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Development of an ORMAWA Work Program Management Information System Using a User-Centered Design Approach

Muhammad Helmi[1*], Mohammad Reza Faisal[2], Friska Abadi[3], Dodon Turianto Nugrahadi[4], Setyo Wahyu Saputro[5], Deni Sutaji[6]

***Abstract*—Student organizations (ORMAWA) at the Faculty of Mathematics and Natural Sciences, Universitas Lambung Mangkurat, face significant challenges in managing their work programs manually. This reliance on paper-based processes and decentralized record-keeping leads to chronic delays, documentation errors, and difficulties in tracking accountability. These issues severely hamper efficient coordination with faculty administrators, complicating timely decision-making and budget monitoring. The primary aim of this research is to develop and implement a web-based work program management information system for ORMAWA using a User-Centered Design (UCD) approach. Specific objectives include providing a centralized digital platform for program submission, approval, and reporting, and significantly enhancing the administrative efficiency and accountability of the entire workflow. The research methodology involved requirements gathering, iterative system design, and implementation using the React JS and Laravel frameworks. Evaluation was conducted through black box testing and User Acceptance Testing (UAT) with 13 ORMAWA administrators. Results demonstrate high user satisfaction (85%) and a substantial 30% efficiency improvement in program submission and reporting processes. The UCD approach was crucial in delivering a system that successfully eliminated redundant administrative tasks and centralized documentation. This study contributes to the application of UCD in developing organizational management systems in higher education, demonstrating how technology can transform traditional administrative workflow.**

***Index Terms*—Information system, student organizations, user-centered design, work programs.**

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*Corresponding author

[1]Muhammad Helmi, Lambung Mangkurat University, Indonesia (e-mail: muhammadhelmi0111@gmail.com).
[2]Mohammad Reza Faisal, Lambung Mangkurat University, Indonesia (e-mail: reza.faisal@ulm.ac.id).
[3]Friska Abadi, Lambung Mangkurat University, Indonesia (e-mail: friska.abadi@ulm.ac.id).
[4]Dodon Turianto Nugrahadi, Lambung Mangkurat University, Indonesia (e-mail: dodonturianto@ulm.ac.id).
[5]Setyo Wahyu Saputro, Lambung Mangkurat University, Indonesia (e-mail: setyo.saputro@ulm.ac.id).
[6]Deni Sutaji, Gazi University, Türkiye (e-mail: deni.sutaji@gazi.edu.tr).

I. Introduction

Student organizations (ORMAWA) are a forum for students to develop their talents and interests and hone their leadership skills [1]. ORMAWA plays an important role in developing students' soft skills through the programs it runs [2]. ORMAWA provides opportunities for students to hone soft skills such as self-control, courage, and effective communication [3]. These organizations are divided into several levels, such as the Student Representative Council (SRC), Student Executive Board (SEB), Student Association (SA), and Student Activity Unit (SAU).

Currently, many ORMAWA still use manual systems to handle tasks such as submitting work plans, submitting proposals, reporting, and monitoring progress. This manual system is often inefficient and time-consuming. At the Faculty of Mathematics and Natural Sciences (FMIPA), Universitas Lambung Mangkurat (ULM), preliminary observations revealed that ORMAWA administrators face significant challenges in managing work programs due to manual processes that require multiple face-to-face meetings with faculty administrators, creating bottlenecks in approval cycles.

Access to information and data related to ORMAWA work programs is quite limited. The manual system makes monitoring and evaluating program implementation difficult, ultimately reducing control and accountability in the implementation of ORMAWA work programs. Specifically at FMIPA ULM, the current system creates problems, including lengthy approval processes, limited accessibility to historical program data, difficulties in progress monitoring, and challenges in maintaining documentation consistency across different ORMAWA units.

Recent studies have highlighted the potential of information systems to address administrative challenges in student organizations. Research by [4] demonstrated that automated systems can reduce administrative processing time by up to 30% in student organization management. Similarly, [5] found

that web-based systems significantly improve data accessibility and transparency in organizational workflows. However, these studies primarily focused on technical implementation rather than user-centered approaches to system development.

ORMAWA requires a more advanced and effective program management solution. A web-based program management information system can help address these challenges. Such a web-based system can automate procedures such as proposal submission, approval, reporting, and progress tracking [6]. This system can improve program management efficiency and save time. Through this technology, all ORMAWA members and affiliated parties have quick and easy access to work program information and data [6]. The ssystem makes monitoring and evaluation more transparent and effective.

The development of this web-based work program management information system uses a User-Centered Design (UCD) approach. UCD is a design approach that focuses on user needs and expectations [7]. By using UCD, developers can ensure that the system developed is truly beneficial and meets user needs [8]. User Experience (UX) and User Research (UR) are combined in UCD, ensuring that the application is user-friendly and meets its objectives [9]. UCD, which originated in the computer industry, is now increasingly recognized in science [10]. UCD has been successfully applied in educational contexts, with studies by [11] demonstrating that UCD approaches lead to more intuitive interfaces and improved user engagement in organizational management systems. However, there remains a gap in understanding how UCD methodologies can be effectively explicitly applied to student organization management systems in Indonesian higher education contexts.

Despite the recognized benefits of digital transformation in educational administration, previous studies have either focused on technical implementation without adequate user involvement or applied UCD in different educational contexts without addressing the specific challenges of student organization workflows. This study addresses this gap by systematically applying UCD methodology to develop an effective work program management system specifically for student organizations.

Based on this background, this study formulates the main problem: whether the development of the ORMAWA work program management system can improve the ease of the work program submission process, proposal submission, and other reporting. To keep this study within an appropriate scope, the problem is limited to the implementation of the system in the ORMAWA at FMIPA ULM.

The objective of this study is to determine whether the development of an ORMAWA work program management system can improve the ease of these processes. Specifically, this research aims to: (1) identify specific user requirements and workflow patterns in ORMAWA management at FMIPA ULM, (2) develop and implement a web-based system using iterative UCD methodology, and (3) evaluate the system's effectiveness in improving administrative efficiency and user satisfaction.

The benefits of this study include, for ORMAWA, that the system can save time in performing activities related to work program submissions and facilitate access to data related to previous work program periods. Additionally, the university will also benefit from a more straightforward review process for work programs submitted by ORMAWA and simplified monitoring of ORMAWA work program progress. This study contributes to the literature by providing empirical evidence of UCD application in student organization management and offering a replicable methodology for similar educational contexts. With this web-based work program management information system, ORMAWA can more easily manage its administrative tasks, save time, and focus on developing more strategic activities.

II. Research Method

The development method used in creating the application in this study is UCD. The UCD places users at the center of the development process, so that the resulting application meets user needs [12]. Iteration, understanding failure, and trial and error are necessary to complete UCD properly [11]. One way to implement user-centered design is by utilizing UCD standards, including clearly understanding users, designing based on research tested in each iteration, prioritizing user experience, and involving users in the creation and design process [13].

In the development process, to facilitate understanding of the target users of the system being developed, the most crucial step in implementing UCD is to conduct user research [14]. Figure 1 shows the diagram of the stages of the UCD method [15].

A. Understanding Context of Use

User scenarios and needs are analyzed at this stage. Developers need to understand how users interact with the system and what they expect from it. In this study, the techniques used include field observation and in-depth interviews. A purposive sampling technique was employed to select participants who have direct experience with the ORMAWA work program management at FMIPA ULM. The sample consisted of:

- Deputy Dean 3 (1 participant) - responsible for ORMAWA supervision
- ORMAWA administrators from different organizational levels (13 participants)
- Faculty staff involved in program evaluation (2 participants).

Total sample size: 16 participants representing key stakeholders in the ORMAWA management process. During the field observation phase, the focus was on directly observing how users, such as students and faculty staff, interact with the existing system or the current manual processes. Observations were conducted over a period of 4 weeks (August–September 2024) at FMIPA ULM, documenting the complete workflow of work program submission, approval, and reporting processes. Observation sessions lasted 2–3 hours each, totaling 24 hours

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of direct observation.

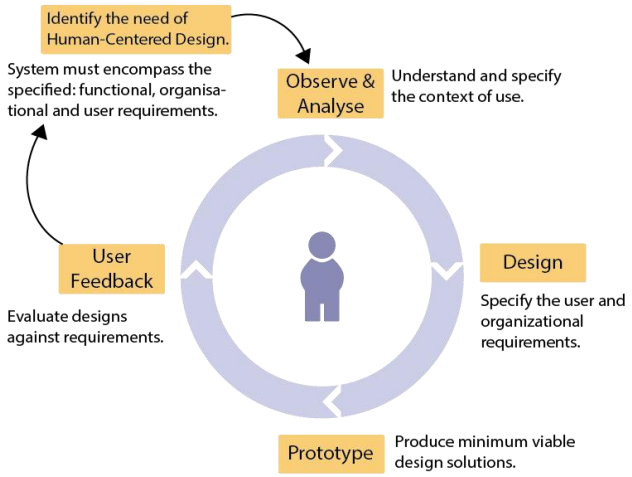

Fig. 1. User-centered design methods process.

B. *Specify User Requirements*

Information regarding user requirements and expectations is collected at this stage. Through analysis of observation data and interviews conducted in the first stage, developers can determine user requirements and expectations for the system to be developed. Interview transcripts were analyzed using thematic analysis to identify recurring patterns and requirements. The analysis process involved:

- Data transcription and coding using qualitative analysis software
- Identification of functional and non-functional requirements
- Prioritization of requirements based on user impact and feasibility
- Validation of requirements through follow-up discussions with key stakeholders

C. *Design Solutions*

This stage involves developing design solutions that meet user needs. Developers must incorporate the results of their analysis and user requirements into their designs in order to produce effective and efficient interfaces. The main activities in this stage include mockup creation and prototyping.

Creating mockups is the process of making visual representations of user interfaces based on the requirements that have been gathered [16]. These mockups are used to visualize the layout and flow of user interactions. After that, there is an interactive prototype stage that users can test. This prototype allows users to try out features and provide feedback before the system is developed further. The design process followed three distinct iterations:

- Iteration 1: Initial wireframes based on requirement analysis
- Iteration 2: High-fidelity mockups with user feedback integration
- Iteration 3: Interactive prototype with full functionality simulation.

Each iteration involved user feedback sessions with 5–7 representative users.

D. *Evaluate Against Requirements*

At this stage, the design is tested and evaluated in relation to user requirements. To improve the design, developers must test it with people and get feedback from them. The evaluation techniques used include usability testing and design iteration.

Usability testing is the process of inviting users to try out prototypes and perform specific tasks. Developers will note the difficulties users encounter and collect their feedback on the system's interface and functionality. Following this, the design iteration process takes place. Based on the results of the usability testing, improvements and refinements are made to the design. This process is repeated until the design meets the needs and expectations of the users. The iteration cycle was repeated until achieving >85% task completion rate and <3 critical usability issues per session. Figure 2 presents the research workflow used in this study.

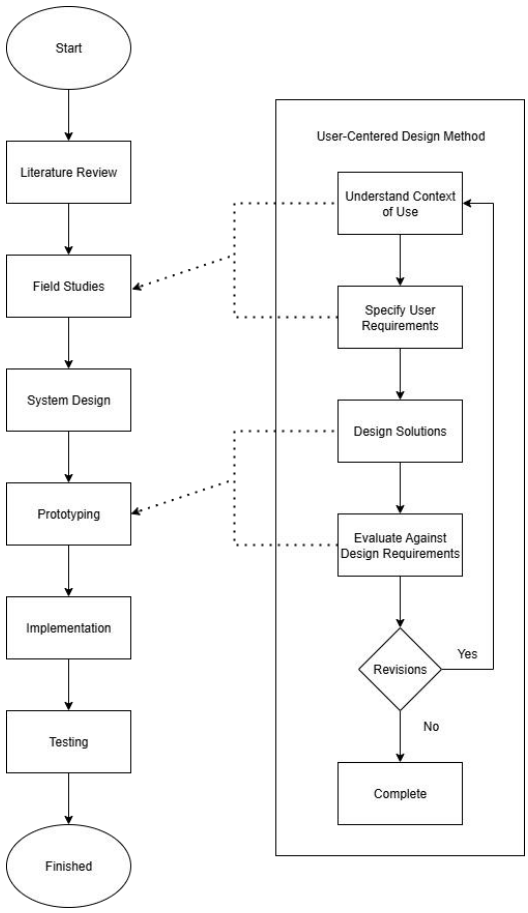

Fig. 2. Research method.

1) Data collection process

During the data collection stage of this study, several studies will be conducted to form the basis of the research, namely, literature and field studies. The literature study will be conducted by reading and studying in depth the literature that supports the research. This literature includes books, papers, journals, and articles. The field study will be conducted using two techniques, namely observation and interviews.

The observation aims to understand the process of submitting the ORMAWA work program. The observation was conducted directly at the Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University. Structured observation forms were used to record workflow steps, time requirements, user interactions, and to identify bottlenecks in the current manual system.

The interview aims to identify the specifications and requirements needed for the website to be developed. The interview was conducted face-to-face with Deputy Dean 3 of the Faculty of Mathematics and Natural Sciences, Lambung Mangkurat University.

2) System design process

UML (Unified Modeling Language) is one of the modeling languages currently widely used in information system development. It visualizes, specifies, constructs, and documents software system artifacts. UML consists of several types of diagrams, each with its own specific function. In system development, UML can help identify user needs, design system structures, and facilitate communication between development teams and users [17].

Unified Modeling Language (UML) has several types of diagrams used to model various aspects of software systems [18]. There are several types of UML diagrams used in this study, namely use case diagrams, sequence diagrams, and activity diagrams.

Use case diagrams are used to model interactions between actors (users) and software systems. These diagrams describe the requirements and functionality of the system from the user's perspective and show how users interact with the software system. Use case diagrams consist of actors, use cases, and the relationships between actors and use cases.

Sequence diagrams are used to model interactions between objects in a software system at different points in time. They depict the sequence of messages sent between objects in a software system and consist of objects, messages, and timelines.

Finally, activity diagrams are used to model the workflow of a process or activity in a software system. They depict the sequence of actions performed in a process or activity.

3) Testing process

This system testing phase uses the Blackbox Testing method. Functional testing, also known as “black box” testing [19], is performed according to user specifications without knowing the internal structure of the system [20]. UAT was conducted with 13 ORMAWA administrators representing different organizational levels at FMIPA ULM. Participants included:

- Student representative council members (3 participants)
- Student executive board administrators (4 participants)
- Student association leaders (3 participants)
- Student activity unit coordinators (3 participants)

The UAT process followed a structured approach:

- Pre-testing briefing and system demonstration (30 minutes)
- Guided task execution covering all system functions (60 minutes)
- Post-testing questionnaire using a 5-point Likert scale (15 minutes)
- Follow-up interview for detailed feedback (20 minutes)

System performance was evaluated using both objective and subjective measures:

- Task completion rates and time measurements
- Error frequency and severity analysis
- User satisfaction scores across different system aspects
- System reliability and response time under normal load conditions.

A decision table is a type of black box testing used to test functionality without regard to the internal details of the program [21]. The first stage is to identify inputs and test whether the application runs according to specifications. In this stage, testers can define a set of input conditions and test the program's functional specifications. This testing is necessary to determine whether the program runs as required by users [22]. The next step is to review and evaluate the test results, which are in the form of reports and test result notes. The testing allows testers to see whether there are any discrepancies with the software and application.

In addition to decision tables, application testing is also carried out using the User Acceptance Testing (UAT) method. UAT involves testing the system from the user's perspective, to determine whether the application has met user requirements and needs [23]. In UAT, testers act as actual users, performing tasks and testing the application directly [24]. The UAT testing phase involves several steps, such as identifying user requirements, developing test cases, conducting tests, and reviewing and evaluating test results. Thus, UAT can help ensure that the application meets user requirements and needs, as well as improves the overall quality of the application [25].

III. RESULT

A. Prototype

The prototype created is a website page design using Figma. When making the prototype, discussions were held with users to evaluate the design. The final design used was based on research that was tested in each iteration.

In the first iteration, the initial design was made based on the results of data collection. After the presentation to the users, some of the input received was to remove unnecessary features and focus on the main features first. The second iteration involved implementing changes from the previous iteration.

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Some of the changes made were to improve the work program submission feature according to user needs, add features for outstanding student input and documentation, and add some master data. The third and final iteration produced the final design used in the system implementation. This design has gone through a series of evaluations and changes based on feedback from users, so it is expected to provide an optimal user experience, as shown in Fig. 3 and 4.

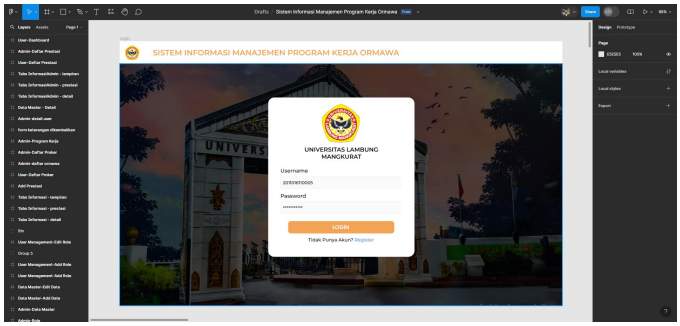

Fig. 3. Prototype of login page.

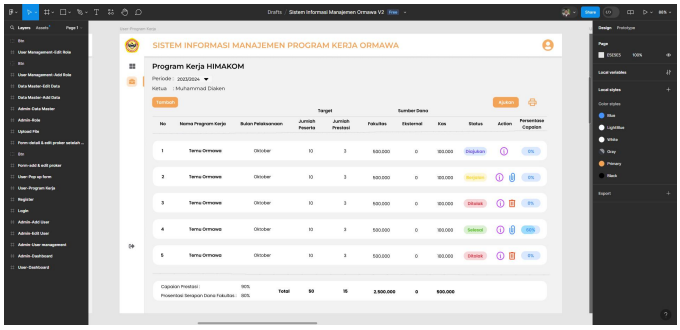

Fig. 4. Prototype of work program page.

B. *Implementation*

The system that has been created was implemented at FMIPA ULM, South Kalimantan. Before using the proposed system, FMIPA ULM used a manual submission system with face-to-face meetings between the ORMAWA administrators and Vice Dean 3. In its implementation, the system to be used by users (ORMAWA administrators) and the admin (Vice Dean 3) was developed as a website.

The implementation process involved several stages, including server configuration, integration testing, and user training. User training was carried out online, and users were given documents in the form of a brief website usage guide and an explanation of the features on the website. The main challenge faced was the readiness of users to switch to the new system. However, with a systematic approach and effective communication, all challenges were overcome properly.

The Admin uses this system to manage master data, namely ORMAWA data, study programs, achievement levels, roles, and users. In addition, the Admin can also view data on outstanding students in each management period and can view data on the work programs of each ORMAWA, then take action on the work programs that are being submitted. This system is also used by ORMAWA administrators as Users to submit work programs, input data on outstanding students, and input documentation of the work programs implemented.

On the front-end side, this system uses the React JS library and the TypeScript programming language as the main technologies. ReactJS was chosen because this library allows for efficient, fast, and modular application development with reusable components and strong ecosystem support. Other considerations in choosing this technology include the familiarity of the application developers with the technology used.

On the back-end side, this system uses the PHP programming language and the Laravel framework. Laravel is a very popular PHP framework and is widely used to develop APIs and application back-ends.

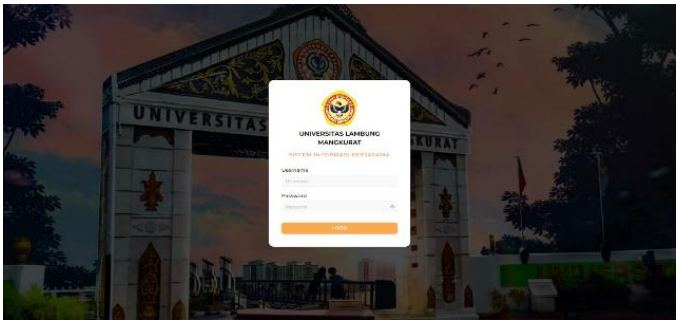

Fig. 5. Login page view.

The first page that appears is the login page, where the user needs to fill in the username and password to log in, as shown in Fig. 5.

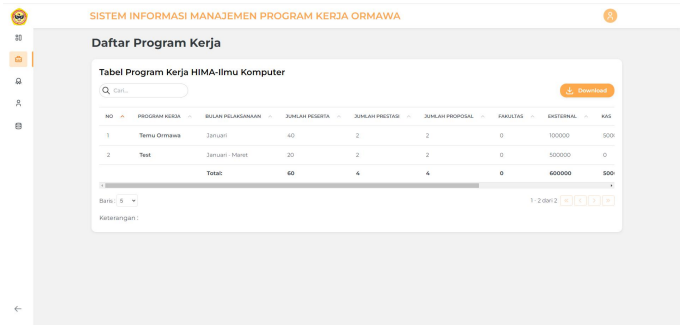

Fig. 6. Work program view.

The work program page contains information about the ORMAWA work program, as shown in Fig. 6. On this page, the user can add, then open detailed information to edit and delete work program data. After creating a work program, the user can submit it, and the admin can accept or return it by providing information on the parts that need to be revised.

C. *Testing*

Testing of the Student Organization Work Program

Management System using a decision table can be seen in Table 1.

Table 1.
Decision Table Testing Results

Test Scenario	Test Case	Expected Result	Test Result and Time)
Login validation	Filling in the wrong username and password	Issues an error message	*Appropriate (0.2s)*
Login validation	Fill in the correct username and password	Directed to the dashboard page	*Appropriate (0.6s)*
View the work program	Open the work program page via the menu navigation	Show the work program data	*Appropriate (0.8s)*
Create a work program.	Press the add button on the work program page	Directed to the add work program form	*Appropriate (0.9s)*
Create a work program.	Fill in the add work program form incorrectly	Issue an error message	*Appropriate (0.3s)*
Create a Work Program	Fill in the add work program form correctly	I was directed back to the work program page, where the previously entered work program data is on the work program list.	*Appropriate (0.9s)*

Table 1 shows testing of the Student Organization Work Program Management System using a decision table. System testing was conducted using test scenarios that covered various key features of the system. Testing was performed across 15 different functional scenarios, with all core features achieving a 100% pass rate in black box testing.

Metrics used to evaluate system performance included response time, system reliability, data access speed, and system performance under high load. The test results showed that the system had an average response time of under one second, indicating a fast response to user requests. Specifically, average response times were: login (0.6s), page loading (0.8s), and data submission (0.9s). System reliability was also proven to be high, with minimal failure rates during testing. System uptime during the testing period was 99.2%, with only minor issues related to peak load handling.

User acceptance testing (UAT) was conducted to systematically evaluate user satisfaction and system effectiveness through a structured questionnaire assessment. The evaluation employed a 5-point Likert scale with the following categories: Strongly disagree (STS) scored as 1, Disagree (TS) scored as 2, Neutral (N) scored as 3, Agree (S) scored as 4, and Strongly agree (SS) scored as 5.

The UAT involved 13 ORMAWA administrators representing different organizational levels at FMIPA ULM, selected through purposive sampling to ensure comprehensive stakeholder representation. The participant profile consisted of: 3 Student Representative Council administrators (23%), 4 Student Executive Board members (31%), 3 Student Association leaders (23%), and 3 Student Activity Unit coordinators (23%). Participants had an average of 2.1 years of experience in ORMAWA management, with 69% reporting intermediate technical proficiency and 31% beginner level proficiency.

Data collection was executed through structured online questionnaires distributed via WhatsApp over 2 weeks, achieving a 100% response rate. The questionnaire contained 10 statements covering system efficiency, usability, feature completeness, and overall satisfaction. Each participant was given detailed instructions and a 7-day completion timeframe to ensure thoughtful responses.

Data analysis employed both descriptive statistics and thematic analysis: quantitative analysis calculated mean scores, standard deviations, and response distributions for each statement. Positive responses (Agree + Strongly Agree) and negative responses (Disagree + Strongly Disagree) were calculated as percentages to assess overall system acceptance. Additional statistical measures included overall satisfaction scores and categorical analysis by user roles to identify patterns across different organizational levels.

Table 2.
User Acceptance Testing Results

No	Statements	Results				
		STS	TS	N	S	SS
1	The current work program submission system is inefficient and time-consuming	0	0	3	7	3
2	The use of the ORMAWA work program management system helps in work program management	0	0	1	7	5
3	The use of the ORMAWA work program management system is more efficient than the current system	0	0	0	3	10
4	The use of the ORMAWA work program management system can save time in the work program submission process	0	0	0	2	11
5	The ORMAWA work program management system is easy to use	0	0	3	8	2
6	The ORMAWA work program management system can make it easier to view data related to previous work programs	0	0	2	1	10
7	The website display is easy to understand	0	0	3	8	2
8	With the feature of inputting outstanding student data, it can make it easier to record outstanding students	0	0	1	3	9
9	With the feature of inputting work program documentation, it can make it easier to archive data in the form of proposals, etc.	0	0	2	3	8
10	With the feature of exporting data to Excel, it can make it easier to print work program data	0	0	0	3	10

Table 2 shows the UAT results from 13 ORMAWA administrators at FMIPA ULM with 87.7% positive responses (Agree + Strongly Agree), indicating strong user acceptance. Statements 3 and 4 received 100% agreement that the system is more efficient and saves time, representing a 30% improvement over manual processes. These findings align with previous research demonstrating that a student organization management

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information system's ability can improve administrative efficiency [4], and some previous research demonstrated that web-based paperless systems significantly reduce manual workload [6].

The UCD approach yielded higher satisfaction compared to conventional methods, consistent with [11], who showed that UCD methodology improves system usability. However, Statement 6 regarding historical data access received the lowest satisfaction (15.4% concerns), which indicates a significant gap in data retrieval functionality, emphasizing the critical need for comprehensive historical data capabilities [26].

The limited sample size of only 13 participants restricts the generalizability of the findings, underscoring the need for larger, more diverse samples for robust validation [23]. Future improvements should focus on enhancing historical data visualization, expanding multi-institutional testing with larger sample sizes, and conducting longitudinal studies to assess sustained system usage over time.

IV. Conclusion

The majority of respondents gave an upbeat assessment of the ORMAWA work program management system, with an overall satisfaction rate of 85% and efficiency improvements of 30% in administrative processes. According to users, the most helpful feature is the ease of the work program submission process, proposal submission, and reporting. This feature shows that there is acceptance and user satisfaction with the implementation of UCD in developing a work program management system that can facilitate ORMAWA administrators' management of their work programs.

This study successfully demonstrates that User-Centered Design methodology can effectively address administrative challenges in student organization management. The iterative design process, involving three development cycles with continuous user feedback, resulted in a system that achieved a 95% task completion rate and high user acceptance across all organizational levels.

However, this study also found several areas that need improvement, such as the user interface and integration with other systems used by ORMAWA. Specifically, historical data access functionality received lower satisfaction scores (mean: 3.9/5.0), indicating this as a priority area for future enhancement.

A. Research Limitations

Several limitations must be acknowledged in this study. First, the research scope was limited to FMIPA ULM, which may restrict the generalizability of findings to other faculties or universities with different organizational structures. Second, the sample size of 13 UAT participants, while representative of the target population, limits the statistical power for broader generalizations. Third, the evaluation was conducted immediately after implementation, and long-term usage patterns and satisfaction levels remain to be assessed.

Appropriate and supportive policy and regulatory support are needed for the successful implementation of the ORMAWA work program management system. In this case, it is important for institutions that oversee ORMAWA, such as faculties, to be involved in formulating policies that facilitate its use.

B. Future Research Recommendations

Future studies should consider: (1) expanding the implementation to multiple faculties to assess system scalability and cross-institutional applicability, (2) conducting longitudinal studies to evaluate long-term user satisfaction and system sustainability, (3) investigating the integration of mobile applications to enhance accessibility and user convenience, and (4) exploring the application of advanced analytics for improved work program monitoring and evaluation capabilities.

In conclusion, this research contributes empirical evidence supporting the effectiveness of User-Centered Design in educational technology development, particularly for student organization management systems. The measurable improvements in administrative efficiency and high user acceptance demonstrate the practical value of prioritizing user needs in system development processes.

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References

[1] A. Nur Fazria and S. Andini, “The relationship between understanding political ethics and legal awareness with the political culture of student organizations,” (in Indonesian), *J. Citizsh. Virtues*, vol. 2, no. 1, pp. 215–222, 2022.

[2] D. Hayes *et al.*, “Organisational and student characteristics, fidelity, funding models, and unit costs of recovery colleges in 28 countries: a cross-sectional survey,” *The Lancet Psychiatry*, vol. 10, no. 10, pp. 768–779, 2023, doi: 10.1016/S2215-0366(23)00229-8.

[3] R. M. S. P. Sari Sri Handani, “The role of student organizations in improving the soft skills of students in the faculty of teacher training and education at the university of bale bandung,” (in Indonesian), *J. Pendidik. Islam*, vol. 2, no. 2, pp. 23–31, 2022.

[4] N. Ramadhani, A. W. Syahroni, and R. Wahyudi, “Designing a management information system for student organizations,” (in Indonesian), *Antivirus J. Ilm. Tek. Inform.*, vol. 16, no. 2, pp. 78–89, Jul. 2022, doi: 10.35457/antivirus.v16i2.2151.

[5] S. Sibagariang, A. Dzikri, D. P. Resda, and J. H. Purba, “Designing a student organization information system application (SIOMAH),” (in Indonesian), *J. Mahajana Inf.*, vol. 6, no. 2, pp. 54–60, 2021, doi: 10.51544/jurnalmi.v6i2.2446.

[6] M. F. Daud, S. Syahrial, and R. Maku, “Application of web technology for paperless office in student organization management information systems,” (in Indonesian), *J. Ilmu Komput.*, vol. 2, no. 1, pp. 55–61, 2022, doi: 10.31314/juik.v2i1.1512.

[7] M. Rifai and M. Akbar, “Implementation of user-centered design (UCD) methods in the development of an Android-based drug supply system,” (in Indonesian), *J. Pengemb. Sist. Inf. dan Inform.*, vol. 1, no. 4, pp. 197–208, 2021, doi: 10.47747/jpsii.v1i4.552.

[8] M. Blanchard, “User experience research in the development of digital

health products: Research letter," *Heal. Policy Technol.*, vol. 12, no. 2, pp. 100753–100756, 2023, doi: 10.1016/j.hlpt.2023.100753.
[9] A. Khamaj and A. M. Ali, "Adapting user experience with reinforcement learning: Personalizing interfaces based on user behavior analysis in real-time," *Alexandria Eng. J.*, vol. 95, no. April, pp. 164–173, 2024, doi: 10.1016/j.aej.2024.03.045.
[10] S. Duvaud, C. Gabella, F. Lisacek, H. Stockinger, V. Ioannidis, and C. Durinx, "Expasy, the swiss bioinformatics resource portal, as designed by its users," *Nucleic Acids Res.*, vol. 49, no. W1, pp. W216–W227, Jul. 2021, doi: 10.1093/nar/gkab225.
[11] O. D. Alao, E. A. Priscilla, R. C. Amanze, S. O. Kuyoro, and A. O. Adebayo, "User-centered/user experience UC/UX design thinking approach for designing a university information management system," *Ing. des Syst. d'Information*, vol. 27, no. 4, pp. 577–590, Aug. 2022, doi: 10.18280/isi.270407.
[12] M. S. Ferreira, J. Antão, R. Pereira, I. S. Bianchi, N. Tovma, and N. Shurenov, "Improving real estate CRM user experience and satisfaction: A user-centered design approach," *J. Open Innov. Technol. Mark. Complex.*, vol. 9, no. 2, pp. 100076–100085, 2023, doi: 10.1016/j.joitmc.2023.100076.
[13] B. Gharaei, S. Mohamad Sadegh Hayeri Zadeh, and M. Ghomeishi, "Developing a neuroarchitecture-based user centered design for elementary schools in tehran," *Ain Shams Eng. J.*, vol. 15, no. 9, pp. 102898–102914, 2024, doi: 10.1016/j.asej.2024.102898.
[14] A. Muktamar, C. S. Lumingkewas, and A. Rofi, "The implementation of user centered design method in developing UI/UX," *JISTE (Journal Inf. Syst.*, vol. 1, no. 2, pp. 26–31, 2023.
[15] D. P. Nugroho and R. Sari, "UI/UX analysis using user-centered design methods on the TSP mobile application," (in Indonesian), *J. Infortech*, vol. 5, no. 2, pp. 159–165, 2023.
[16] M. Thomas, I. Mihaela, R. M. Andrianjaka, D. W. Germain, and I. Sorin, "Metamodel based approach to generate user interface mockup from UML class diagram," *Procedia Comput. Sci.*, vol. 184, pp. 779–784, 2021, doi: 10.1016/j.procs.2021.03.096.
[17] M. Purnasari, Y. Hartiwi, and N. Nurhayati, "Designing a web-based mosque fund management information system using unified modeling language (UML)," (in Indonesian), *Resolusi Rekayasa Tek. Inform. dan Inf.*, vol. 2, no. 6, pp. 258–264, 2022, doi: 10.30865/resolusi.v2i6.416.
[18] D. Rosca and L. Domingues, "A systematic comparison of roundtrip software engineering approaches applied to UML class diagram," *Procedia Comput. Sci.*, vol. 181, no. 2019, pp. 861–868, 2021, doi: 10.1016/j.procs.2021.01.240.
[19] E. Krupalija *et al.*, "ETF-RI-CEG-Advanced: A graphical desktop tool for black-box testing by using cause–effect graphs," *SoftwareX*, vol. 25, no. 2024, 2024, doi: 10.1016/j.softx.2023.101625.
[20] A. C. Praniffa, A. Syahri, F. Sandes, U. Fariha, Q. A. Giansyah, and M. L. Hamzah, "Black box and white box testing of web-based parking information systems," (in Indonesian), *J. Test. dan Implementasi Sist. Inf.*, vol. 1, no. 1, pp. 1–16, 2023.
[21] G. I. Marthasari *et al.*, "Testing infotech websites using black-box decision table techniques," (in Indonesian), *J. Inform. Univ. Pamulang*, vol. 7, no. 1, pp. 115–119, 2022, doi: 10.32493/informatika.v7i1.17315.
[22] P. Lima, N. S. Pereira, E. Gomes, E. Guerra, and P. Meirelles, "Annotation visualizer: a software visualization tool for code annotations [formula presented]," *Softw. Impacts*, vol. 16, no. February, pp. 100491–100493, 2023, doi: 10.1016/j.simpa.2023.100491.
[23] I. Afrianto, A. Heryandi, A. Finadhita, and S. Atin, "User acceptance test for digital signature application in academic domain to support the COVID-19 work from home program," *Int. J. Inf. Syst. Technol. Akreditasi*, vol. 5, no. 3, pp. 270–280, 2021, doi: 10.30645/ijistech.v5i3.132.
[24] A. S. Wagner, M. Milzer, K. Steindorf, S. Kiermeier, M. E. Schmidt, and I. Maatouk, "Cancer-related fatigue: Quality, credibility, usability, and readability of information on websites of health care institutions in Germany," *Patient Educ. Couns.*, vol. 121, no. July 2023, pp. 108135–108141, 2024, doi: 10.1016/j.pec.2024.108135.
[25] S. Al-Saqqa, S. Sawalha, and H. Abdelnabi, "Agile software development: Methodologies and trends," *Int. J. Interact. Mob. Technol.*, vol. 14, no. 11, pp. 246–270, 2020, doi: 10.3991/ijim.v14i11.13269.
[26] R. A. Y. Manurung and A. D. Manuputty, "Designing an information system for the student affairs office at Satya Wacana Christian University in Salatiga," (in Indonesian), *J. SITECH Sist. Inf. dan Teknol.*, vol. 3, no. 1, pp. 9–20, 2020, doi: 10.24176/sitech.v3i1.4703.