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MyUNNES-Parent: A Parental Involvement App for Preventing Academic and Non-Academic Student Issues at Universitas Negeri Semarang

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Abstract: *The background of this research draws on 2023 data from the Indonesian Ministry of Education, which shows that Indonesia's dropout rate has reached 2.8%, with lack of parental monitoring identified as one of the main contributing factors. Research by Rahman et al. (2023) revealed that students actively monitored by their parents have a 35% higher on-time graduation rate. This study proposes the development of the MyUNNES-Parent application as an integrated solution to facilitate parental monitoring of students' academic progress at Universitas Negeri Semarang. The system implementation includes a monitoring dashboard, multi-layered security with multi-factor authentication, and integration with existing systems such as Sikadu and MyUNNES-Student. The research methodology follows a Research and Development (R&D) approach using a prototyping development model, carried out in five stages: needs analysis, system design, implementation, testing using the System Usability Scale (SUS) questionnaire method, and evaluation and refinement. Results demonstrate that the application achieved a usability score of 82% (Very High Usability category) with a Cronbach's Alpha reliability coefficient of 0.954, indicating excellent consistency. The four evaluated dimensions showed strong performance: Usefulness (78.57%), Ease of Use (85.06%), Ease of Learning (79.29%), and Satisfaction (85.92%). This study concludes that the application is highly feasible for enhancing parental engagement in the educational process, which in turn is expected to improve both academic and non-academic student performance, reduce dropout rates, and maintain the privacy of certain student data to prevent unnecessary conflict.*

Keywords: *Academic Information System, MyUNNES-Parent, Parental Monitoring, Real-time Data, Usability Testing*

INTRODUCTION

The rapidly growing digital transformation has changed the landscape of higher education, where student success depends not only on the quality of learning but also on a comprehensive and integrated support system (Cattaneo et al., 2022; Sepúlveda, 2020; Vajen et al., 2023). According to the latest data from the Ministry of Education, Indonesia's college dropout rate reached 2.8% in 2023. The Ministry of Education and Culture (2023) explains that one of the main factors contributing to this rate is the lack of ongoing monitoring and support from parents.

Research by Rahman et al. (2023) revealed that students whose parents actively monitored their academic progress had a 35% higher on-time graduation rate than those who did not receive active monitoring. These findings emphasize the importance of developing information systems that can facilitate parental involvement in the higher education process effectively and sustainably.

Universitas Negeri Semarang (*UNNES*), as a leading higher education institution, has implemented various information systems to support academic and non-academic processes, such as the Academic Information System (*Sikadu*) and Student Information System (*MyUNNES-Student*). However, parental involvement in monitoring students' study progress remains limited due to the absence of an integrated, real-time system specifically designed to meet the needs of parents as key stakeholders in the education process.

The strategic role of parents in supporting student success is significant, both in terms of emotional and financial support. Various studies have shown that active parental involvement in the education process can increase students' learning motivation, academic performance, and psychological well-being (Laudon & Laudon, 2016). Therefore, there is a need for an information system that allows parents to monitor their child's study progress in a comprehensive, real-time, and integrated manner.

Based on 2023 data from the Ministry of Education, cases of risky behavior among university students show an alarming trend. Research conducted by the Centre for Indonesian Mental Health (2023) revealed that 15% of university students in Central Java experienced symptoms of depression, with 3.2%

having suicidal thoughts. The study also showed that active parental involvement in monitoring students' academic and social activities can reduce the risk of negative behavior by 45%.

The importance of the *MyUNNES-Parent* system in this context is evident in several aspects. First, the system allows parents to monitor students' attendance patterns and academic performance in real time. A sudden drop in college attendance or academic grades is often an early indicator of a more serious problem. According to research by Widodo and Pratiwi (2024), early detection through academic monitoring can prevent 60% of college dropout cases related to mental health issues. Second, the system facilitates more effective communication between institutions and parents. The automatic notification feature for unusual behavior patterns (such as consecutive absences or a significant drop in grades) enables faster family intervention. Rahman et al. (2023) reported that rapid responses to behavioral changes can reduce the risk of suicide by 75% in at-risk students. Third, integration with the campus counseling system allows parents to coordinate with campus counselors in supporting students' mental well-being. Data from the *UNNES* Counselling Centre (2024) showed that students who received coordinated support from parents and campus counselors had a 40% higher recovery rate from mental health problems.

Despite the recognized importance of parental involvement in higher education, a significant research gap exists in the development and implementation of integrated, real-time parent monitoring systems specifically designed for Indonesian universities. While existing studies have documented the positive correlation between parental engagement and student success (Rahman et al., 2023; Chen et al., 2024), limited research has addressed the practical challenges of implementing such systems in the Indonesian higher education context, particularly regarding privacy concerns, cultural sensitivities, and technical integration with legacy academic information systems.

Previous research in this domain has primarily focused on either theoretical frameworks of parental involvement (Laudon & Laudon, 2016) or stand-alone monitoring applications without considering the complex ecosystem of existing institutional systems. Chen et al. (2024) examined parent monitoring systems in Asian higher education contexts, but their study did not address the specific architectural challenges of real-time data synchronization across multiple heterogeneous systems. Similarly, while Wang et al. (2023) explored the application of Apache Kafka in educational technology, their research did not incorporate the critical dimension of privacy-preserving parental access or the balance between transparency and student autonomy.

The novelty of this research lies in three key contributions. First, it presents a privacy-aware system design that strategically excludes certain attendance data (*Mulang Presence*, *Mulang Recap*, and *Lecture Schedule*) based on empirical student feedback, addressing the previously unexplored tension between parental oversight and student privacy in Indonesian higher education. Second, it demonstrates the successful implementation of a publish-subscribe architecture using Apache Kafka, specifically tailored for academic data synchronization and providing a technical blueprint that other Indonesian universities facing similar integration challenges can adapt. Third, it provides a comprehensive usability evaluation using the validated Use Questionnaire instrument, establishing empirical evidence of user acceptance and identifying specific areas for improvement in parent-facing educational technology.

The development of the *MyUNNES-Parent* application is crucial to reduce college dropout rates by increasing parental involvement, which is expected to lower these rates in line with Ministry of Education and Culture data (2023). In addition, this system is expected to improve student academic performance through active parental support, consistent with the findings of Rahman et al. (2023). Optimizing existing information systems through integration with parent monitoring platforms will enhance the efficiency and effectiveness of academic and non-academic data management. Data security is also a top priority, with the system designed to maintain student data confidentiality in accordance with data protection regulations.

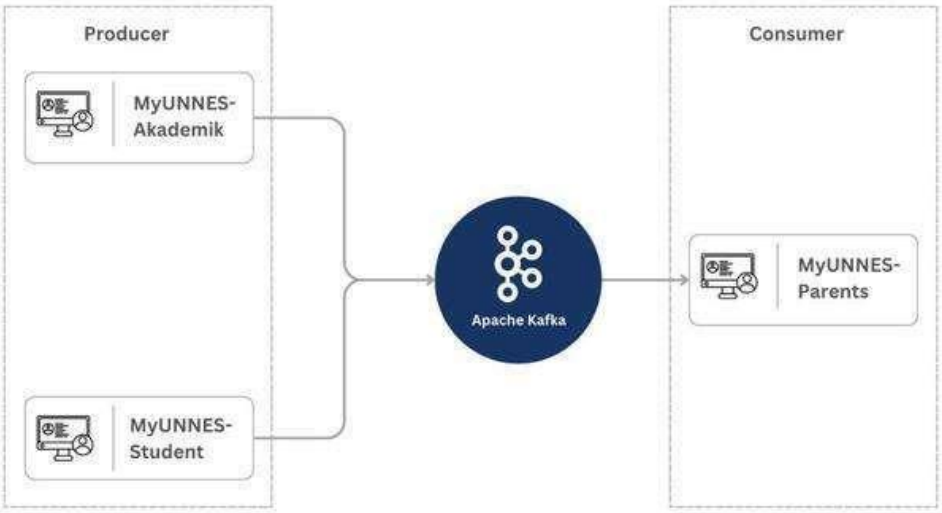


Figure 1: Diagram of Integration of Academic Information System and Parent Information System

This research aims to answer several key questions, including how to develop a parent information system integrated with Sikadu and MyUNNES-Student using a publish-subscribe architecture that supports real-time monitoring, how to implement a real-time data streaming mechanism using Apache Kafka to synchronise academic and non-academic data efficiently and reliably, how to design a security and reliability system that ensures the confidentiality of student data and service availability in accordance with educational data security standards, and how to measure and evaluate the effectiveness of the system in increasing parental involvement and its impact on student academic performance.

The benefits of this research extend to multiple stakeholders: For parents, the system provides unprecedented transparency and real-time access to their children's academic progress, enabling timely intervention and informed support. For students, the privacy-aware design respects their autonomy while maintaining appropriate parental involvement, potentially reducing stress and improving mental health outcomes. For UNNES as an institution, the system offers a scalable technical solution for enhancing stakeholder engagement, potentially reducing dropout rates and improving overall student success metrics. For the broader academic community, this research contributes a validated methodology and technical architecture that can be adapted by other Indonesian universities seeking to implement similar parent engagement systems. Finally, from a policy perspective, the findings provide empirical evidence supporting the role of technology-mediated parental involvement in higher education, which may inform future educational technology initiatives and institutional policies regarding student data access and stakeholder engagement.

MATERIALS AND METHOD

This research uses a Research and Development (R&D) approach with a prototyping development model which is then tested with the usability test "Use Questionnare" method. This approach was chosen because it allows iterative system development with continuous feedback from users. This method also allows gradual validation of features and functionality, rapid adaptation to changing needs, and measurable evaluation of impact. References to the methodology used in this research refer to Creswell & Creswell (2017), who emphasise the importance of a flexible research design that is responsive to user needs.

This research is divided into four main stages: needs analysis, system design, implementation and testing, and evaluation and improvement. First, the MyUNNES-Parent system development process begins with needs analysis through literature studies and preliminary data collection on students, as well as evaluation of existing systems such as Sikadu and MyUNNES-Student to map system needs. Second, the design of publish-subscribe-based architecture with Apache Kafka, distributed database, UX interface design, and security protocols. Third, Implementation to Parent sample users with a focus on

backend development, Kafka configuration, and integration of existing systems, as well as providing monitoring dashboards for parents. Fourth, The testing phase includes a system usability test which is then used as evaluation material to make improvements to MyUNNES-Parent. system sustainability.

Data collection in this study was conducted through an R&D approach with the Usability Test "Use Questionnaire". This approach involves a user satisfaction instrument using a structured questionnaire to measure the level of satisfaction of parents as the main users. System log analysis was also conducted to collect system usage data and analyse usage patterns and performance. Performance metrics such as throughput, latency, and uptime were used to evaluate the technical performance of the system, while feature usage statistics analysed the frequency and usage patterns of various features in the system.

The MyUNNES-Parent system architecture was designed using a publish-subscribe approach with Apache Kafka to ensure real-time data synchronisation between academic, student affairs, and parent application systems. The system includes a responsive web interface, a MyUNNES-Base-based backend, and a distributed database that stores student, parent, activity, and academic and non-academic monitoring data. The UI/UX is intuitively designed with dashboard features, detailed information, and real-time notifications. System security is strengthened with multi-factor authentication, end-to-end encryption, RBAC, IDS, and real-time monitoring. System integration is done through API and middleware that allows data exchange with Sikadu and MyUNNES-Student accurately and consistently.

RESULTS AND DISCUSSION

1. Needs Analysis

This process began with a comprehensive literature study that examined educational information systems, parental involvement, and publish-subscribe architecture. In addition, preliminary data collection was conducted to students to find out their perceptions of the MyUNNES-Parent application. A total of 28 student respondents from the information systems study programme at Semarang State University, perceived that the 3 features of information that parents are not allowed to know from their data in Sikadu and MyUNNES-Student are in order of least allowed as follows. (1) Mulang Presence, (2) Mulang Recap, and (3) Lecture Schedule. These three features are information features of student attendance in ongoing lecture activities. Furthermore, the application is structured without information on the three features above to avoid the emergence of insecurity, avoid the emergence of conflicts, and protect privacy (Ramadhan, Aulia, & Salasabila, 2024). Analysis of existing systems such as Sikadu and MyUNNES-Student was also conducted to identify shortcomings in supporting parental involvement. The results of this analysis were used to map the functional and non-functional needs of the system, as well as to conduct risk analysis and mitigation of potential problems that may arise during system development and implementation.

2. System Design

The focus of the research shifted to system design. At this stage, an integrated system architecture design was developed using publish-subscribe architecture supported by Apache Kafka as the backbone. In addition, a distributed database design was carried out that supports system integration and scalability. A user experience (UX)-based user interface design was also developed, including wireframes and mockups to ensure an intuitive and easy-to-use interface for parents. Security protocol design was established to ensure that the system met the required security and data protection standards. All these aspects of the system design were documented in detail for subsequent implementation guidance.

MyUNNES-Parent is an application intended for parents of UNNES students to monitor the academic development of their children. The following are the main features of the application. The features were developed with the aim of providing transparency and convenience for parents in monitoring the academic progress of their son/daughter while studying at UNNES.

Figure 2. MyUNNES-Parent Interface Wireframe

2.1. Account Management

2.1.1. Password Change Menu

To maintain account security, the application provides a feature to change the parent account password. The system will verify the old password first before allowing the change. For security reasons, the new password must meet security standards that include a combination of letters, numbers, and special characters.

2.1.2. Generate User (Parent) Menu

The application provides two methods for parent account creation. The first method is individual account creation, which allows administrators to create accounts individually for parents of specific students. The second method offers bulk account generation, where administrators can generate many accounts at once based on groups of study programmes, faculties, or even the entire university.

2.2. Academic Data

2.2.1. Student Menu

Provides complete access to student profile information linked to parent accounts. This profile data is automatically updated through integration with Sikadu API to ensure the information is always accurate and up-to-date. This menu also provides a parental account generate button and a PDF document containing the generated username and password.

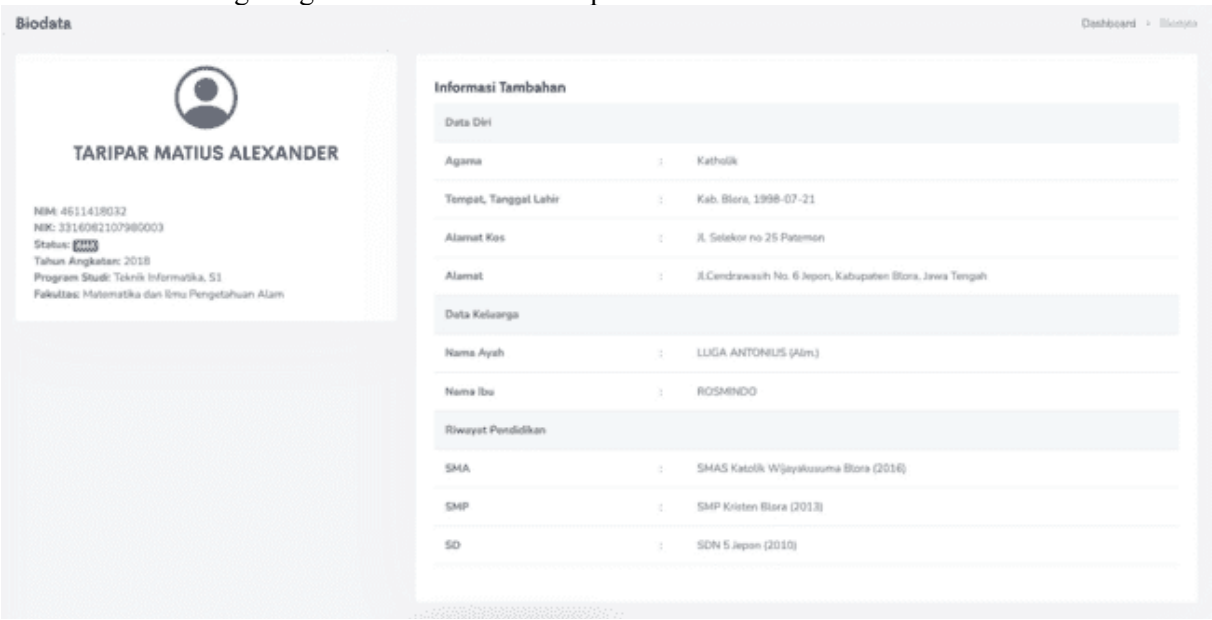


Figure 3. Student Profile Information Feature Integrated with Sikadu.

2.2.2. Faculty and Study Program Menu

Allows users to view information about the faculty structure along with the available study programmes, providing a complete picture of the academic environment where students pursue their education.

2.3. Academic Monitoring

2.3.1. Independent Activity Menu

This feature allows parents to monitor various non-academic activities of their children. This includes achievements made in various competitions, recognition received from various institutions, and a collection of portfolios that show the development of students' soft and hard skills. All of this data is directly integrated with the MyUNNES-Student application to ensure the information is always accurate and up-to-date.

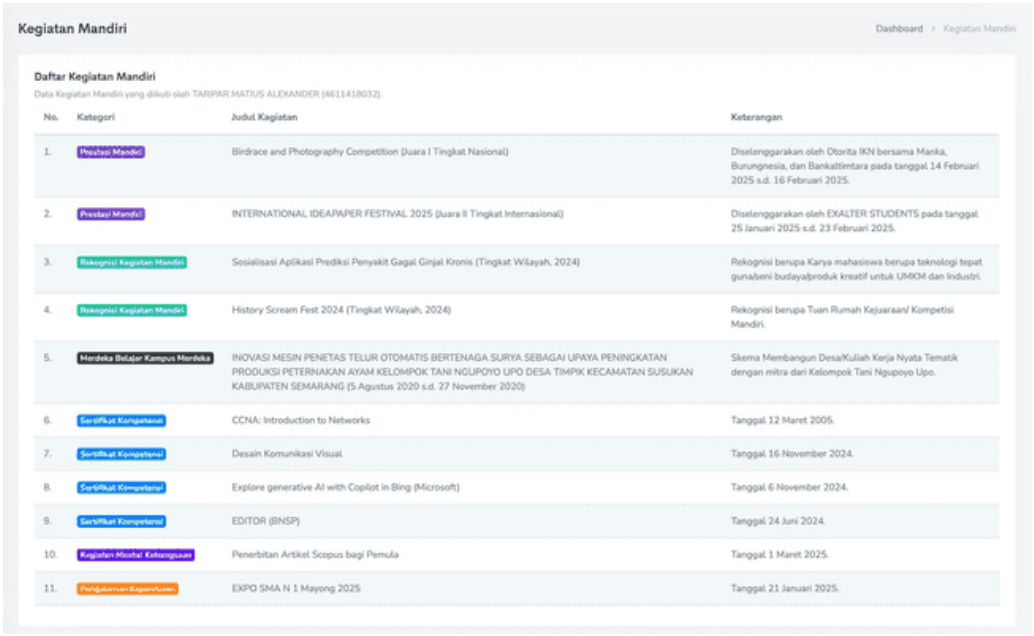
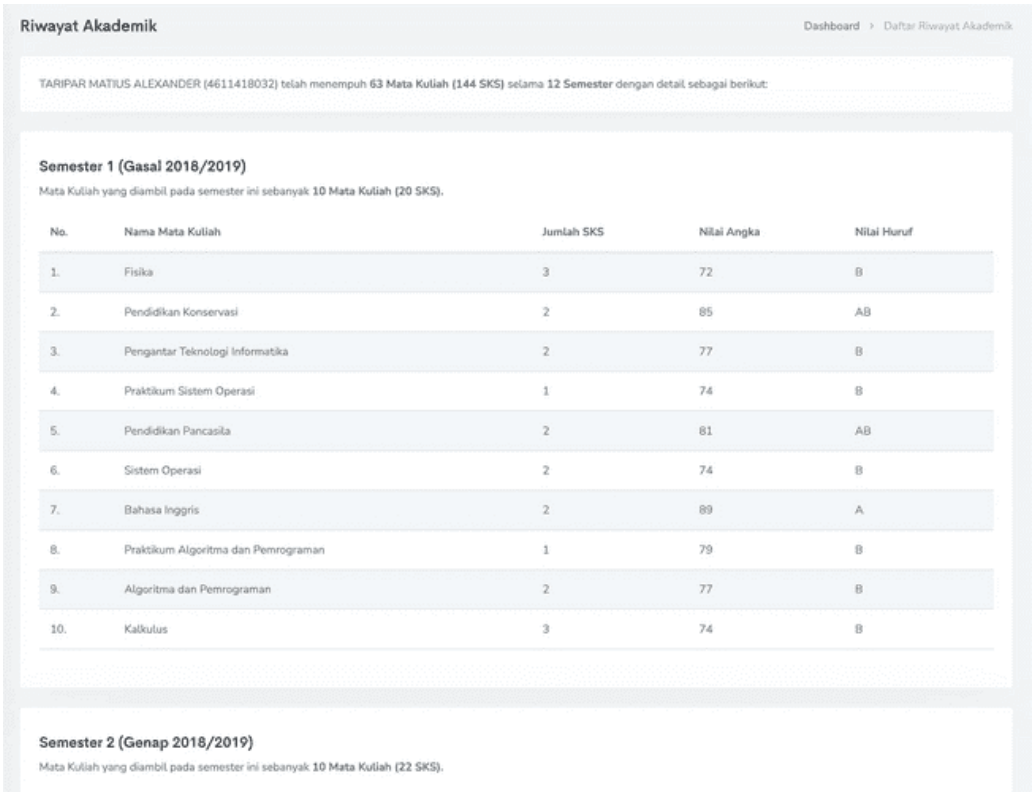


Figure 4. Non-academic achievement information feature integrated with MyUNNES-Student application.

2.3.2. Academic History Menu

To facilitate parents in monitoring their son/daughter's academic development, the application provides a feature that displays a comprehensive academic record. Parents can see the list of courses taken each semester along with the grades obtained. The system also presents a summary of academic achievement in the form of Grade Point Average (GPA) and total Semester Credit Units (SKS) that have been taken.



Riwayat Akademik

Dashboard › Daftar Riwayat Akademik

TARIPAR MATIUS ALEXANDER (4611418032) telah menempuh **63 Mata Kuliah (144 SKS)** selama **12 Semester** dengan detail sebagai berikut:

Semester 1 (Gasal 2018/2019)

Mata Kuliah yang diambil pada semester ini sebanyak **10 Mata Kuliah (20 SKS)**.

No.	Nama Mata Kuliah	Jumlah SKS	Nilai Angka	Nilai Huruf
1.	Fisika	3	72	B
2.	Pendidikan Konservasi	2	85	AB
3.	Pengantar Teknologi Informatika	2	77	B
4.	Praktikum Sistem Operasi	1	74	B
5.	Pendidikan Pancasila	2	81	AB
6.	Sistem Operasi	2	74	B
7.	Bahasa Inggris	2	89	A
8.	Praktikum Algoritma dan Pemrograman	1	79	B
9.	Algoritma dan Pemrograman	2	77	B
10.	Kalkulus	3	74	B

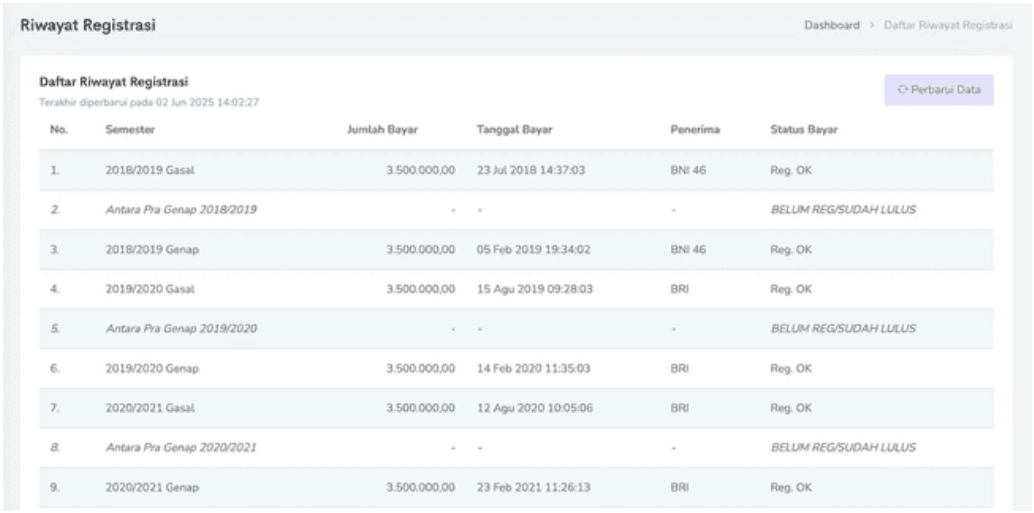
Semester 2 (Genap 2018/2019)

Mata Kuliah yang diambil pada semester ini sebanyak **10 Mata Kuliah (22 SKS)**.

Figure 5. Sikadu integrated student academic registration data information feature

2.3.3. Registration History Menu

The application provides complete information about students' registration status in each semester, enabling parents to monitor their son/daughter's activity in lectures. In addition, this feature also includes payment history details that help parents track and verify financial transactions related to lectures.



Riwayat Registrasi

Dashboard › Daftar Riwayat Registrasi

Daftar Riwayat Registrasi

Terakhir diperbarui pada 02 Jun 2025 14:02:27

Perbarui Data

No.	Semester	Jumlah Bayar	Tanggal Bayar	Penerima	Status Bayar
1.	2018/2019 Gasal	3.500.000,00	23 Jul 2018 14:37:03	BNI 46	Reg. OK
2.	*Antara Pra Genap 2018/2019*	-	-	-	*BELUM REG/SUDAH LULUS*
3.	2018/2019 Genap	3.500.000,00	05 Feb 2019 19:34:02	BNI 46	Reg. OK
4.	2019/2020 Gasal	3.500.000,00	15 Agu 2019 09:28:03	BRI	Reg. OK
5.	*Antara Pra Genap 2019/2020*	-	-	-	*BELUM REG/SUDAH LULUS*
6.	2019/2020 Genap	3.500.000,00	14 Feb 2020 11:35:03	BRI	Reg. OK
7.	2020/2021 Gasal	3.500.000,00	12 Agu 2020 10:05:06	BRI	Reg. OK
8.	*Antara Pra Genap 2020/2021*	-	-	-	*BELUM REG/SUDAH LULUS*
9.	2020/2021 Genap	3.500.000,00	23 Feb 2021 11:26:13	BRI	Reg. OK

Figure 6. Administrative registration (tuition payment) information feature integrated with Sikadu.

2.3.4. Final Project Guidance Menu

This feature allows parents to monitor the progress of their son/daughter's final project. Through this menu, parents can see the progress of the final project, access information on the guidance schedule, and read notes and feedback given by the supervisor. This transparency helps parents to stay connected to an important stage in the student's academic journey.

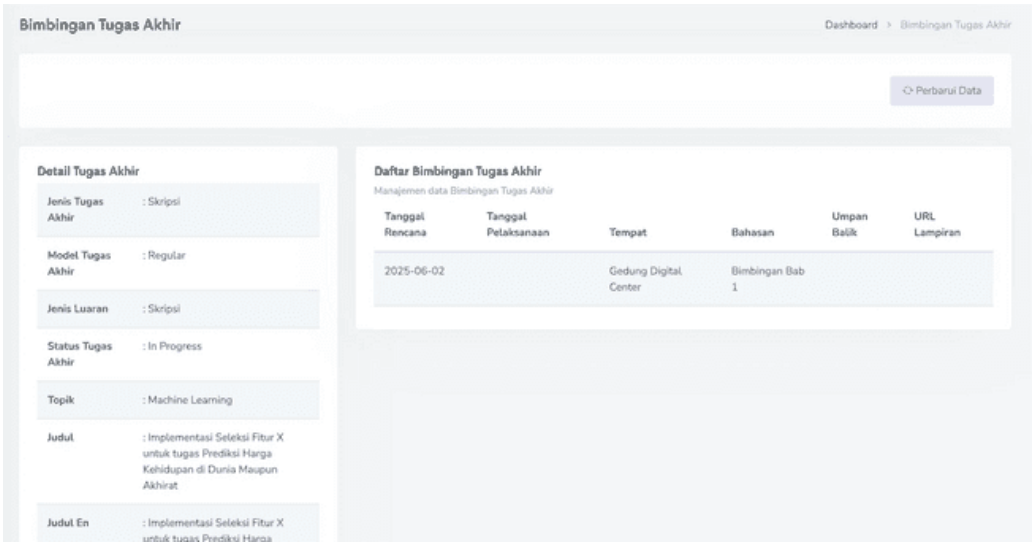


Figure 7. Information feature of student final project guidance programme integrated with Sitedi data in Sikadu

2.4. System Integration

To ensure accurate and up-to-date data, MyUNNES-Parent has been seamlessly integrated with several important systems at UNNES, namely MyUNNES-Student which contains information on students' non-academic data and Sikadu which contains students' academic data. The application obtains data on extracurricular activities and student achievements through integration with MyUNNES-Student, while synchronisation of main academic data is done through Sikadu. For grade and registration status information, the application is directly connected to the university's academic system, ensuring parents always get valid and real-time information about their son/daughter's development.

3. Implementation and Testing

The implementation and testing phase lasted for two months to a sample of parents, where the system was developed in accordance with student perceptions and the predetermined design. Backend development was conducted using MyUNNES-Base to manage business logic and integration with existing systems. Configuration and optimisation of Apache Kafka was done to ensure optimal performance in handling real-time data streaming. A layered security system was implemented with multi-factor authentication, data encryption, and role-based access control. In addition, a monitoring dashboard was developed to enable parents to monitor their child's academic and non-academic progress in real-time. Integration with existing systems such as Sikadu and MyUNNES-Student is also done to synchronise data automatically and accurately. After that, parents and students are welcome to fill in the assessment instrument of MyUNNES-Parent application. System testing is conducted to ensure that the system functions properly and fulfils all the predetermined needs. This stage includes comprehensive unit testing to test each module individually, as well as end-to-end integration testing to ensure smooth data flow between modules and with existing systems. Performance testing is conducted to measure system performance under various loads, followed by optimisation to achieve low latency. Security testing and audits were conducted to identify and fix security vulnerabilities. In addition, User Acceptance Testing (UAT) involved end-users, i.e. parents as well as students (children) to test the system and provide necessary feedback for further improvement.

System optimisation is carried out based on user feedback and test results to ensure the system functions optimally. MyUNNES-Parent will later be evaluated with a software Usability Test to measure the perception of users (parents) and students about the usability of MyUNNES-Parent using the "Use Quetionnare" method.

3.1. Respondents

The number of respondents taken was 30 people, this is in accordance with the opinion of Singarimbun and Effendi (1995) that the minimum number of trials of the questionnaire form is at least 30 respondents so that this study involved 30 main respondents who were selected in a controlled manner with the following qualifications. Parents/Guardians (Parent Respondents) and Parents of students

enrolled at UNNES.

Context of Use: The application is used by parents to monitor their child's academic and administrative progress at UNNES, such as viewing grades, lecture history, and financial information. Parent Respondents interact with the application to ensure involvement in their child's educational process.

3.2. Software Usability Test

Based on the research by Kurniawan, Abdul Mu'izz, Durunnafis, Yaqin, & Fauzan (2023), the updated method has proven to be highly effective and efficient, making it both valid and reliable for measuring software usability. This method is known as the "Use Questionnaire." The test uses a standardized set of statements available internationally via the following link: https://garyperlman.com/quest/quest.cgi?form=USE.

The questionnaire instrument is used to assess the usability of the MyUNNES-Parent application, covering four aspects: usefulness, ease of use, ease of learning, and satisfaction. During the questionnaire phase, respondents were provided with information about the application and given 7 days to complete the questionnaire. Subsequently, the usability of the results was measured through two testing stages: validity testing and reliability testing. In the final phase, the usability score was measured to determine the overall usability level of the MyUNNES-Parent application.

3.2.1. Test Instrument

The test instrument used consists of 30 statements with response options based on a Likert scale ranging from a score of 1 for strongly disagree to a score of 7 for strongly agree, with a score of 4 representing neutral, as follows.

Score 1 = Strongly Disagree
Score 2 = Disagree
Score 3 = Slightly Disagree
Score 4 = Neutral / Unsure
Score 5 = Slightly Agree
Score 6 = Agree
Score 7 = Strongly Agree

The statements in the Use Questionnaire instrument were developed by Lund, A.M. (2001) as follows.

Table 1. Use Questionnaire Instrument by Lund (2001) Version

Number	Statement	Code
	Usefulness	
1	It helps me be more effective.	S1
2	It helps me be more productive.	S2
3	It is useful.	S3
4	It gives me more control over the activities in my life.	S4
5	It makes the things I want to accomplish easier to get done.	S5
6	It saves me time when I use it.	S6
7	It meets my needs.	S7
8	It does everything I would expect it to do.	S8
	Ease of Use	
9	It is easy to use.	S9
10	It is simple to use.	S10
11	It is user friendly	S11
12	It requires the fewest steps possible to accomplish what I want to do with it.	S12
13	It is flexible.	S13
14	Using it is effortless.	S14
15	I can use it without written instructions.	S15
16	I don't notice any inconsistencies as I use it.	S16
17	Both occasional and regular users would like it.	S17
18	I can recover from mistakes quickly and easily.	S18

19	I can use it successfully every time	S19
	Ease of Learning	
20	I learned to use it quickly	S20
21	I easily remember how to use it	S21
22	It is easy to learn to use it.	S22
23	I quickly became skillful with it.	S23
	Satisfaction	
24	I am satisfied with it.	S24
25	I would recommend it to a friend.	S25
26	It is fun to use	S26
27	It works the way I want it to work.	S27
28	It is wonderful.	S28
29	I feel I need to have it.	S29
30	It is pleasant to use.	S30

Based on the results of the test instrument completed by parent respondents, a descriptive analysis can be conducted as follows.

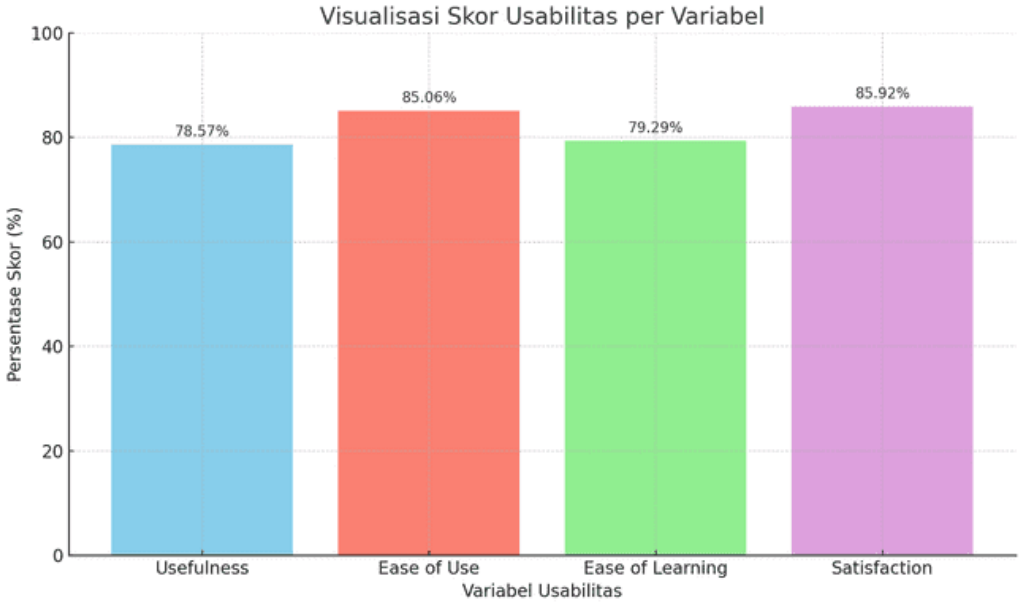


Figure 8. Usability Test Results on Four Evaluation Aspects

This report presents the results of a quantitative descriptive analysis of usability test data obtained from 30 respondents evaluating the system/application under study. The analysis includes instrument reliability, item validity, variable score percentages, and result interpretation. The maximum total score is 6,300 (30 items × 30 respondents × maximum score of 7), while the actual total score is 5,214. Overall, the application is rated as high usability for use based on the four usability dimensions. All items are valid, and the instrument demonstrates very high reliability (Cronbach's Alpha = 0.954). Improvements can be focused on the aspects of usefulness and ease of learning.

The total variance among respondents was 138.166, and the item-wise variance ranged from 0.257 to 0.920. This indicates a moderate to high level of variation in individual assessments of certain items. Items with high variance (e.g., S15 with a variance of 0.920) suggest differing user perceptions that may require further qualitative analysis. Items with the highest scores (S9, S17, S27, S29) indicate that aspects of "ease of use" and "satisfaction" were highly appreciated by users. The item with the lowest score (S15 – I can use it without written instructions) suggests that some users still feel the need for written guidance. This analysis highlights opportunities for improvement in specific areas, such as the provision of user guides, as a consideration for future evaluation and refinement.

This test was conducted to determine the usability of each statement within the aspects of the test instrument. The instrument is considered valid if the correlation coefficient exceeds the Pearson product-moment correlation value, calculated using the CORREL formula in Excel. Based on the data analysis, the calculated correlation (r-count) for each statement was greater than the critical r-table value (0.361)

at a 5% significance level. Therefore, the test instrument is considered valid and consistent in measuring software usability.

3.2.2.2. Reliability Test

The reliability test is used to determine and verify the consistency of the measuring instrument (test instrument) used. The result of the reliability test is indicated by the value of the Cronbach's Alpha coefficient, calculated using the formula:

$$a = \left(\frac{n}{n-1}\right)\left(1 - \frac{\sum \quad Var}{Var_{total}}\right) \qquad (1)$$

Description:

$$a = Cronbach's\ Alpha\ score$$
$$n = Number\ of\ respondents$$
$$Var = Varian$$

It is considered reliable if the calculated Cronbach's Alpha value is greater than 0.7. Based on the data analysis results, there were 30 statement items distributed across 5 variables (Usefulness, Ease of Use, Ease of Learning, Satisfaction). The calculated Cronbach's Alpha value was 0.954, which is higher than the table value (0.361) at a 5% significance level. Therefore, all statements are declared valid. Each statement is capable of accurately and validly measuring the intended aspect.

3.2.3. Usability Measurement

The formula for measuring application usability is as follows.

$$pk(\%) = \frac{Observation\ score}{Expected\ score} \times 100 \qquad (2)$$

Description:

$$pk = usability\ score$$

The percentage result of the usability measurement is then compared with the standard usability value as follows.

Tabel 2. Usability Category

Score Range (%)	Category
$pk < 21$	Very Low Usability
21 - 40	Low Usability
42 - 60	Moderate Usability
61 - 80	High Usability
$pk > 80$	Very High Usability

Based on the data analysis results, the usability score (pk) was 82 (Very High Usability), indicating that the MyUNNES-Parent application is perceived as very high usability and usable by users based on usability indicators. The usability evaluation of the MyUNNES-Parent application, based on four key dimensions (Table 3), reveals a generally positive user experience with areas for targeted improvement.

Table 3. Usability Scores

Variable	Total Score	Maximum Score	Percentage
Usefulness	1320	1680	78.57%
Ease of Use	1965	2310	85.06%
Ease of Learning	666	840	79.29%
Satisfaction	1263	1470	85.92%

In the Usefulness dimension, the application received a score of 78.57%, placing it in the "High Usability" category. Users found the application to be helpful in supporting their needs; however, some noted that the system could be further enhanced to make achieving their goals even more efficient and intuitive. For Ease of Use, the application scored 85.06%, falling under the "Very High Usability" category. Most users agreed that the application is straightforward and user-friendly, though a few still needed written instructions, suggesting minor usability adjustments could further enhance the experience. In the Ease of Learning dimension, the application earned a score of 79.29%, also within the "High Usability" category. Respondents generally found the application easy to learn, yet some highlighted a need for improved guidance in terms of remembering functions and quickly acquiring the necessary skills to use the system independently. Finally, in terms of Satisfaction, the score was 85.92%, indicating "Very High Usability." Users expressed high levels of satisfaction, describing the application as enjoyable and aligned with their expectations. Overall, these results suggest that while the application performs very well in terms of usability, especially in satisfaction and ease of use, there remains opportunity for refinement in usefulness and learnability to create an even more seamless and impactful user experience.

4. Evaluation and Improvement

This stage is a crucial part of the MyUNNES-Parent application development cycle, aimed at ensuring that the designed and implemented system meets user needs and performs optimally. The evaluation is conducted after the completion of the previous four stages—needs analysis, system design, implementation, and testing—based on a Research and Development (R & D) approach using a prototyping model.

The evaluation process involves collecting feedback from end users, specifically parents of UNNES students, using the Use Questionnaire instrument that measures four main dimensions: usefulness, ease of use, ease of learning, and satisfaction. Based on data from 30 respondents, the application demonstrated a very high level of usability, with a total usability score of 82%, falling into the "very high usability" category. The validity and reliability tests of the instrument also yielded strong results, with a Cronbach's Alpha value of 0.954, indicating high consistency in measuring user perceptions.

However, despite the overall high rating, the analysis also revealed areas needing improvement, particularly items related to ease of learning and usage without written guidance. These findings serve as the main basis for the system refinement process, which is carried out iteratively based on analytical data and user feedback. Enhancements include improving the user experience (UX), simplifying the interface, adding interactive help features, and providing usage documentation in the form of user guides.

Additionally, technical optimization was conducted based on system performance tests such as latency, throughput, and integration stability with the Sikadu and MyUNNES-Student systems. Adjustments were made to strengthen system security, expand the range of data accessible to parents, and increase server capacity to handle growing real-time data traffic.

The final part of this stage is marked by the preparation of complete documentation, including technical guides, user manuals, and training sessions for administrators and parents to ensure a smooth and sustainable transition to the new system. Through this evaluation and improvement approach, the MyUNNES-Parent application is not only ensured to function technically but also to be adaptive to real user needs in supporting a more holistic educational process for students at UNNES.

CONCLUSION

This research successfully developed and validated the *MyUNNES-Parent* application as a feasible, user-accepted tool for boosting parental involvement in students' academic and non-academic progress at *Universitas Negeri Semarang*, achieving an overall usability score of 82% via the USE Questionnaire, with standout ease of use (85.06%) and satisfaction (85.92%). It provides real-time monitoring integrated with *Sikadu* and *MyUNNES-Student* systems through a reliable Apache Kafka publish-subscribe architecture, while prioritizing student privacy by excluding sensitive attendance data. For future research, I suggest a longitudinal study tracking long-term impacts on student GPAs, retention rates, and dropout prevention, alongside machine learning-driven adaptive notifications for predictive

risk alerts and a comparative analysis of well-being and autonomy between app users and non-users to assess ethical implications.

REFERENCES

Cattaneo, A. A. P., Antonietti, C., & Rauseo, M. (2022). How digitalised are vocational teachers? Assessing digital competence in vocational education and looking at its underlying factors. *Computers & Education, 176*, 104358. https://doi.org/10.1016/j.compedu.2021.104358

Centre for Indonesian Mental Health. (2023). Prevalence of mental health issues among university students in Central Java. *Journal of Indonesian Psychology, 15*(2), 78–92.

Chen, L., Wang, H., & Kim, S. (2024). Implementation of real-time parent monitoring systems in Asian higher education: A comprehensive analysis of impact and outcomes. *International Journal of Educational Technology in Higher Education, 21*(2), 45–67.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Kurniawan, P. M., Abdul Mu'izz, D. F., Durunnafis, A., Yaqin, M. A., & Fauzan, A. C. (2023). Survey of software usability measurement using systematic literature review method. *ILKOMNIKA: Journal of Computer Science and Applied Informatics, 5*(3), 223–243. https://doi.org/10.28926/ilkomnika.v5i3.444

Laudon, K. C., & Laudon, J. P. (2016). *Management information systems: Managing the digital firm* (14th ed.). Pearson Education.

Lund, A. M. (2001). Measuring usability with the USE questionnaire. *STC Usability SIG Newsletter, 8*(2).

Rahman, A., Setiawan, B., & Pratiwi, D. (2023). Early intervention in student mental health: The role of parent monitoring systems. *Southeast Asian Journal of Higher Education, 42*(1), 123–138.

Rahman, A., et al. (2023). Parent engagement and student success in higher education: A longitudinal study. *Higher Education Research & Development, 42*(1), 123–138.

Ramadhan, E., Aulia, N. D., & Salasabila, T. (2024). Student perspective of social media hiding from parents. In *Proceedings of the National Seminar on Social Sciences (SNIIS)* (Vol. 3).

Sepúlveda, A. (2020). *The digital transformation of education: Connecting schools, empowering learners*. TIC Educación.

Singarimbun, M., & Effendi, S. (1995). *Metode penelitian survei* (ed. revisi). LP3ES.

UNNES Counselling Centre. (2024). *Annual report of student counselling services 2023*. Universitas Negeri Semarang.

Vajen, B., Kenner, S., & Reichert, F. (2023). Digital citizenship education: Teachers' perspectives and practices in Germany and Hong Kong. *Teaching and Teacher Education, 122*, 103972.

Wang, Y., Liu, X., & Zhang, Q. (2023). Enhancing real-time data processing in academic information systems with Apache Kafka. *Journal of Educational Technology Systems, 52*(1), 89–105.

Widodo, S., & Pratiwi, R. (2024). Academic monitoring systems and mental health prevention in Indonesian universities. *Journal of Educational Technology in Higher Education, 21*(3), 234–249.