DESIGN UI/UX E-LEARNING ENGLISH MOBILE USING USER CENTERED DESIGN (UCD) METHOD

Dwi Rizky Alamsyah[1]*, Mochzen Gito Resmi[2])*, Irsan jaelani[3]
[1,2,3]STT Wastukancana, Indonesia
[1]dwirizky41@stt-wastukancana.ac.id, [2]mochzen@stt-wastukancana.ac.id ,
[3] irsan@stt-wastukancana.ac.id

Abstract : E-learning English Mobile application design is a Mobile-based application design that is needed by one of the schools for future learning purposes. With this application design, the school has an overview of learning applications that will facilitate students and teachers in learning and teaching activities. In this application design research, there are several methods that are widely used by previous researchers. One of the methods used in this research is the User Centered Design (UCD) method which is a new method in system development. UCD is a language that is widely applied in describing designs. The concept of UCD is the user as the center of the system development process, and the goals, the system environment are all based on the user experience. The results of this study produced a learning application prototype, namely E-learning English Mobile. After testing using the System Usability Scale (SUS). The average value obtained is 78. It can be concluded that the design of the E-Learning English Mobile application is acceptable because it meets the Acceptable category.

Keywords: E-Learning, Design, User Centered Design, Mobile, System Usability Scale.

INTRODUCTION

English language skills are essential in the age of globalization. English is an advantage when communicating with other countries, because English is an international language. English is the default language in many areas of our lives. Even today, English is used as a language of instruction and school language in many classes or schools. State Senior High School (SMAN) 2 Purwakarta is one of the colleges in Purwakarta district. This school is one of the most popular public secondary schools in the Purwakarta region due to the quality of education..

Every year this school has students who excel or excel in every field whether it is academic or non-academic and always win every competition and creative and innovative students who make this school one of the most popular schools. in the Purwakarta area. The development of multimedia technology in the learning of the English language makes the class more active than the teacher-centered model. Interactive multimedia meets the learning demands of the digital age. Some of the factors that affect student learning are student interest and student motivation. Based on the researcher's observation of the level of smartphone usage with the English teacher in this school, the results show that about 95 percent of the students have already developed smartphones to maximize learning. Strong motivation is one of the most important things if you want to learn a foreign language, namely English. Based on the information obtained after observations and interviews. This school needs a mobile English app design to help the learning process. (Susanti et al., 2020)

Several methods are often used in application design, one of which is the widely used UCD (User Centered Design), which is a new method in system development. UCD is a widely used language for describing models. The UCD concept is at the heart of the user system development process and the

*name of corresponding author

goals, system environment are all based on the user experience. UCD is an interactive process where the planning and evaluation stages are carried out from the beginning of the project to the implementation phase. UCD follows established methods and techniques for analyzing and evaluating hardware and software interfaces. In UCD, the most important thing is user participation in the whole process (Iqbal et al., 2020) .One of the previous scientific works that has an attachment to this research is a journal (Utomo, 2019) This article is about the creation of educational applications using the UCD method to help prospective Hajj or Umrah pilgrims to know the obligatory and Sunnah requirements during the practice of Hajj or Umrah.

After the application design is completed, a test is conducted to determine the usability value of the application, namely the System Usability Scale (SUS) test, which is a questionnaire that measures the perceived usefulness of the software after the software is installed. . built and developed, the software is tested using the SUS method. Regarding the measurement of this method, which contains 10 questions, choosing on a scale of 1-5. In this case, a value of 1 (one) means strongly disagree and also a value of 5 means strongly agree. After collecting the data from the respondents, the data is calculated (Irawan et al., 2022).

One of the previous scientific works that has an attachment to this research is a journal (Moch Taufik, 2022) titled This article discusses the prototyping of the Sukatani Mobile bumdes application with System Usability Scale (SUS) Testing, which aims to make services easier to use for residents and easier to sell for residents by making original products easier to find. village.

METHOD

UCD (User Centered Design) is a new method for system development. UCD is a widely used language for describing design (Huda & Priyatna, 2019). The concept of UCD is that the user is at the center of the system development process, and the goals and environment of the system are completely based on the experience of the user. UCD is an interactive process where the planning and evaluation phases are carried out from the beginning of the project to the implementation phase.(Hartawan, Muhammad syarif et al., 2022). UCD follows established methods and techniques for analyzing and evaluating hardware and software interfaces. In UCD, the most important thing is user participation in the whole process. Users not only contribute to the design concepts, but must also be intensively involved in all aspects, including the implementation phase of the system, that affect their operations. Users are also involved in initial testing and evaluation and iterative design. However, there are several variations of the approach depending on the complexity of the system being built (Solichuddin & Wahyuni, 2021).These processes can be seen in Figure 1.
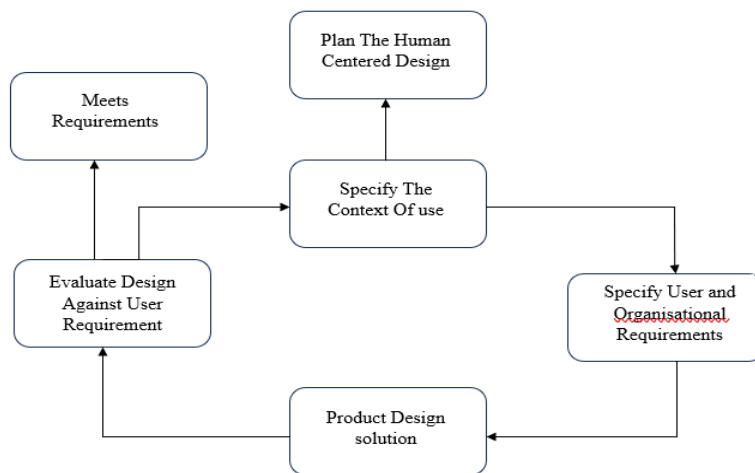

Figure 1. User Centered Design Processes
(Sandi et al., n.d.)

The explanation of each stage of the UCD software development method is as follows:
1. Plan the Human Centered Design

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In this step, a survey of the theoretical background literature supporting the study is conducted to gather research needs. Literature research is conducted by reading and understanding reference books, journals and other data processing tools that support and reinforce existing theories to ensure that UCD designs meet user expectations.

2. Specify the Context of Use

In this step, the needs analysis phase is carried out, where it is determined which users can be used as respondents for the analysis.

3. Specify User & Organization Requirements

In this phase, identifying the details of the user needs is done to gather information about the system design needs.

4. Product Design Solutions

After passing through several previous stages, in this stage, the system design is done, making the proposed system in the form of a flowchart and user interface design..

5. Evaluate Design Against User Requirements

The evaluation is done by involving the users from the initial process to the final process. The purpose of the evaluation is to verify whether the designed and built application complies with the preferences and needs of the User.

RESULT

The results of this research will be explained in stages according to the phases in the UCD process. Here is the explanation:

Plan the Human Centered Design

The main theories used in this study are Garrett's UCD theory and previous studies on the application of UCD in the development of mobile phone systems (Priyatna, 2019).

Specify The Context Of Use

The first process of this UCD method is to determine the user context (understanding the user context). In this stage, identification of users is done through observation, interviews and distribution of questionnaires. This identification is done to determine who are the users who use the system, and what are the needs of the users.

    a. Observasi

The purpose of the survey is to obtain student data and user needs. Observations or observations were made by the author in the school in February-April 2023. The first observations were made by interviewing the teacher about the needs of users in the design of online learning applications.

    b. Questionnaire

From the results of the survey, it was possible to identify problems related to the use of e-learning application prototypes and to know what users need to facilitate the use of e-learning application prototypes.

Specify User and Organization Requirement

In this phase, six respondents, one English teacher and five students of SMAN 2 Purwakarta were interviewed. In addition to interviews, direct observation of application design needs was conducted at SMAN 2 Purwakarta.

    a. Empathy Map

Based on the results of the interview, an empathy map was created that mapped the responses of several people. This empathy map is designed to identify user needs. Below is an empathy map based on the interview results.
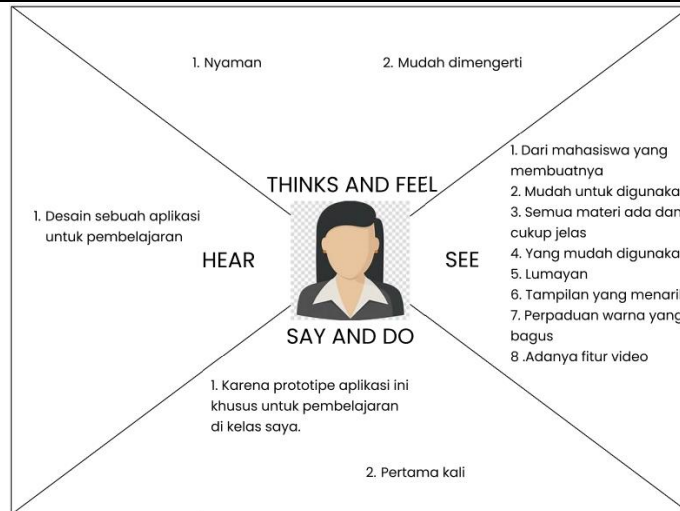
Figure 4 Empathy Map

b.   User Persona

A user persona is used to describe the target users of a prototype application, including profiles, problems, desires and conditions of use, which will later be used as a standard for the needs of users using the prototype application. The information collected to determine the identity of the user is obtained through previously conducted interviews.

Figure 5 User Persona

Product Design Solution

After defining the needs of the users, the next step is to create a design that meets the needs of the users. Based on the solution design made in previous stages from wireframe fabrication, user interface design to prototyping.

a.   User Flow

User Flow is used to explain the flow of using a system to complete a job.
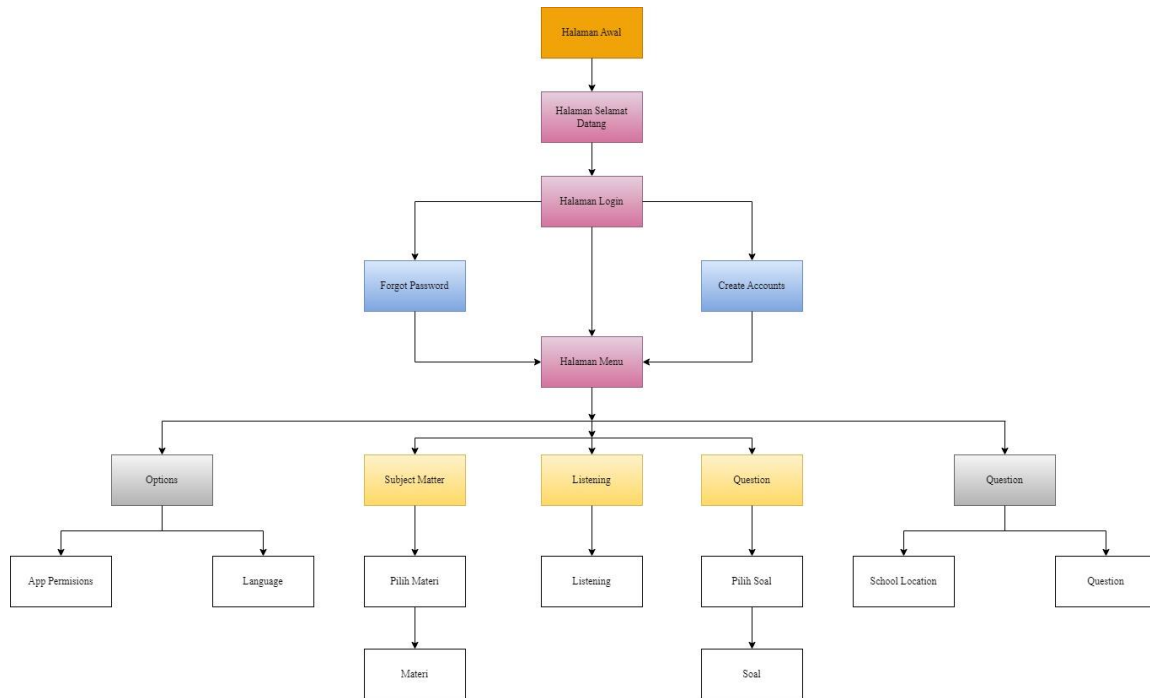
*name of corresponding author

Figure 6 User Flow

b. Wireframe

Wireframes are used to show drawings of the intended user interface and are often referred to as detailed design. This iron wire is crudely made so that it does not show the original design of the application prototype.

Figure 7 Wireframe Home page

Figure 8 Wireframe Menu page

c. Mockup

A mockup is the final result of a design that already contains a lot of detailed information, such as detailed images, typography, colors and shapes. This stage results in a user interface design that looks like a finished application.

Figure 9 Mockup Home page

Figure 10 Mockup Menu page

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d. Prototipe

    A prototype is an example of an API in the making, this stage is an extension of the model that is connected between frameworks to interact with users.
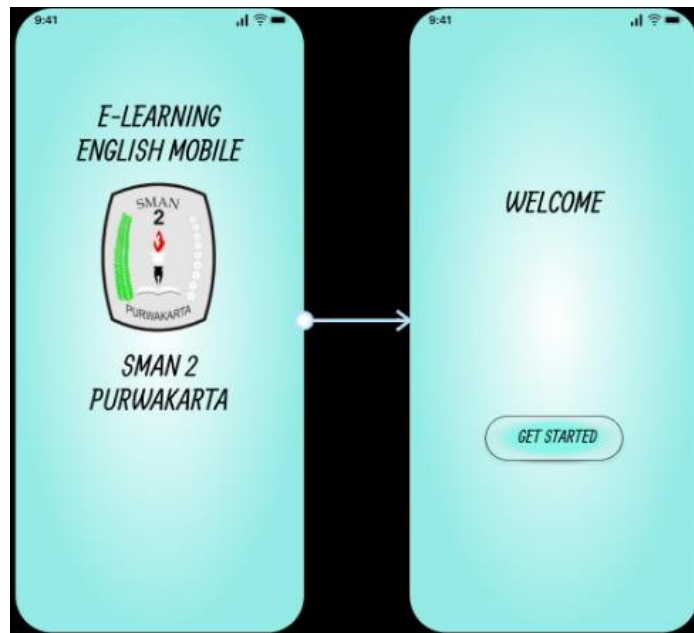
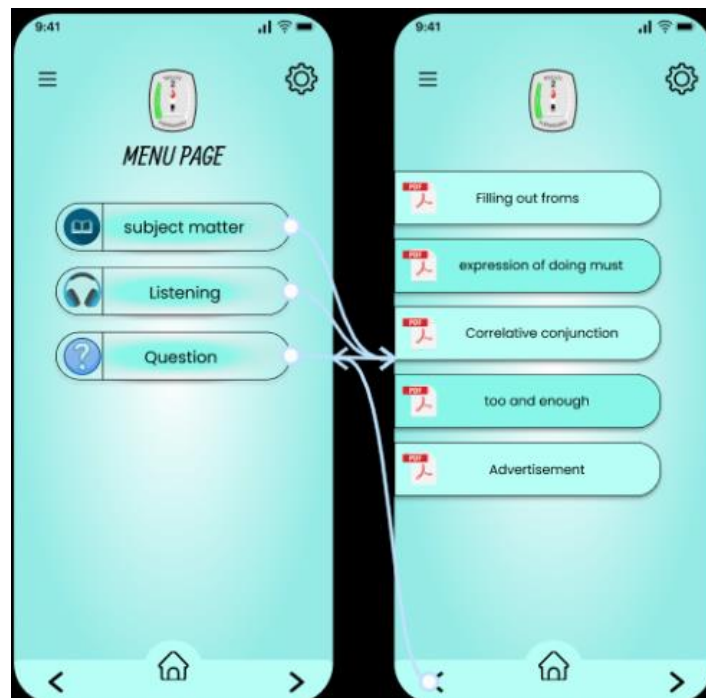

Figure 11 Prototipe Home page

Figure 12 Menu page

DISCUSSIONS

Evaluate Design Against User Requirement

    In this phase, the prototype made in the previous phase is tested with usability testing by giving questionnaires and links to the prototype to potential users. A System Usability Test (SUS) consists of 10 questions that potential users can answer on a scale of 1-5 based on how much they agree with these questions about the prototype being tested. (Sanjaya et al., 2021).

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a. Testing

SUS data was calculated to determine the usefulness value of 5 respondents, with the following calculation rules (Setiawan, 2021):

1. For odd numbers of statements, the rater's answer is reduced by 1.
2. For even statement numbers, 5 is subtracted from the rater's answer.
3. Answers are 0 to 4, with 4 being the best.
4. Summation of all rater answers and multiplied by 2.5.
5. Calculate the average score for all rater answers.

Table 1 Question System Usability Scale

Number	Question	Scale
1	I think that I will use this app more often	1 - 5
2	I found that this app, it doesn't have to be this complicated	1 - 5
3	I think the app is easy to use	1 - 5
4	I think that I will need help from a technical person to be able to use this app	1 - 5
5	I find the various functions in this app well integrated	1 - 5
6	I think there are too many incompatibilities in this app	1 - 5
7	I imagine that most people will find it easy to learn this app very quickly.	1 - 5
8	I found this app very complicated to use	1 - 5
9	I feel very confident to use this app	1 - 5
10	I need to learn a lot of things before I can start using the app	1 - 5

(Nurlistiani & Purwati, 2021)

Table 2 Original score of respondent's answer

Respondent	Question									
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
R1	5	2	5	3	5	2	4	2	4	3
R2	4	2	5	3	5	2	4	2	5	2
R3	4	2	5	2	4	2	4	2	4	3
R4	5	2	4	3	5	2	4	2	4	2
R5	5	3	5	2	4	3	5	2	5	2

Table 3 Calculated score

Respondent	Question										Raw SUS	SUS Score	Grades
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10			
R1	4	3	4	2	4	3	3	3	3	2	31	77.5	B
R2	3	3	4	2	4	3	3	3	4	3	32	80	A
R3	3	3	4	3	3	3	3	3	3	2	30	75	B
R4	4	3	3	2	4	3	3	3	3	3	31	77.5	B
R5	4	2	4	3	3	2	4	3	4	3	32	80	A
Average												78	B

(Damayanti et al., 2022)

Description:

    R = Respondent,

    Q = Question.

In table 1 above is the answer to the SUS question and the final result of the assessment using the SUS formula with an average result of 78. As in Figure 4.42 if the average SUS value is more than 70 then the application prototype is acceptable and for a value of 78 it is included in grade B.
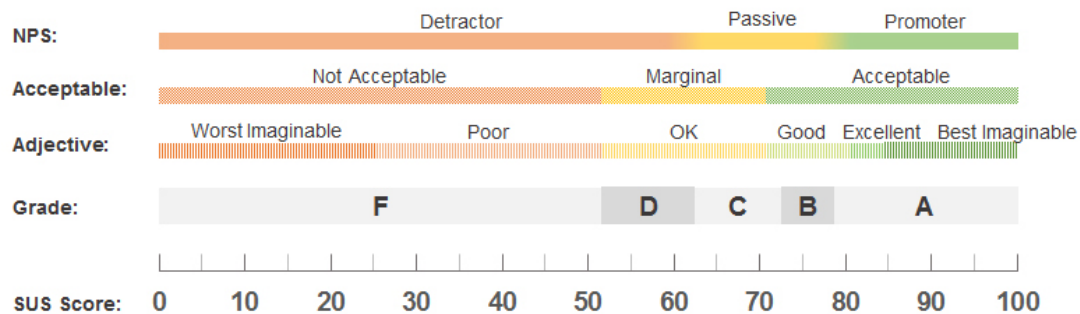

Figure 13 SUS Scale
(Anggara et al., 2021)

CONCLUSION

The user-centered design method of application design can be used to create a user interface design that meets the needs of users. When designing the user interface and user experience of the E-learning English Mobile application, using the user-centered design method, the E-learning English Mobile application produces a prototype design that provides students with convenience. Use multiple functions in one application. The results of this study produced a prototype learning application, namely E-learning English Mobile. After the System Usability Scale (SUS) Test. The average score is 78. It can be concluded that the structure of the E-Learning English Mobile application is acceptable because it corresponds to the acceptable category.

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*name of corresponding author