



Usability Evaluation and Improvement of iGracias Mobile Application Design Using Usability Testing Method with User Centered Design Approach

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Abstract

iGracias Mobile is an academic information system application that aims to provide lecture information to students at the ITT Purwokerto. Based on the results of the questionnaire involving ITTP students, the problem is display still needs to be more optimal in presenting lecture information. Based on the evaluation of the current design using the System Usability Scale, the contemporary design has a score of 58, which is included in grade D with an adjective rating of poor, so it is necessary to improve the design. The Usability Testing method uses to evaluate and develop the iGracias Mobile application design with a User-Centered Design approach. The results obtained are a new design of the iGracias Mobile application based on the respondents' suggestions and the steps in the UCD method. This research found that the new design usability value has increased from 58 to 80.8, which is included in grade A with an adjective rating of excellent.

Keywords: Mobile Applications, Academic Information Systems, UCD

Abstrak

iGracias Mobile merupakan aplikasi sistem informasi akademik yang bertujuan untuk memberikan informasi perkuliahan kepada mahasiswa di ITT Purwokerto. Berdasarkan hasil kuesioner yang melibatkan mahasiswa ITT, permasalahannya adalah tampilan masih perlu lebih optimal dalam menyajikan informasi perkuliahan. Berdasarkan evaluasi desain saat ini dengan menggunakan System Usability Scale, desain kontemporer memiliki nilai 58 yang termasuk dalam grade D dengan nilai kata sifat kurang baik, sehingga perlu dilakukan perbaikan desain. Metode Usability Testing digunakan untuk mengevaluasi dan mengembangkan desain aplikasi iGracias Mobile dengan pendekatan User-Centered Design. Hasil yang diperoleh adalah desain baru aplikasi iGracias Mobile berdasarkan saran dari responden dan langkah-langkah dalam metode UCD. Penelitian ini menemukan bahwa nilai usability desain baru mengalami peningkatan dari 58 menjadi 80,8 yang termasuk dalam grade A dengan nilai kata sifat sangat baik.

Kata-kata kunci: Aplikasi Gawai, Sistem Informasi Akademik, UCD



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1. Introduction

An academic Information System is designed to process educational data by applying computer technology [1]. One institution that implements educational information systems is the Telkom Purwokerto Institute of Technology. The theoretical information system service at the Telkom Institute of Technology is iGracias Mobile. iGracias Mobile is a mobile-based academic information system that makes it easier for IT Telkom Purwokerto academics to carry out teaching and learning activities in the campus environment. Starting from attendance, getting the latest academic information, see the location of the lecture hall, course schedule information, etc [2]. The mobile academic information system is a system that runs on the Android platform that can display educational details [3].

Mobile applications for learning media usually have a complex interface with various menus, so mobile applications need to be designed and developed to be attractive and user-friendly so that they can be accepted by users [4]. iGracias Mobile is an application based on the iGracias website, used to display information about attendance, class schedules, and student grades. In the iGracias Mobile application, there is still a user interface that could be more attractive and user-friendly. Some features and functions of the web version of iGracias still need to be implemented in the Mobile version. The data was obtained from a review of the iGracias ITTP application on the Google Play Store. Problem-solving is necessary to make improvements and developments in the display design of the iGracias Mobile application. The data is also supported by the results of the calculation of the questionnaire that the author has collected, which obtained a usability scale system score with an average value of 58, which the number falls into category D, so improvements are still needed.

In a study that describes several stages of how to design a chatbot using the UCD method, it is said that the UCD approach is suitable for analyzing product problems directly related to users. And choosing the correct interface can improve the user experience of chatbots that use the interface [5].

In developing a mobile application using Usability Testing by Doni Abdul Fatah, the System Usability Scale score obtained an average value of 60, which indicates that Acceptability Ranges are Marginal Low. The grade Scale is in category D, for Adjective Ratings are in OK grade. These results found that the proposed improvement design for the mobile application was based on the input obtained from the respondents. The second test was carried out using the SUS Calculation method, getting an average score of 80.25 [6].

An interactive and attractive design is needed to make it easier for users to use the iGracias Mobile application. User-Centered Design is a development process based on user experience. Therefore, it is not surprising that the user will be the centre, meaning every process will involve the user's perspective. Interface design based on User-Centered Design will ensure that the application design will meet user needs. Applications with a positive UX will generate user interest and make it easier for users to use the application [7]. This study aims to evaluate and improve the design of the iGracias mobile application to determine the ease of use of the mobile application.

2. Method

This section describes the stages of research in evaluating the usability of the iGracias Mobile application. **Figure 1** is a research flow chart consisting of several steps.

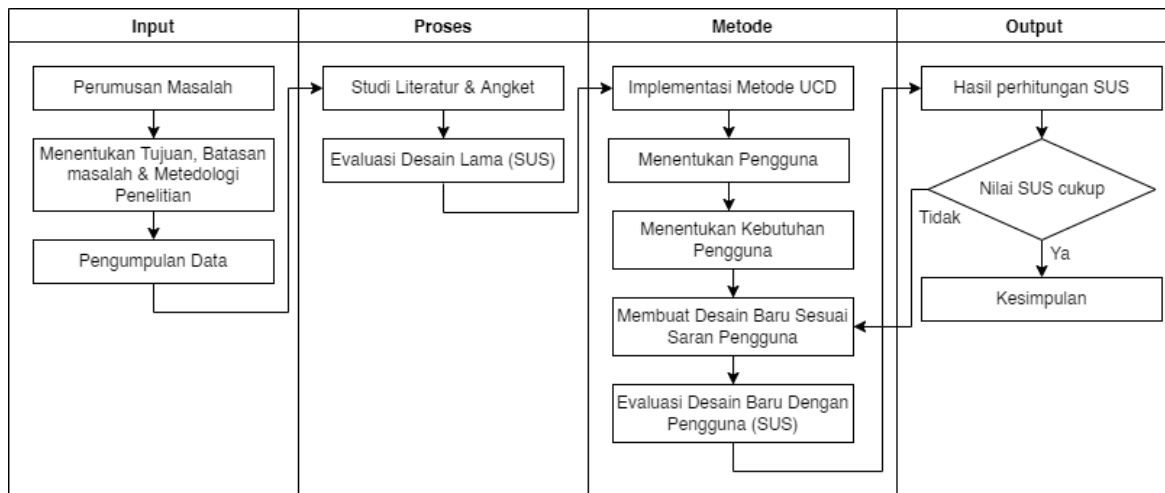


Figure 1. Flow Diagram

a. Problem statement

At this stage, it begins with observing and identifying the problems in the iGracias application. From the results of these observations and identifications, there is still a need for improvement in the current iGracias application design. So, the authors make improvements to the creation of the iGracias application based on the existing iGracias application to assist users in using the iGracias Mobile application.

b. Objectives, Limitations and Methods

At this stage, the purpose of the research is determined to solve the problems that the user has described. The limitation of the problem is determined according to the issue raised by

the author. The author also analyses and collects data on existing problems to develop a display design using the User-Centered Design method.

c. Data Collection

At the Data Collection stage, researchers collect data by studying various information about research problems through journal articles and other research. The questionnaire method is used to conduct evaluations by distributing questionnaires.

d. Implementation of the User-Centered Design method

At this stage, the researcher implements the steps in the UCD method, which starts with determining the user, determining the user's needs, creating a new design according to the user's suggestions, and evaluating the plan that has been made [8].

e. System Usability Scale Testing

The researcher implemented the SUS questionnaire as a usability measurement tool at this stage. Table 1 is indicators for the SUS questionnaire [6].

Table 1. SUS Indicator

No	SUS Indicator
1	Saya berpikir akan menggunakan aplikasi iGracias ini lagi
2	Saya merasa aplikasi iGracias ini rumit untuk digunakan
3	Saya merasa aplikasi iGracias ini mudah digunakan
4	Saya membutuhkan bantuan dari orang lain atau teknisi dalam menggunakan aplikasi iGracias ini
5	Saya merasa fitur tampilan aplikasi iGracias ini berjalan dengan semestinya
6	Saya merasa ada banyak hal yang tidak konsisten (tidak serasi pada aplikasi iGracias ini)
7	Saya merasa orang lain akan memahami cara menggunakan aplikasi iGracias ini dengan cepat
8	Saya merasa aplikasi iGracias ini membingungkan
9	Saya merasa tidak ada hambatan dalam menggunakan aplikasi iGracias ini
10	Saya perlu membiasakan diri terlebih dahulu sebelum menggunakan aplikasi iGracias ini

The SUS questionnaire uses a 5-point Likert scale for ratings ranging from “strongly disagree”, “disagree”, “undecided”, “agree”, and “strongly agree” [9]. In the SUS score, each answer to the odd question will be deducted by 1, and for each exact answer, the final score is obtained from a score of 5 minus the score for precise answers. Then the sum of the scores will be multiplied by 2.5 [10].

3. Results and Discussion

The results of the tests that have been carried out using the SUS questionnaire to 26 respondents of class S1IF-06-D students of the Informatics Engineering study program class 2018 Telkom Institute of Technology Purwokerto. Respondents were also asked to provide suggestions for developing iGracias Mobile design improvements. **Figure 2** is the old design of the iGracias application (Ver 2.0.1) and tes results is preented on **Table 2**.



Figure 2. iGracias Ver 2.0.1

Table 1. Test Results SUS iGracias Prototype Version

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
R1	4	4	4	3	4	4	3	3	2	2	52.5
R2	3	2	4	1	1	5	4	2	4	4	55
R3	3	2	4	2	2	4	4	3	3	4	52.5
R4	5	2	4	2	3	4	4	2	4	2	70
R5	5	4	3	4	2	4	3	4	2	4	37.5
R6	3	2	4	1	1	1	4	4	4	4	60
R7	4	2	4	2	3	3	4	2	4	2	70
R8	5	3	5	1	2	3	4	3	2	4	60
R9	3	2	4	2	3	4	4	3	4	3	60
R10	4	2	5	2	4	4	3	3	4	2	67.5
R11	4	2	5	1	3	2	3	3	5	2	75
R12	4	2	4	1	1	3	4	2	3	4	60
R13	5	3	4	1	1	5	5	1	3	1	67.5
R14	4	4	2	5	3	4	4	3	2	5	35
R15	3	2	4	2	1	3	4	4	2	4	47.5
R16	3	3	4	2	4	4	3	4	3	4	50
R17	4	3	3	3	2	5	3	3	3	4	42.5
R18	4	3	4	3	2	3	3	3	3	4	50
R19	5	2	4	2	5	1	4	2	4	4	77.5
R20	3	3	3	2	2	5	4	2	4	4	50
R21	5	2	4	1	3	3	4	2	3	2	72.5
R22	3	2	4	2	1	5	4	2	4	4	52.5
R23	5	1	4	2	3	3	4	2	3	1	75
R24	3	2	4	1	1	5	3	2	4	3	55
R25	2	2	4	1	2	5	4	3	4	5	50
R26	3	3	3	2	3	3	3	2	3	2	67.5
Skor Rata-rata (Hasil Akhir)											58,1

Table 2 shows that the average SUS in the current iGracias Mobile application design (ver 2.0.1) is 58.1. The score is in the interval 51-67, which means it has a grade of D with an adjective rating of poor.

Based on the results of questionnaires and reviews on google playstore, the next step is to design a new user interface for the iGracias Mobile application based on the current iGracias Mobile application using the User-Centered Design method. The new application design is only a prototype or design. The following is the implementation of the proposed improvement of the iGracias Mobile application, which can be seen in **Figure 3**.

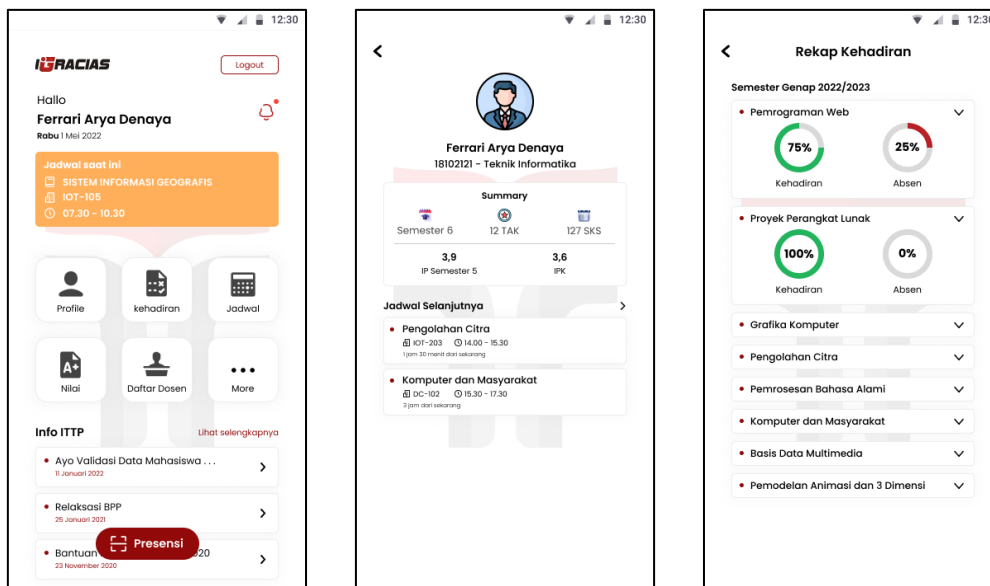


Figure 3. New Design Igracias

From the design that has been made using Figma, it will be re-tested using the SUS questionnaire to 26 respondents of class S1IF-06-D students of the 2018 Informatics study program, Institut Teknologi Telkom Purwokerto.

Table 2. New Design SUS Questionnaire Results

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Score
R1	5	2	4	2	5	2	4	1	4	2	82.5
R2	3	1	5	1	5	1	5	1	5	5	85
R3	5	1	5	2	4	2	5	2	4	3	82.5
R4	4	2	5	2	4	2	5	2	4	2	80
R5	5	2	5	3	5	2	4	2	4	3	77.5
R6	4	3	3	3	4	3	4	3	4	3	60
R7	4	2	4	2	3	3	4	2	4	2	70
R8	4	2	5	2	4	2	4	3	2	3	67.5
R9	5	1	5	1	5	1	5	1	1	1	90
R10	4	2	5	2	5	3	3	2	4	4	70
R11	5	1	5	1	4	1	4	1	5	2	92.5
R12	5	1	5	1	5	1	5	1	5	5	90
R13	5	3	5	1	3	5	3	3	4	1	67.5
R14	5	2	5	2	5	2	5	1	5	2	90
R15	4	2	4	2	4	3	4	2	4	4	67.5
R16	4	2	4	2	4	2	5	2	4	2	77.5
R17	4	2	4	1	5	3	5	1	5	2	85
R18	5	1	4	1	5	1	4	1	5	2	92.5
R19	5	1	5	3	5	2	5	2	5	4	82.5
R20	4	1	5	2	5	1	5	1	4	4	85
R21	4	1	5	1	4	2	5	1	4	2	87.5
R22	3	1	4	2	5	1	5	1	5	4	82.5
R23	5	1	4	2	5	3	5	2	4	3	80
R24	4	1	5	2	5	1	5	1	5	5	85
R25	3	1	5	2	5	1	5	1	5	1	92.5
R26	5	2	5	2	4	2	4	1	4	3	80
Skor Rata-rata (Hasil Akhir)											80,8

Based on **Table 3**, it is known that the average SUS in the new design of the iGracias Mobile application is 80.8. The score is in the interval > 80.3 , which means it has an A grade with an excellent adjective rating. Following the results of the SUS questionnaire in Table 3, the new design of the iGracias Mobile application can be well received and used efficiently by users.

4. Conclusion

Based on the research that has been done, the iGracias Mobile application has been redesigned based on proposed improvements from 26 respondents. Based on the results of data analysis using SUS on the iGracias Mobile application, a SUS score of 58.1 is currently obtained, which is included in grade D with an adjective rating of poor. In the new iGracias Mobile application, the SUS score increased by 22.7, which increased to 80.8, which is included in grade

A with an adjective rating of excellent. As for suggestions for further research so that the resulting iGracias application is not only limited to a prototype and is expected to be able to develop this research with calculation methods other than using SUS to see comparisons and optimize the results of further study.

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