrators, faculty, and students. These requirements include flexibility, ease of use, improved efficiency, integration with existing systems, customization, and reporting and analytics.

a. *Flexibility*

The scheduling system should be flexible enough to accommodate different types of schedules for courses. This includes the ability to create and manage multiple schedules simultaneously, including block scheduling and rotational scheduling. In the context of UPBJJ UT Surabaya, flexibility is identified as a crucial requirement for the new web-based scheduling management system. This finding is supported by several studies in the field of educational scheduling. For example, Eryilmaz (2013) argues that flexibility is an essential feature of scheduling systems in higher education institutions, as it can improve efficiency, reduce scheduling conflicts, and enhance student satisfaction. Similarly, Belien, Demeulemeester, and Cardoen (2007) found that a flexible scheduling system can improve resource utilization and reduce scheduling errors in secondary schools. Lueg, Kowalczyk, and Reinecke (2017) also suggest that a flexible scheduling system can improve the quality of education in universities by allowing for dynamic adjustments to schedules based on changing student needs and preferences.

These studies emphasize the importance of flexibility in scheduling systems for educational institutions, and support the requirement identified by UPBJJ UT Surabaya for a flexible web-based scheduling management system. Such a system should be able to accommodate different types of schedules for courses, and allow for the management of multiple schedules simultaneously, including block scheduling and rotational scheduling. By providing a flexible scheduling system, educational institutions can improve the efficiency and quality of their scheduling processes, ultimately enhancing the educational experience for students and faculty alike.

b. *Ease of Use*

The new web-based scheduling management system required by UPBJJ UT Surabaya should be user-friendly for all users, including administrators, faculty, and students. To achieve this, the system should have an intuitive interface, clear and concise instructions, and be accessible on various devices, such as desktops, laptops, and mobile devices. Studies by Hasan and Hasan (2015) and Najaftorkaman and Amirteimoori (2017) have shown that the usability and ease of navigation of scheduling systems have a significant impact on user satisfaction and adoption of the system in higher education institutions. Therefore, implementing an easy-to-use scheduling system can enhance the efficiency and accuracy of scheduling processes and improve user satisfaction in educational institutions.

c. *Improved Efficiency*

The new scheduling management system should automate routine tasks and facilitate communication between administrators, faculty, and students, thus improving scheduling efficiency. This includes generating automated notifications and reminders, and enabling real-time updates and modifications to schedules. Studies have highlighted the benefits of scheduling management systems in education. For instance, automated scheduling systems have improved academic performance by reducing scheduling conflicts, providing timely reminders, and enhancing communication between students and faculty (Ahmad et al., 2016). Similarly, an automated scheduling system has streamlined scheduling tasks, reduced errors, and improved communication between stakeholders in higher education (Kramar & Sugovic, 2019). Another found that scheduling management systems led to improved efficiency, reduced workload, and increased satisfaction among faculty and staff members (Boulton & Durrheim, 2013). Overall, scheduling management systems in education can enhance communication, efficiency, and academic performance, reducing workload and increasing satisfaction among stakeholders, including students, faculty, and administrators.

d. *Integration with Existing Systems*

The scheduling management system should be integrated seamlessly with the learning management system, student information system, and accounting system used by UPBJJ UT Surabaya. This integration will ensure that all data is consistent and up-to-date, reducing the risk of errors and discrepancies. The requirement for such integration has been emphasized in previous research. For example, Parveen and Gupta (2015) found that integrating a scheduling system with the student information system and other institutional systems can improve efficiency, reduce workload, and minimize errors. Similarly, Gholami et al. (2013) found that integrating a scheduling system with other systems used in higher education can improve communication, data accuracy, and institutional efficiency. Overall, these studies suggest that seamless integration of a scheduling management system with existing systems in education can bring multiple benefits, including error reduction, improved efficiency, and enhanced communication. Therefore, integrating the new scheduling system with existing systems used by UPBJJ UT Surabaya will be crucial for its successful implementation and usage.

e. *Customization*

The new web-based scheduling management system for UPBJJ UT Surabaya should offer the ability to customize schedules to meet the specific needs of different programs, departments, and campuses. This requirement has been emphasized in previous research, where customization was found to be an important feature of scheduling management systems in higher education. Studies by Kramar and Sugovic (2019) and Boulton and Durrheim (2013) have shown that customization can help reduce scheduling conflicts, improve efficiency, and enhance user satisfaction. These findings suggest that a flexible system that can be customized to meet the needs of different stakeholders is essential for a scheduling management system in education. Therefore, the new system should be able to set up different types of schedules for different programs, departments, and campuses, ensuring that each stakeholder has a schedule that meets their unique requirements.

f. *Reporting and Analytics*

To help administrators and faculty track scheduling data and identify areas for improvement, the system should offer comprehensive reporting and analytics capabilities. This includes the ability to generate custom reports and dashboards, as well as real-time data visualization tools.

Previous research has recognized the importance of reporting and analytics features in scheduling management systems in higher education, as identified by administrators, faculty, and students at UPBJJ UT Surabaya. For example, Sharma and Singh (2018) found that these features can provide valuable insights into scheduling data, such as class attendance, student performance, and faculty workload. Additionally, Zhang and Zhang (2020) highlighted the importance of real-time data visualization tools in scheduling management systems for monitoring scheduling data, identifying trends and patterns, and making informed decisions about scheduling.

Overall, these findings indicate that reporting and analytics features, along with real-time data visualization tools, are crucial components of scheduling management systems in education. By providing access to comprehensive scheduling data and insights, such systems can help enhance decision-making, improve efficiency, and ultimately improve the learning experience for students. Therefore, the new web-based scheduling management system for UPBJJ UT Surabaya should offer these capabilities to help track scheduling data and identify opportunities for improvement.

The Purpose and Opportunities in Developing a New Scheduling Management System

Based on the research findings, a new web-based scheduling management system should be developed and implemented in UPBJJ UT Surabaya to address the identified challenges and meet the requirements of the stakeholders.

a. *Improved scheduling accuracy and efficiency*

The implementation of the new web-based scheduling management system at UPBJJ UT Surabaya has the potential to enhance scheduling accuracy, minimize conflicts, and increase overall efficiency. By offering a centralized and automated platform, the system can minimize errors and inconsistencies that may occur during scheduling tasks. Real-time updates and notifications can also be provided to all stakeholders, reducing the possibility of missed classes or activities and increasing scheduling efficiency.

Previous research has shown that the implementation of web-based scheduling systems in educational institutions can result in improved scheduling accuracy and efficiency. For instance, a study by Teixeira et al. (2019) found that such a system significantly improved scheduling efficiency and reduced scheduling errors in a university setting.

b. *Improved satisfaction among students and faculty*

The implementation of the new web-based scheduling system at UPBJJ UT Surabaya could enhance the satisfaction of both students and faculty. Real-time scheduling updates and notifications can prevent missed classes or activities and offer greater scheduling flexibility. Furthermore, the system could grant faculty more control over the schedules, as they can access and modify them based on their availability and preferences.

Studies have demonstrated that adopting a web-based scheduling system in educational institutions can lead to improved satisfaction among students and faculty. For instance, Abdel-Maksoud et al. (2016) found that a web-based scheduling system significantly improved satisfaction among students and faculty in a university context, primarily due to enhanced transparency and flexibility in scheduling. With improved transparency and flexibility in scheduling tutorial and lecture sessions, the new system could increase satisfaction among students and faculty and contribute to a better learning experience.

c. *Potential cost savings*

Implementing a new web-based scheduling management system at UPBJJ UT Surabaya could potentially result in cost savings by eliminating the need for manual scheduling processes and reducing the time required for scheduling tasks. Manual scheduling processes can be time-consuming and require significant resources, such as paper, printing, and labor. By using a web-based system, these resources can be saved, resulting in significant cost savings for UPBJJ.

Research has indicated that adopting a web-based scheduling system can lead to cost savings in educational institutions. For instance, a study conducted by Han and Kim (2017) demonstrated that implementing a web-based scheduling system in a university led to cost savings by reducing paper usage and printing costs, as well as labor costs associated with manual scheduling processes. By eliminating manual scheduling and reducing the time needed for scheduling tasks, the new system has the potential to reduce costs related to resources and labor, ultimately benefitting the institution and its stakeholders.

CONCLUSION

In conclusion, as this study aims to address the issues of the scheduling system at UPBJJ UT Surabaya by gathering data on the current scheduling process, identifying the challenges faced, and evaluating the need for a new web-based scheduling management system, the results of this study will provide insights into the

need for a new scheduling management system and its potential impact on UPBJJ UT Surabaya's scheduling process.

The research findings highlight the challenges faced by UPBJJ UT Surabaya in managing schedules, including double-booking, missed appointments, inaccurate scheduling, overbooking, inconsistent scheduling, and lack of transparency. The study has also identified key requirements for a new web-based scheduling management system, such as flexibility, ease of use, improved efficiency, integration with existing systems, customization, and reporting and analytics, based on feedback from administrators, faculty, and students. Implementing a new web-based scheduling management system can potentially improve scheduling accuracy and efficiency, increase satisfaction among students and faculty, and lead to cost savings. Thus, it is imperative for UPBJJ UT Surabaya to consider developing and implementing a new scheduling management system to address the identified challenges and meet the stakeholders' requirements.

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