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WEBSITE INTERFACE EVALUATION USING GOAL-DIRECTED DESIGN METHOD IN XYZ UNIVERSITY

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Abstract: This research focuses on designing an interface refinement for the XYZ University company profile website that facilitates public information services. This research aims to increase the website's usability value by implementing the Goal-Directed Design (GDD) method in website interface refinement. GDD provides solutions that meet user needs and goals and address business goals. This research begins the interface design process by identifying user behavior patterns and goals to help deepen understanding of the domain, business goals, and technical constraints that will be used as a reference in website interface design refinement. Furthermore, usability testing is conducted using the System Usability Scale (SUS) as the measurement parameter. The usability aspects assessed in this research are effectiveness, efficiency, and satisfaction. Usability testing is conducted on the current website interface design and the website interface refinement design. Tests were conducted on six participants, consisting of three XYZ University students and three members of the general public. The findings show that the website's usability has increased from the previous value of 49.16 to 83.33. Based on the SUS score interpretation, the value that was previously categorized as "poor" increased to "excellent". Therefore, the result of the website interface refinement design using the GDD method has succeeded in increasing the usability value of the website.

Keywords: goal-directed design; system usability scale; university website; user interface

Abstrak: Penelitian ini berfokus pada perancangan perbaikan antarmuka website company profile Universitas XYZ yang memfasilitasi pelayanan informasi publik. Tujuan dari penelitian ini adalah untuk meningkatkan nilai usability website dengan mengimplementasikan metode Goal-Directed Design (GDD) dalam melakukan perancangan perbaikan website. GDD memberikan solusi yang memenuhi kebutuhan dan tujuan pengguna, dan juga menangani tujuan bisnis. Penelitian ini memulai perancangan antarmuka dengan mengidentifikasi pola perilaku dan tujuan pengguna untuk membantu memperdalam pemahaman tentang domain, tujuan bisnis, dan kendala teknis yang akan dijadikan acuan dalam perancangan antarmuka website. Selanjutnya, dilakukan usability testing dengan menggunakan System Usability Scale (SUS) sebagai parameter penilaiannya. Aspek usability yang diukur pada penelitian ini adalah efektivitas, efisiensi, dan kepuasan pengguna. Pengujian dilakukan terhadap kondisi awal website dan rancangan perbaikan antarmuka website. Pengujian dilakukan kepada enam partisipan yang terdiri dari tiga mahasiswa Universitas XYZ dan tiga masyarakat umum. Didapatkan bahwa nilai usability website mengalami peningkatan dari yang sebelumnya bernilai 49,16 menjadi 83,33. Berdasarkan skala penilaian SUS, nilai yang sebelumnya berkategori “poor” meningkat menjadi “excellent”. Dengan demikian, dapat disimpulkan bahwa hasil dari rancangan perbaikan antarmuka website dengan menggunakan metode GDD berhasil meningkatkan nilai usability website.

Kata kunci: goal-directed design; system usability scale; user interface; website universitas

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INTRODUCTION

The website allows users who are connected via the internet to get the information they want. Educational institutions such as colleges and schools use the website to convey information to the public, as a medium for documenting higher education activities, building a positive image, and as a medium for promotion and branding [1]. In the field of education, the website plays a vital role as a means of disseminating information and communication. XYZ University is a private university located in Kediri City, East Java. As a higher education institution, XYZ University has a website that facilitates public information services.

The quality of the existing website will affect the quality of information dissemination services, which impacts the satisfaction value of website users in accessing existing information. There are considerations that can determine whether the quality of a website is good or bad, which are the speed of accessing the website, whether the content displayed is easy to read, and whether the website has a consistent design [2].

The user interface refers to the interaction between the user and the system through techniques for operating the system, inputting data, and using existing content [3]. A good user interface should be able to display the correct information, not too much or too little. A system is always judged by its users based on its user interface design. Users will always appreciate a well-designed user interface for easy learning and use [4]. An effective user interface on university websites can strengthen institutional credibility and branding, increase user satisfaction, and save time and money [5].

The website must also have good usability to provide convenience for its users when interacting with the system. More is needed for a product to be understood and usable. It must also convey the impression of pleasure and beauty. Therefore, the usability value of a product needs to be considered [6]. Usability measures how effectively, efficiently, and satisfactorily a system, product, or service may be used by specific users to accomplish particular goals in certain usage contexts [7]. Based on that, the usability aspects assessed in this research will focus on effectiveness, efficiency, and satisfaction.

Usability problems on the XYZ University website can be found by evaluating usability. Usability evaluation has three main objectives: to assess the scope and achievement of system functionality; to assess the user experience in interacting with the system; and to determine the problems that exist in the system [8]. One of the usability evaluation methods is usability testing, which aims to find issues in the design so they can be fixed to reduce user frustration [9]. System user involvement is required during the design process to design a good user interface. By involving users, the designs created will meet user expectations and be successfully utilized [4].

The website does not have an instruction manual to read beforehand to help guide users in doing tasks. Therefore, a good user interface design must be able to meet the needs that are aligned with the goals expected by the user and make it easier for them to use it. The user interface design method used in this research is Goal-Directed Design (GDD). GDD provides solutions that meet user needs and goals, and also address business goals [10]. This method has advantages, including focusing on understanding user needs and goals, being able

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to understand technical and business aspects, and having a plan to design products that are useful, economical, and technically feasible.

This research begins interface design by identifying user behavior patterns and goals to help deepen understanding of the domain, business goals, and technical constraints that will be used as a reference in website interface design. Then, usability testing will be conducted using the System Usability Scale (SUS) as the assessment parameter. SUS aims to measure the subjective usefulness of a system or product quickly and reliably [11]. SUS has several advantages, namely having a test scale that is easy for respondents to understand, being able to provide reliable results with a small sample size, and being able to effectively distinguish which systems are suitable for use or not [12]. Testing will be conducted on the initial condition of the website and the website interface refinement design. The results of the two evaluations will be compared to determine changes in the website's usability value.

METHOD

This research was carried out in stages and adapted the concept of GDD. GDD is a method for designing user interfaces that focuses on how users use the system. GDD has six stages: research, modeling, requirements, framework, refinement, and support. The flow chart, as a depiction of the stages of research implementation, can be seen in Image 1.

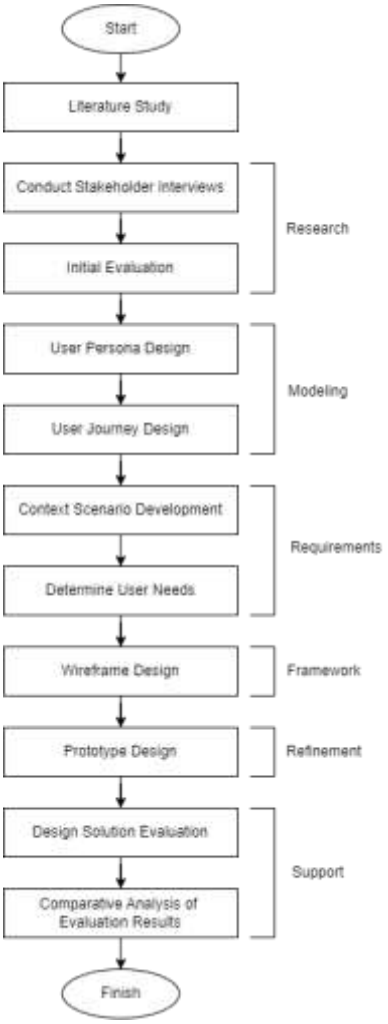

Image 1. Stages of Research

This research begins with conducting a literature study. At this stage, a review of theories and a collection of information from journals, e-books, articles, and previous research related to this research are carried out. This stage aims to broaden knowledge and understanding regarding theories related to the research being conducted. After conducting a literature study, the research stage on GDD continues.

At the research stage, initial research data was collected through observation and interviews with stakeholders. At this stage, an evaluation of the initial condition of the XYZ University website was also conducted using the usability

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testing method and SUS. Testing can be conducted on five participants because that is enough to reveal 80% to 85% of the usability problems that exist in the system [13]. The evaluation in this research was conducted on six participants, which are three XYZ University students and three members of the general public, by conducting tests with tasks that can be seen in Table 1.

Table 1. Evaluation Tasks

No.	Task
1.	Read the latest news from XYZ University
2.	Access the Learning Management System (LMS) feature and view XYZ University journals or scientific work
3.	View tuition fee information and academic guideline information
4.	View new student registration information
5.	See information on supporting facilities and existing study programs

After conducting the evaluation, several qualitative questions were asked of the respondents to support website refinement. This stage is carried out to assess the usability value of the initial condition on the website and get a good understanding of the problems on the website from the user's perspective.

The second stage is modeling, which begins with determining the user's persona from the user's behavioral patterns and goals obtained from interviews with stakeholders. User personas are useful to help make design decisions and as a reminder that real people are using the system being designed [14]. At this stage, a description of user interaction is also carried out, which is described by the user journey. The user journey is important to find out whether the designed system is able to meet the user's needs.

The third stage is requirements, which begins with creating a context scenario that focuses on fulfilling the goals and needs of a particular user persona. Context scenarios can describe the user's workflow on the system used. At this stage, a card sorting technique is also conducted to compile user needs, which can assist in designing a website sitemap.

The fourth stage is the framework, which is the stage of designing a design framework that will determine the functions, components, and layout of the design. This stage will produce a design that is stable and able to provide a structure that will be designed in more detail. The design framework created is in the form of a wireframe that will refer to design guidelines, context scenarios, and predetermined user needs.

The fifth stage is refinement, which is the stage of designing a design solution that can be used as a reference for refinement on the XYZ University website. The design created is a visualization of typography, sizes, icons, and elements from the design framework that was made previously. The design is made in the form of a prototype that can be evaluated before the system is implemented because the prototype represents the initial appearance of the system, which is built faster and easier [15].

The final stage is support, which at this stage evaluates the design solution that have been designed. The evaluation conducted will be the same as that conducted in the initial evaluation. This evaluation aims to determine the value of usability in the design results of user interface refinement on the website. After getting the two evaluation results, the results will then be analyzed and compared

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to find out whether there is a change in the value of usability on the website, whether it provides better results or not.

RESULT AND DISCUSSION

Research Stage

Interviews were conducted with computer center staff, the general public, and XYZ University students. Based on the interviews conducted, it can be said that the users who access the website are the general public and students of XYZ University. The general public often accesses the website for new student registration purposes, while XYZ University students often access the website for the purpose of seeking academic information.

Refinements need to be made on the website because the current user interface is said to be less attractive and to increase the ease and comfort of users when accessing and getting the information they need on the website. Several things were found that made it difficult for users to use the website, including the layout of features that were not suitable and the lack of information displayed on some website pages.

Furthermore, an evaluation of the initial condition on the XYZ University website was conducted using the usability testing method and SUS. Evaluation was conducted on six participants, which are three XYZ University students and three members of the general public, by conducting tests with predetermined tasks. Following are the evaluation results on the initial condition of the XYZ University website:

Table 2. Initial Evaluation Effectiveness Aspect Measurement

Task	Completion					
	P1	P2	P3	P4	P5	P6
1	✓	✓	✓	✓	✓	✓
2	✗	✗	✓	✗	✗	✗
3	✓	✓	✗	✗	✓	✗
4	✓	✓	✓	✗	✓	✓
5	✓	✓	✓	✓	✓	✗

$$Effectiveness = \frac{20}{30} * 100 = 67\% \quad (1)$$

Table 3. Initial Evaluation Efficiency Aspect Measurement

Task	Time (per second)					
	P1	P2	P3	P4	P5	P6
1	24	20	26	19	25	19
2	34	36	40	21	34	39
3	21	29	36	41	27	40
4	20	17	18	45	13	12
5	11	9	12	18	14	26

$$Overall\ relative\ efficiency = \frac{375}{746} * 100\% = 50{,}26\% \quad (2)$$

Table 4. Initial Evaluation Satisfaction Aspect Measurement

Respondent	Calculation Score										Total	Grade
	1	2	3	4	5	6	7	8	9	10		
1	3	1	1	3	1	1	3	3	1	1	17	42,5
2	3	3	3	3	1	2	2	1	1	1	20	50
3	3	1	2	2	1	2	2	1	2	0	16	40
4	4	2	2	3	1	1	3	1	3	1	21	52,5
5	0	4	3	4	2	3	1	3	2	1	23	57,5
6	3	3	3	3	0	1	1	2	3	2	21	52,5
Mean												49,16

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The measurement of the effectiveness aspect value is 67%. The average for calculating the value of effectiveness is 78% [16]. So, it can be said that the XYZ University website has not been effective. After that, the measurement of the efficiency aspect value is 50.26%. The measurement of the efficiency aspect is said to be successful if the evaluation results increase further. Then, the measurement of the satisfaction aspect value is 49.16.

Based on the SUS rating scale, the value on the aspect of satisfaction is in the acceptability range of "not acceptable", has an "F" value on the grade scale, and is at the "poor" adjective rating. After conducting the initial evaluation, several qualitative questions were asked of the participants to support website refinement.

Modeling Stage

From the behavior patterns and user goals obtained from the interviews that have been conducted previously, at this stage, the user persona is determined. In this research, two user personas were used, namely XYZ University students and the general public.

Image 2. Student Persona

Image 3. General Public Persona

The interactions that users have in achieving their goals are described by the user journey. User journeys are created for each user persona, which are for XYZ University students and the general public. The user journey for XYZ University students can be seen in Image 4. And the user journey for the general public can be seen in Image 5.

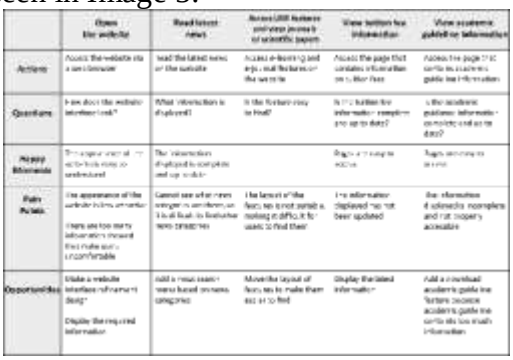

Image 4. Student User Journey

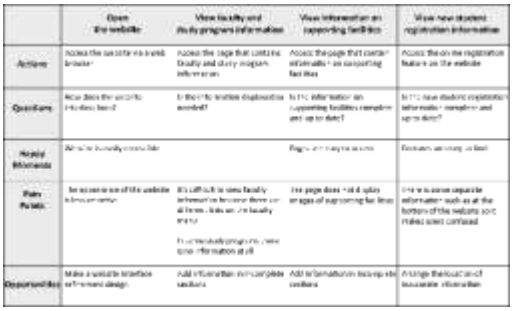

Image 5. General Public User Journey

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Requirements Stage

At this stage, a user workflow description is carried out on the system used with context scenarios. The context scenario for XYZ University students can be seen in Image 6. And the context scenario for the general public can be seen in Image 7.

Context Scenario
Ilham is a student at XYZ University. Ilham accessed the XYZ University website to easily and quickly find the academic information he needed. To help with lectures, Ilham needs to access the e-journal feature to search for journals or scientific papers and the e-learning feature to access the Learning Management System (LMS). Apart from that, Ilham also needed information such as tuition fees and academic guidelines. To get to know XYZ University more deeply, Ilham also wanted to know the latest news and what supporting facilities are available at XYZ University.

Image 6. Student Context Scenario

Context Scenario
Ratna is a parent who has a child who is currently entering college. Ratna accessed the XYZ University website to find information about new student registration to register her child. Before registering, Ratna had a need to find out which faculties and study programs were available at XYZ University. In addition, Ratna also needs information regarding the accreditation of the study program she has chosen. Not only knowing the existing faculties and study programs, Ratna also wanted to know what supporting facilities exist at XYZ University that can help with lecture activities.

Image 7. General Public Context Scenario

What is needed by the user can be arranged by using the card sorting technique. To get a category for each website's content, an open card sort technique was conducted on the XYZ University computer center staff. After obtaining a list of website content categories, card sorting is conducted using the closed card sort technique. Respondents were asked to group content into predetermined website categories. After getting all the data needed from conducting card sorting, the results will be described in the form of a sitemap. The sitemap that has been created can be seen in Image 8.

Framework Stage

At this stage, the wireframe design is carried out, which is the design framework. Several websites were selected to be used as references in wireframe design, namely websites with the top three rankings on the Webometrics website, which are the websites of the University of Indonesia, Gajah Mada University, and Brawijaya University. Because XYZ University is a private university, three private university websites are also added as references: Telkom University, Bina Nusantara University, and Yogyakarta Muhammadiyah University.

Image 8. XYZ University Website Sitemap

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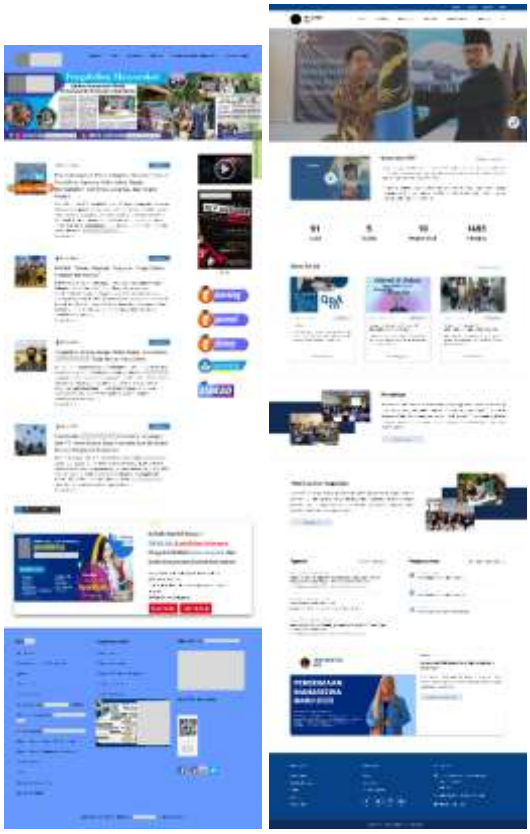
Refinement Stage

The website refinement plan will refer to the Material Design guidelines by Google, the problems faced by users, and the user needs that have been determined in the previous stage. Image 9. is an example of the prototype designed in this research. Image 9. (a) shows the initial home page of the website, and Image 9. (b) shows the home page design solution result as the website refinement design. The complete design results can be accessed at the following link: bit.ly/UIWebsiteXYZ.

There were changes to the website header section on several menus and new menus for features needed by students, such as e-learning, e-journal, e-library, and login. It can also be seen on the home page that there is a change in website color and feature layout. By using blue color #074287 as the primary color for stakeholder needs, the tools provided by Material Design can determine color variations to be used in the design. The layout of the features is determined by input and suggestions from users obtained from the initial evaluation. On the home page, information is added, such as statistical data for lecturers, faculties, study programs, and students. There is also additional information, namely in the education, research, and service sections. New information was also added, namely the agenda and announcements that were previously on the website footer. The university profile video, which was previously small and not highlighted on the right side of the website, was enlarged and moved so that it is more highlighted in the center of the website. There is an improvement in the appearance of the news section; a link was added to view all the news that was not there before.



(a) (b)

Image 9. Home Page: (a) Existing, and (b) Design Solution

Support Stage

After making the website refinement design, an evaluation of the design solution is carried out by conducting tests with the same tasks as the initial evaluation. Following are the results of the evaluation of the XYZ University website design solution:

Table 5. Design Solution Evaluation Effectiveness Aspect Measurement

Task	Completion					
	P1	P2	P3	P4	P5	P6
1	✓	✓	✓	✓	✓	✓
2	✓	✓	✓	✓	✓	✗
3	✓	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	✓	✓
5	✓	✓	✓	✓	✓	✓

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$$Effectiveness = \frac{29}{30} * 100 = 96.67\% \quad (3)$$

Table 6. Design Solution Evaluation Efficiency Aspect Measurement

Task	Time (per second)					
	P1	P2	P3	P4	P5	P6
1	20	13	16	14	20	11
2	18	12	16	13	14	25
3	21	24	29	34	24	35
4	19	13	15	26	12	10
5	10	9	10	15	12	24

$$Overall\ relative\ efficiency = \frac{499}{524} * 100\% = 95.23\% \quad (2)$$

The measurement of the effectiveness aspect value is 96.67%. It can be said that the refinement design of the XYZ University website has been effective because the value is above the average [16]. After that, the measurement of the efficiency aspect value is 95.23%. The measurement of the efficiency aspect is said to be successful because the results of the evaluation of the design solution have increased from the results of the previous evaluation. Then, the measurement of the satisfaction aspect value is 83.33%. Based on the SUS rating scale, the value on the aspect of satisfaction is in the acceptability range of "acceptable", has a "B" value on the grade scale, and is at the adjective rating level of "excellent".

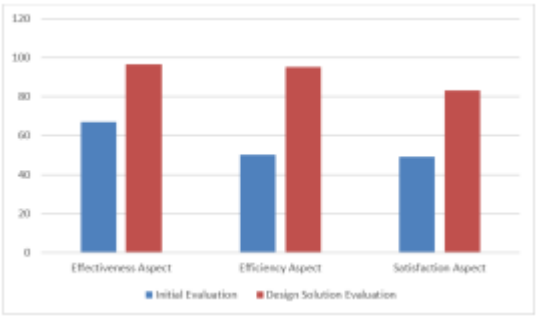

Image 10. Comparison Chart of Evaluation Results

Image 10. shows a graph comparing the results of the two evaluations carried out. The value of the effectiveness aspect increased by 29.67%, which indicates that the results of the website improvement design have become more effective than the initial website design. The value of the efficiency aspect increased by 44.97%, which indicates that the results of the website improvement design have become more efficient than the initial website design. The value of satisfaction on the website improvement design experienced an increase in satisfaction from a rating of "poor" to "excellent". Based on the results of the analysis, it can be said that the results of the website refinement design that were made succeeded in increasing the usability value of the XYZ University website in the aspects of effectiveness, efficiency, and satisfaction.

Table 7. Design Solution Evaluation Satisfaction Aspect Measurement

Respondent	Calculation Score										Total	Grade
	1	2	3	4	5	6	7	8	9	10		
1	3	3	3	4	4	3	4	3	3	3	33	82,5
2	3	3	3	4	4	4	3	3	3	3	33	82,5
3	4	3	4	3	3	4	4	3	3	3	34	85
4	4	3	4	4	4	4	3	4	3	4	37	92,5
5	3	3	4	3	3	4	3	3	3	3	32	80
6	3	3	4	3	3	3	3	3	3	3	31	77,5
Mean												83,33

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CONCLUSION

The purpose of this research is to increase the usability value of the website company profile of XYZ University by implementing the Goal-Directed Design (GDD) method in website refinement. The design of the XYZ University website refinement using the GDD method succeeded in increasing the usability value of the website and meeting user needs. This can be seen from the comparison results of the two evaluations, which show an increase in all aspects of usability measured in this research.

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