

EDUPULSE: A TECHNOLOGY-DRIVEN SYSTEM FOR EMPOWERING ACADEMIC ADVISING AND STUDENT PROGRESS MONITORING

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Abstract

EduPulse is a technology-driven system designed to support academic advisors in efficiently tracking, managing, and monitoring student academic progress. In increasingly complex educational environments, academic advisors face significant challenges in handling large volumes of student data, which can hinder their ability to provide timely and accurate academic guidance. EduPulse serves as a comprehensive platform that delivers detailed insights into students' final examination results, performance in individual courses, and compliance with prerequisite requirements. Through this system, academic advisors can easily monitor student progress, evaluate course statuses, review grades, and identify students at risk of falling behind or missing critical courses required for graduation. Survey results from 57 respondents at Politeknik Kuching Sarawak revealed that 91% agreed EduPulse helps identify the status of students' courses, 90% agreed it facilitates quick checking of course statuses, and 88% believed it effectively tracks each subject taken. These findings suggest high user satisfaction and affirm the system's effectiveness in improving academic advising and course monitoring. In addition, EduPulse enhances advisor efficiency and productivity by reducing manual administrative workloads and minimizing the risk of human error. Its streamlined reporting capabilities ensure advisors have access to reliable, real-time data to make well-informed decisions and provide high-quality academic support. By leveraging technology to optimize advising processes, EduPulse contributes to improved operational efficiency within educational institutions and supports better learning outcomes for students. Overall, the system is a valuable tool in building a more responsive, data-informed, and student-centered academic environment that benefits both advisors and the students they guide.

Keywords: Student Academic, Student Performance, Tracking.

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INTRODUCTION

The rapid advancement of web technology has significantly influenced various domains, including education, commerce, and organizational management. In the field of education, improved digital access to information has enhanced the productivity and efficiency of both educators and students. According to (Fazilah & Abdul Khalid, 2022), the development of a mobile online news application has enabled users to access current news more swiftly and obtain comprehensive information, thereby promoting better awareness and decision-making.

In the industrial sector, (Stangl, Pielmeier, Berger, Braunreuther, & Reinhart, 2016) demonstrated that a web-based monitoring system integrated with cloud services for distributed production processes has effectively minimized operational costs. Similarly, (Chia, Mahdin, & Mohammad Syafwan, 2022) introduced an online business platform designed to simplify the ordering process for customers and improve the overall management of online sales. Routine monitoring processes have also benefited from web technology. As reported in (Choi, Cho, & Shim, 2016), web-based surveillance systems can now be implemented with greater optimization, enhancing security and operational oversight.

One notable advantage of web-based systems is their accessibility across time and geographical boundaries. This is supported by (Nawi et al., 2022), who developed a web-based E-College Monitoring System at UiTM Machang. The system allows administrators and parents—regardless of their physical location—to monitor student activities in real-time. In addition to promoting better parental engagement, this system also reduces administrative workloads and operational costs by streamlining the process of monitoring student attendance and campus entry and exit.

E-commerce has similarly evolved through web technology. As highlighted in (Mohd Adnan & Noraini, 2022), the development of the UTHM e-Commerce website allows students and other university members to conduct online transactions, whether for selling or purchasing goods. This platform not only facilitates economic activity within the campus but also fosters entrepreneurial spirit among students, encouraging them to generate their own income.

Furthermore, (Noor Izzati & Kasim, 2022) discussed the Audit Management and Monitoring System developed for Sawit Kinabalu Sdn Bhd (SKSB), which enables the company to manage and monitor audit activities more systematically and efficiently. The implementation of this system has significantly reduced the time required for conducting internal audits.

1.PROBLEM STATEMENT

In the pursuit of academic success in higher education, one of the essential responsibilities of students is to successfully complete all structured courses outlined in their academic curriculum. However, academic and course attrition are common challenges faced by many students in higher education. Academic attrition refers to the inability of students to continue their studies, often due to factors such as financial difficulties, academic pressure, mismatched programs, or personal circumstances (Li & Killian, 1999). This form of attrition can adversely affect students' academic outcomes, future career opportunities, and the reputation and continuity of the educational institution.

Research by (Csuka & Banasz, 2014) highlights that institutional factors—including the institution's location, type, condition, academic standing, teaching quality, available facilities, and infrastructure play a significant role in influencing students' decisions to withdraw from their studies. Additionally, demographic factors are shown to contribute to student dropout rates, further complicating the issue.

Course attrition, which refers to the failure to complete required credit hours before graduation, can

directly contribute to academic attrition if not properly addressed. For diploma students in polytechnics, completing Industrial Training (LI) during their final semester (Semester 6) is a crucial requirement. To qualify for LI, students must have fulfilled all required credit hours as dictated by the curriculum. Failure to do so can result in ineligibility for Industrial Training and subsequent delays in graduation. Common course attrition issues include failing prerequisite courses or neglecting to retake failed courses in a timely manner.

Tracking and identifying students' course progress manually presents significant challenges for academic advisors. This process can become increasingly complex, making it difficult to monitor students who have failed or missed essential courses. As a result, it is not uncommon for students to reach the end of their studies only to discover they have not completed all the necessary courses. This oversight can be attributed to a lack of awareness or failure to properly manage course requirements throughout the academic journey.

To address these issues, this study aims to evaluate the perceptions of academic advisors and students regarding the effectiveness of the EduPulse application. This web-based information system was developed to support academic advisors in supervising students under their guidance by enabling systematic monitoring of registered and completed courses. The objective is to reduce course attrition and prevent students from missing critical courses required for graduation. With its user-friendly and accessible interface, EduPulse offers real-time course tracking and facilitates the generation of comprehensive reports on student course status. This, in turn, can help reduce administrative burdens and enhance the overall efficiency and productivity of academic advisors and instructors.

2. RESEARCH INQUIRY

The research question is aligned with the following research objectives:

- i. To evaluate the effectiveness of EduPulse in delivering a systematic information system for monitoring students' course statuses
- ii. To assess how effectively EduPulse serves as a platform for students to update their current course statuses
- iii. To determine the capability of EduPulse in generating comprehensive reports on students' course statuses

3. RESEARCH OBJECTIVE

This study aims to:

- i. Assess the effectiveness of EduPulse in establishing a structured information system for monitoring students' course statuses.
- ii. Examine how effectively EduPulse facilitates students in updating their current course statuses.
- iii. Determine the capability of EduPulse in producing comprehensive reports on students' course statuses

4. RESEARCH FOCUS

This study was conducted among lecturers and students at Politeknik Kuching Sarawak using a quantitative research approach. Data were collected through the preparation and distribution of online questionnaires administered to the respondents.

5. ANALYSIS AND FINDINGS

5.1. Respondents Background

Data analysis was conducted based on survey questionnaires randomly distributed to 57 respondents, comprising both students and lecturers from various departments at Politeknik Kuching Sarawak. The demographic background of the participants is summarized in Table 1.

Table 1. Demographic background

Question	Category	Total
Status	Student	55
	Lecturer	2
Gender	Male	34
	Female	23
Age	18-23 years old	55
	24 years and above	2
Race	Malay	23
	Chinese	5
	Bumiputera	25
	Others (Iban)	2
Semester	Jabatan Teknologi Maklumat dan Komunikasi	27
	Jabatan Kejuruteraan Mekanikal	25
	Jabatan Perdagangan	5

The respondents included 34 males and 23 females. A majority of 55 respondents were aged between 18 and 23 years, while the remaining two were aged 24 and above. In terms of ethnicity, the largest group was Bumiputera with 25 respondents, followed by Malays with 23. Additionally, there were 5 respondents of Chinese ethnicity and 2 from other ethnic backgrounds. The participants represented various departments: 27 from the Department of Mechanical Engineering, 25 from the Department of Information and Communication Technology, and 5 from the Department of Commerce.

5.2. Analysis of Research Findings

Section II of the study focuses on key aspects such as the effectiveness and user satisfaction with EduPulse in monitoring and managing student course statuses, its suitability and user satisfaction in facilitating student course management, and the application's overall impact on efficiency and productivity in course monitoring and management. Table 2 presents the results for Section A of the questionnaire, which pertains to the effectiveness and user satisfaction with EduPulse in tracking and managing student course statuses.

Table 2. Question items related to the effectiveness and user satisfaction with EduPulse in monitoring and managing student course statuses

Question Code	Item	% Agree	% Disagree
S1	The use of EduPulse enables easy checking of students' course statuses	84	16
S2	The use of EduPulse helps identify the current statuses of courses taken by students	91	9
S3	The use of EduPulse simplifies the process of generating reports for students who are lagging behind	88	12
S4	The use of EduPulse can be easily accessed	81	19
S5	The use of EduPulse provides concise and detailed data on students' course statuses	88	12
S6	The use of EduPulse assists in complex manual verification processes.	86	14

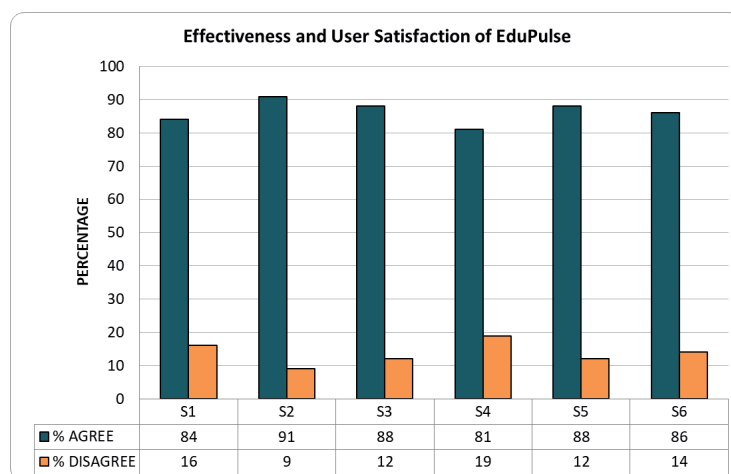


Fig. 1. Effectiveness and user satisfaction of EduPulse

As shown in Fig. 1, EduPulse has proven effective in helping both academic advisors and students track the courses that have been taken and completed. It not only simplifies the process of verifying course statuses but also replaces the time-consuming and error-prone manual verification. For example, 84% of respondents agreed that EduPulse enables easy checking of students' course statuses (S1), while 91% agreed that it helps identify the current statuses of courses (S2). Additionally, 88% of respondents supported the statement that the system simplifies report generation for students falling behind (S3), and 88% also agreed that it provides concise and detailed data (S5). Based on these responses from Table 2, the average agreement level across key items related to effectiveness and satisfaction (S1 to S6) is approximately 86.3%, indicating strong support for the system's capabilities in monitoring student progress.

Table 3 presents the findings from Section B of the questionnaire, which focuses on the appropriateness and user satisfaction of EduPulse for student course management.

Table 3. Question items related the appropriateness and user satisfaction with EduPulse in course management for students

Question Code	Item	% Agree	% Disagree
S7	The developed system is suitable for the issues faced by students.	86	14
S8	EduPulse is very user-friendly	81	19
S9	EduPulse greatly assists students in avoiding subject discrepancies	86	14
S10	The developed EduPulse is capable of tracking each subject taken by students	88	12
S11	The developed system is highly suitable for use by every layer of students.	88	12
S12	EduPulse can attract students' interest in using it	83	17
S13	The design of EduPulse is in line with its usability	86	14

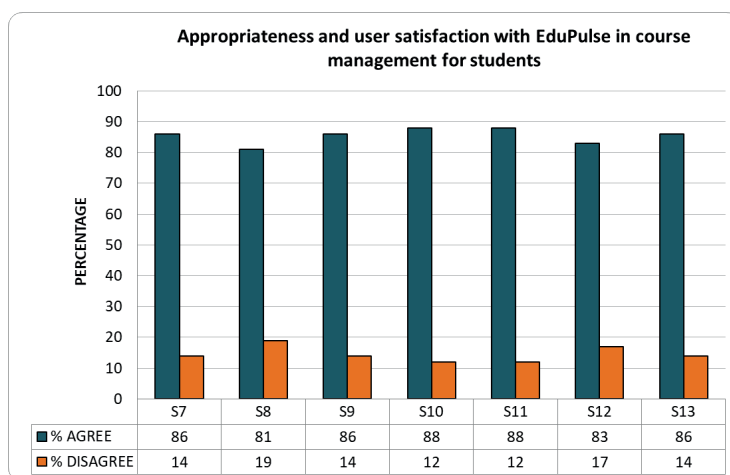


Fig. 2. Appropriateness and user satisfaction with EduPulse in course management for students

The EduPulse application was developed to address the issue of course discrepancies among students. As shown in Fig. 2, EduPulse has proven effective in tracking the courses taken by students, with 88% of respondents agreeing with question item S10. This functionality helps students avoid course discrepancies before completing their studies at the polytechnic, a benefit acknowledged by 86% of respondents in question items S7 and S9. Additionally, 83% of respondents agreed with question item S12, stating that "EduPulse can attract students' interest in using it." This is largely attributed to the application's user-friendly and intuitive design, a feature recognized by over 80% of respondents in question items S8 and S13.

The findings from Section C, which explore the impact of the EduPulse application on the efficiency and productivity of course management and monitoring, are presented in Table 4 below.

Table 4. Question items related to the efficiency and productivity of course management and monitoring for students

Question Code	Item	% Agree	% Disagree
S14	The EduPulse application facilitates the process of quickly checking students' course statuses	90	10
S15	The EduPulse application saves time in searching for student data	91	9
S16	The EduPulse application can generate student course status reports quickly	86	14
S17	The EduPulse application enhances the productivity of lecturers as Academic Advisors.	86	14
S18	The EduPulse application allows Academic Advisors to quickly generate lists of students with discrepancies	90	10
S19	The EduPulse application assists in more effective time management.	90	10

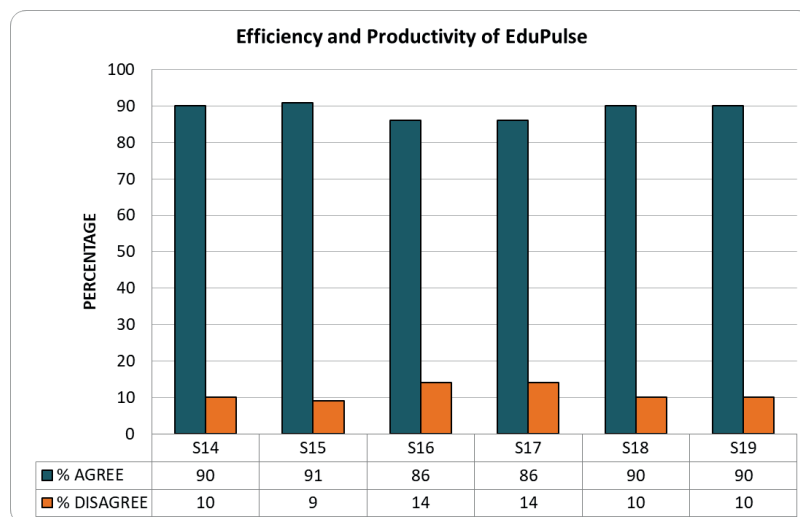


Fig. 3. Efficiency and productivity of course management and monitoring for students

As shown in Fig. 3, the results for item S14 reveal that 90% of respondents agree that EduPulse streamlines the process of quickly checking students' course statuses. This is further supported by item S18, where 90% of respondents believe that EduPulse enables Academic Advisors to efficiently identify students with discrepancies. This feature helps both Academic Advisors and students save time and manage it more effectively when checking course statuses, ultimately boosting the productivity of both lecturers and students. This is also evident in item S17, where 86% of respondents agree that EduPulse contributes to increased productivity for lecturers.

7. DISCUSSION

The integration of technology in monitoring student course statuses has positively impacted the way academic advisors oversee student progress. According to (Cherkasova, Sirotkin, & Kostyukov, 2022), the web-based conference verification system has significantly streamlined conference application management, making it faster, easier, and more efficient than manual processes. Similarly, the use of technology in the routine work of lecturers and academic advisors directly contributes to enhancing their productivity.

The EduPulse application has demonstrated a positive impact on managing and monitoring student course statuses, as evidenced by the findings presented. The main advantage of this application is its ability to quickly and easily check student course statuses, simplifying the otherwise complex manual review process. This not only helps academic advisors identify completed courses but also enables students to more effectively monitor their academic progress. Specifically, based on Table 2, 91% of respondents agreed that EduPulse helps identify the status of courses taken by students (item S2), while 90% agreed it facilitates quick checking of course statuses (item S14, Table 4). These high percentages, derived from the total number of respondents ($N = 57$), reflect the strong positive perception of the system's usability and effectiveness.

Moreover, EduPulse helps reduce the risk of course discrepancies. By providing detailed and up-to-date information on students' course statuses, the application allows academic advisors to identify missing courses more quickly and efficiently. This not only saves time but also enhances the productivity of both academic advisors and students. Additionally, the application aids in generating reports for students with course discrepancies, with 86% of respondents agreeing that EduPulse assists in quickly producing course status reports (item S16, Table 4). These features contribute to greater efficiency in overall academic management.

Another key advantage of EduPulse is its ability to attract user interest. Its user-friendly and easy-to-use design has led to satisfaction for over 80% of respondents. This ease of use is vital for encouraging widespread adoption of the application among students.

Finally, EduPulse has proven to enhance lecturer productivity. By providing access to accurate, up-to-date information on student statuses, lecturers can offer more effective guidance to students needing additional support. As shown in Table 4, 86% of respondents agreed that EduPulse increases lecturer productivity (item S17). For further improvement, the application could benefit from the addition of an Android version, providing multiple access points for users.

CONCLUSION

Overall, the findings suggest that EduPulse has offered substantial benefits in resolving course discrepancy issues and improving academic management for both students and academic advisors at Politeknik Kuching Sarawak. Based on the quantitative analysis, 91% of respondents agreed that EduPulse helps identify the current course status (Table 2, S2), 90% found it effective for quickly checking course statuses (Table 4, S14), and 88% acknowledged its role in tracking each subject taken by students (Table 3, S10). In addition, 86% of respondents confirmed that the system improves productivity for academic advisors (Table 4, S17). These benefits can also be extended to other polytechnics across Malaysia. The integration of web-based technology into the work of lecturers and academic advisors has proven to significantly enhance organizational performance, data accessibility, and time efficiency. With its real-time data features and user-friendly interface, EduPulse represents a valuable step forward in creating a more data-informed, responsive, and student-centered academic advising system.

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