Development of User interface Design For integrated Academic information Systems Sumedang Stmik Based on Perceptions of Easy and Usefulness

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***Abstract*— In accordance with many accesses from various devices found to contain SIAP displays that are not responsive when accessed on a mobile display. Developing a user interface on the Sumedang STMIK academic information system needs to be done to improve user convenience. Technology Acceptance Model (TAM) is one method that can be used to measure user perceptions of the ease and benefits of system utilization. The first stage of the successful implementation of an academic information system is the user's willingness to receive various facilities from SIAP, whether it is useful and provides convenience for the user of the function and appearance. Overall, the variable uses a good academic information system by students, but on some indicators it has a small total score below 300. The development of the academic information system website user interface that facilitates the same experience on various screens can be used to understand the concept of material design so can search information looking for from various types of devices.**

***Keywords*— Academic Information Systems, User Interfaces, Material Design, Ease of Use and Usefulness**

I. INTRODUCTION (*HEADING 1*)

The development of technology and information has an impact on educational institutions to develop better information services. In the information age, an organization's business activities cannot be separated from the role of information systems (IS), SI is a mainstay tool to win competition in the education service business, assist universities in realizing and improving service quality to consumers, as a trigger for universities to be able to create cheap, quality, and fast educational processes and activities [1]. Academic information systems are very common in every college. In the ease of accessing a system, it cannot be separated from the user interface [2]. Academic information systems have a user interface or interface that serves to connect users with the information needed from the system itself.designs interface according to the functions and needs of their users [3].

The College of Informatics and Computer Management (STMIK) Sumedang has an academic information system called the Integrated Academic Information System (SIAP). One application of information technology that aims to support student activities in the needs of a service and access to information. Along with many accesses from various devices, obstacles were found in the form of an unresponsive when accessed on a mobile. Based on user experience, the problem encountered today is an inconsistent system display where the layout of several menus has different sizes so that it confuses users. In addition, the system does not contain the Grade Point Average (GPA) ranking feature of students for each batch, where students must be able to see their GPA position transparently based on their generation.

This relates to the user interface which involves the perception of the ease and benefits felt by the user when using the system. In the development of the user interface is designed to create user comfort and convenience. Evaluation of the academic information system needs to be done to measure user perceptions of the ease and benefits of the system as well as development recommendations. One method that can be used is the Technology Acceptance Model (TAM) introduced by Davis in 1989, users will be more likely to use the system if the system is easy to use and useful for users [4]. The first stage of the successful implementation of an academic information system is the willingness of users to accept various facilities from SIAP, whether they are useful and provide convenience for users in terms of function and appearance.

Based on the problems above, this study discusses the development of the user interface by adding a student GPA rating feature based on the perceived usefulness and ease of evaluation of the Technology Acceptance Model (TAM) on the academic information system of STMIK Sumedang. The results of this study are expected to improve the quality of the display and user experience on academic information systems, so that the system can be used comfortably, safely and easily.

II. METHOD

The initial step taken in this research is problem identification to determine problems related to the implementation of the Integrated Academic Information System (SIAP) at STMIK Sumedang. The problem that will be raised in this study is how to develop a user interface feature for student GPA ratings on the STMIK Sumedang academic information system based on the perception of the

ease and usefulness of the TAM method. Analysis and identification of the appearance of the academic information system was carried out as research material related to the evaluation stages of the old design. Next, collect data to identify user needs and desires in the form of a questionnaire that refers to the perception of the ease and usefulness of the TAM method.

The population is 743 students as active users of the integrated academic information system at STMIK Sumedang based on three study programs, namely Informatics Engineering (IT), Information Systems (IS) and Information Management (MI). The type of sampling used in this study is probability sampling with random sampling technique, which is a random sampling technique so that all members of the population have the same opportunity to be sampled. The number of samples taken is based on a significance level of 10% with a total of 88 students in this study.

Questionnaire data processing was carried out by several tests, including validity tests, reliability tests and descriptive analysis. Validity test is used to determine the level of validity of each question item in the questionnaire or questionnaire. The validity test was carried out on all questions in the instrument, namely by correlating the score of each item with the total score through the Pearson Correlation (PC) technique. The PC value found will be compared with the r-table, where if the PC value is greater than r-table (Pc > r-table) then the question item is considered valid [5]. Next is the reliability test to show the consistency and stability of a measurement scale using the Croncbach alpha in the analysis results [5]. The formula for Alpha (Cronbach's) method is:

$$r_i = \frac{k}{(k-1)}\left\{1 - \sum \frac{s_i^2}{s_t^2}\right\} \qquad (1)$$

Description:

k = mean square between subjects

$\sum s_i^2$ = mean square of error

s_t^2 = total variance

Reliability testing is carried out using SPSS 21. Provisions for reliability decision making [6] are as follows:

1) If the Cronbach Alpha value > 0.80, then the item is declared reliable.
2) If the Cronbach Alpha value < 0.80, then the item is declared unreliable.

Descriptive analysis was conducted to explain the overall answers of the respondents. In this case, using answers on a scale of 1 – 5, starting from the number (1) with an answer of "strongly disagree", (2) with an answer of "disagree", (3) with an answer of "don't know", (4) with an answer "agree" and (5) with the answer "strongly agree".steps user interface. Repair and development of the user interface is carried out based on the following stages:

1) Mockup

This stage conveys aspects of visual design, including images, colors, and typography. The mockup provides a detailed overview before the product is created. The mockup is made in black and white and emphasizes the content more.

2) Prototype

This stage is a simulation of how the user interacts with user interface , improving effective communication and demonstrating how the web works. The prototype is clickable and capable of responding to the user. In building a prototype will be used tools to design the appearance of the website, namely Adobe XD.

III. Result and Discussion

3.1 Device SIAP

In figure 3.1 presents respondent data based on the user device used to access the academic information system.

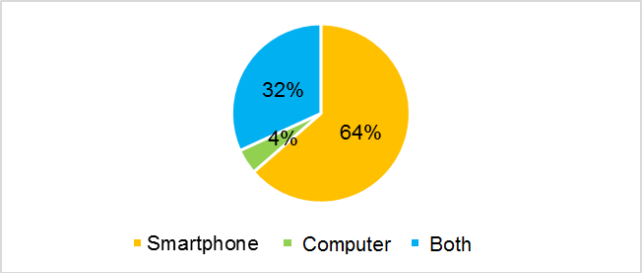


Figure 3.1 SIAP Usage Device

Based on a total of 88 respondents, the results showed that most of the respondents, namely 64% of users access SIAP via smartphone devices or the mobile version. The problems that respondents found when using SIAP are described in the following picture:

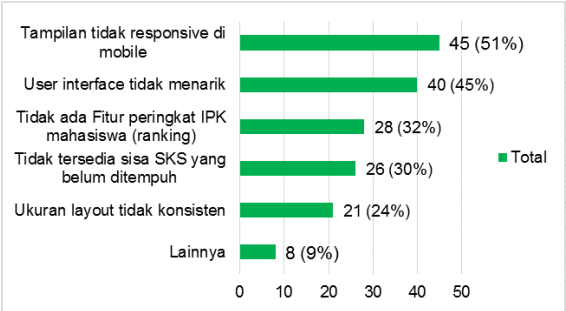


Figure 3.2 SIAP User Problems

Unresponsive layout or display on the mobile version is a problem that many users complain about, namely 88 respondents or 51% of users.

3.2 Validity and Reliability Test

3.2.1 Perceived Ease of Use

Table 3.1 Perceived Ease of Use Validity Test Results

No	Indicator Variable	Total *(Pearson Correlation)*	*r-table* (df=86,α= 10%)	Description
1	The use of SIAP is easy to learn	0.768	0.178	Valid
2	The menu function on SIAP is easy to understand and understand	0.850		Valid
3	Information on SIAP uses language that is easy to understand so that you are proficient	0.809		Valid
4	The menu on SIAP is well organized so that the available features are easy to use	0.806		Valid
5	The SIAP website on the mobile version is easy to control	0.773		Valid
6	SIAP has a display layout, display and colors that are easy to recognize and see	0.787		Valid

Table 3.2 Perceived Ease of Use Reliability Test Results

Reliability Statistics

Cronbach's Alpha	N of Items
.882	6

The Cronbach's Alpha value obtained is quite large (> 0.80), so it can be concluded that all question indicators are valid and consistent in measuring the perceived ease of use variable.

3.2.2 Usefulness

Table 3.3 Usefulness Validity Test Results

No	Indicator Variable	Total *(Pearson Correlation)*	*r-table* (df=82,α= 10%)	Descprition
1	Using SIAP helps to quickly access lecture information	0.887	0.178	Valid
2	Using SIAP can improve KRS filling performance and class selection	0.787		Valid
3	Using SIAP helps increase productivity in viewing course grades	0.892		Valid
4	Using SIAP increases the effectiveness of viewing grades, lecture schedules and classes	0.879		Valid
5	Using SIAP makes it easier to view academic information	0.830		Valid
6	The use of SIAP is very useful	0.849		Valid

Table 3.4 Usefulness Reliability Test Results

Reliability Statistics

Cronbach's Alpha	N of Items
.924	6

The Cronbach's Alpha value obtained is quite large (> 0.80) so it can be concluded that all question indicators are valid and consistent in measuring perceived usefulness variables.

3.2.3 Result of Descriptive Analysis Assessment

Table 3.5 Result of Descriptive Analysis Assessment

No	Assessment Aspects	Total Score Evaluation Student	Rating Range	Results
1	*Ease of Use*	1900	528 – 950.4 : Very Not Good 950.4 – 1372.8: Not Good 1372.8 – 1795.2 : Enough 1795.2 – 2217.6 : Good 2217.6 – 2640 : Very Good	Good
2	*Usefulness*	2033	528 – 950.4 : Very Not Good 950.4 – 1372.8: Not Good 1372.8 – 1795.2 : Enough 1795.2 – 2217.6 : Good 2217.6 – 2640 : Very Good	Good

Overall, the academic information system assessment indicators are considered good by students, but some indicators have a small total score, which is below 300, so they need to be developed.

3.3 Evaluation Results

Table 3.6 Recommendation

No	Question	Total (order of smallest score)	Recommendations
Ease of Use			
1	SIAP website on mobile version is easy to control	281	Needs to be developed
2	SIAP has a display layout, display and colors that are easy to recognize and see	292	Needs to be developed
3	The menu in SIAP is well structured so that the available features are easy to use	324	Maintained and still developing
4	The menu function on SIAP is easy to understand and understand	325	Maintained and still developing
5	Information on SIAP uses language that is easy to understand so that you are proficient	327	Maintained and still developing
6	The use of SIAP is easy to learn	336	Maintained and still developing
Usefulness			
7	Using SIAP can improve KRS filling performance and class selection	314	Maintained and still developing
8	Using SIAP is easier to see academic information	335	Maintained and still developing
9	Using SIAP helps to quickly access lecture information	338	Maintained and still developing
10	Using SIAP increases the effectiveness of viewing grades,	339	Maintained and still developing

	lecture schedules and classes		
11	Using SIAP helps increase productivity in viewing course grades	346	Maintained and still developing
12	The use of SIAP is very useful	346	Maintained and still developing

The results of the evaluation of perceived ease and usefulness of the TAM model illustrate user acceptance that the current academic information system user interface does not have a harmonious and responsive layout on the mobile screen so it is difficult to control. One feature that is not yet available in SIAP is the student GPA ranking feature to see the position of student achievement.

User interface development needs to be done as a recommendation to the system developer to improve the user interface of the academic information system by paying attention to the ease and benefit of the user. The creative concept applied is to use visual design in accordance with current website trends, namely material design. The use of fonts and the application of color in the development of academic information systems are as follows:



Figure 3.3 Raleway and Raleway Bold fonts



Figure 3.4 Color Palette

The results of developing the user interface on the SIAP website are as follows:

1) Mockup

This stage conveys visual design aspects to provide a detailed description in black and white and emphasizes the content of the content.

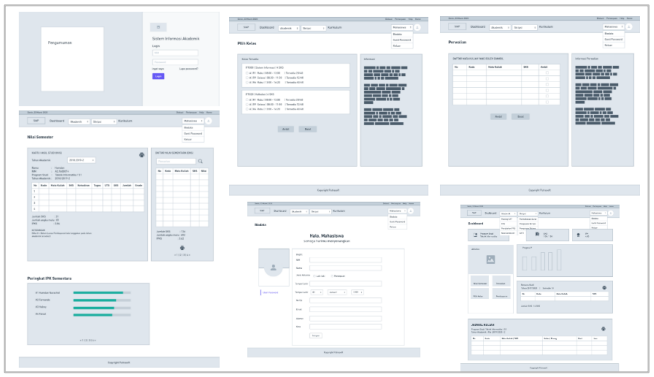


Figure 3.5 SIAP Website Design Mockup

2) Design Prototype

This stage is a simulation of how the user interacts with the real user interface. In building the prototype, special tools are used to design the appearance of the system, namely Adobe XD.

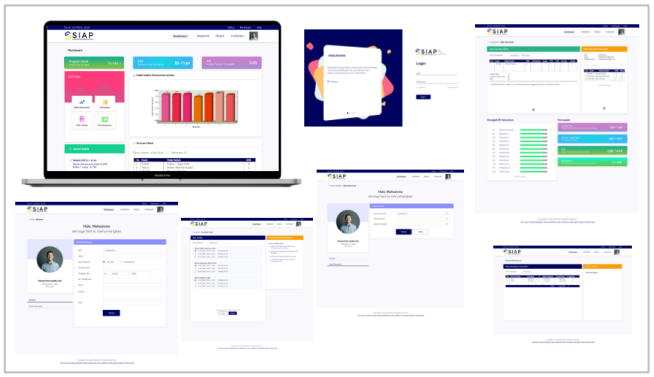


Figure 3.6 Prototype of Website Design Results SIAP Desktop

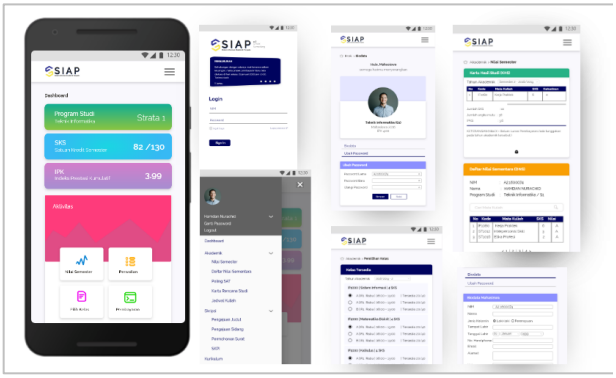


Figure 3.7 Prototype of SIAP Mobile Website Design Results

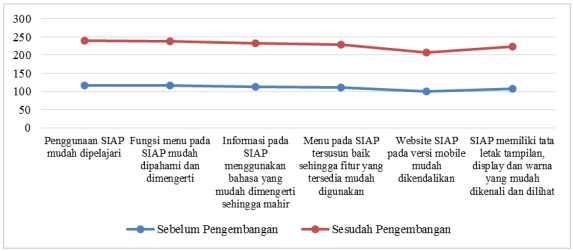


Figure 3.8 Test Results Diagram

In the table above, it can be seen that the user's convenience to the old user interface compared to the new user interface of academic information systems after development. There is an increase in every aspect tested to respondents, indicating that the design and redevelopment of the user interface can increase the ease and usefulness when using the academic information system.

IV. Conclusion

Evaluation of academic information systems with reference to the ease and usefulness of the Technology Acceptance Model (TAM) can be used as a guide for system improvement. The overall academic information system assessment indicator is considered good by students, the ease of use factor has a total rating of 1900 which is smaller than the usefulness which is a total of 2033. Based on the research and design activities that have been carried out, it can be concluded that to design the user interface academic information system by adding a student GPA ranking feature must start from the function and purpose. Presentation of information to users through informative media must be accompanied by visuals that emphasize the quality and readability of the content (readability). The material design concept in the development of the user interface design feature of the student GPA rating is able to provide the same experience on various screen sizes and make it easier for users to find information from various types of devices.

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