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Go Story: Design and Evaluation Educational Mobile Learning Podcast using Human Centered Design Method and Gamification for History

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Abstract. Technological developments, especially in the field of education, can help students learn more effectively and help the learning process. The learning method used in high school for history learning still uses conventional methods. The use of this conventional method often experiences problems such as students being less motivated in learning. Previous research data on the entry and development of Islam in the archipelago showed that the learning outcomes of 28 students had an average score of only 41.8 on a scale of 1-100. so that this research designs and develops learning media that can increase student learning scores. One of the solutions proposed in this article is to design an android-based learning media that can support the activities of the learning process named go-story. Interface design for students as application users and (UI/UX) based on human centered design methodology and the concept of gamification. The human centered design approach and the concept of gamification will be used in the analysis and design process to maximize the usability and engagement of the application. The application will be implemented and tested on students to measure its effectiveness. The trials that have been carried out show the results of improvements. The test results using The Post-Study System Usability Questionnaire (PSSUQ) method show a final score of 86.84.

Keywords: educational media, human centered design, gamification.

1 Introduction

In Junior High Schools (SMP/MTs) and Senior High Schools (SMA/SMK/MA) the subjects of History and especially Indonesian History are compulsory subjects. History has many values that are contained such as history as moral education, as policy education, as education for change, and others in learning Indonesian history should be very important in individual attitudes in the life of the nation and state so that enthusiasm, motivation, willingness will arise. defend the nation, and love the homeland.

Initial observations that have been carried out in high schools in Hulu Sungai Utara Regency, found the fact that learning history with conventional methods and the delivery of learning materials that still use modules and books and have not used innovative and interactive learning media without being considered difficult by students because it causes they are less motivated to learn. The initial observations made have given a general idea that the subject of history is one of the difficult

subjects. When students face the problem of date and time in history, they mostly find it difficult. In addition, the lack of supporting devices in the history learning process makes learning difficult for students. Ironically, previous research data on the entry and development of Islam in the archipelago showed that the learning outcomes of 28 students had an average score of only 41.8. To answer these problems, innovative and interactive strategies are needed through good learning media to help students understand history subjects. One of the innovations that wants to be applied to overcome these problems is through the design of educational media using the Human Centered Design (HCD) methodology which is added to the element of gamification in the design of educational media. Human Centered Design is a methodology used to develop user interface and user experience (UI/UX) systems, in general HCD is divided into 4 stages, including Understand and specify the context of use, Specify the user requirements, Produce design solutions to meet these requirements, and Evaluate the designs against requirements. Then gamification is the use and application of game elements in non-game contexts such as the use of points, levels, leaderboards, and so on. The educational media application in this research is named go-story. This research is expected to provide solutions to overcome the problems faced in the learning process in some historical learning materials, especially the material for the process of Islamization of the archipelago.

2 Related Work

The development of technology is currently very fast and has an impact on learning methods that change and adapt to the needs of students. There are various kinds of mobile learning-based educational media that have been developed. However, each has advantages and disadvantages that are tailored to its application to student needs.

First, research conducted by [1] uses the HCD method in designing a mobile application for the Meteorology, Climatology and Geophysics Agency (BMKG) that provides early weather warnings. However, this application is only limited to providing information to users, there is no gamification element in the media related to learning media with the HCD method. In this study, the HCD design method is used to design android mobile learning media for learning to read the Koran. A similar study was conducted by [2] using the HCD method in designing a virtual reality (VR) application with the aim for children with autism to be able to catch up in terms of communicating and interacting, but there is still no element of gamification in the educational media.

In addition, research was conducted [3] which examines History and by adding elements of gamification. The purpose of the design is as a learning support media that can provide instant feedback through the gamification method used. However, its development is not digital-based and is still boardgame-based. Then the research conducted [4] related to the design of educational media based on Android applications with the HCD method and the concept of gamification with the aim of being able to learn about the Koran that was adjusted to age.

Furthermore, research on the design of android-based application educational media for history lessons using the concept of gamification carried out [5] has developed a media with a good gamification concept. However, the media uses the Scott design method and is limited to grade 5 elementary school.

Based on various references from previous studies, this study intends to accommodate various existing deficiencies in order to maximize the effectiveness of the learning process, especially in the history learning process using the human

centered design and gamification methods. This study designs an educational media that is integrated with mobile android and the concept of gamification with the human centered design method which aims to support the needs of media to support the learning process in high school material for the process of Islamization and cross-culturalism in the archipelago..

3 Literature Review

3.1 Educational Media

Media is a word that comes from Latin with its original form, namely medium which means intermediary or introduction. Educational media has various meanings, including according to [6] mentioning educational media as everything that can be used to help improve thoughts, feelings, and attention for learners. In addition, learning media can also be used as a tool to increase the effectiveness of students in learning [7]. By utilizing interactive educational media, learning will be more fun, interesting, innovative, and motivating and further strengthen the absorption of students in learning. From the two understandings mentioned above, we can conclude that learning media are everything or something that we can use to convey messages, whether in the form of learning materials or learning materials, to be able to stimulate the attention, interests, talents, and feelings of students in learning activities. achieving goals.

3.2 Human Centered Design

Human Centered Design (HCD) is one of the approaches from the UX (User Experience) field in designing and developing an interactive system that aims to make the system easier to use and more useful by focusing on users and their needs, by applying ergonomic factors. , and usability knowledge and techniques. The HCD approach is expected to increase effectiveness and efficiency, improve human welfare, user satisfaction, accessibility, and sustainability; and is also expected to counteract the possible adverse effects of use on human health, safety and performance [8].

In [9] When developing an educational media in particular, either a designer or a media developer must pay attention to factors, several factors related to the interaction of students with the educational media, because the purpose of the educational media created is so that the problems that occur and the needs students with the educational media itself can be completed and achieved properly and correctly. The problem that often arises in the interaction between students and educational media is that there is often a misperception of students, especially on existing educational software or media, so that it is not the effectiveness and efficiency of the learning process that is obtained, but instead causes the learning process to be inefficient and effective. user students often have difficulty using the educational media because they are not very familiar with the media, in this case the design of educational media which is sometimes too complicated makes it difficult for students to use and learn. Educational media that are not in accordance with the needs of students will not be able to accommodate the important needs of students in the learning process.

By paying attention to students as the main user focus, an appropriate and

appropriate educational/learning media can be developed for students. The right educational media for students will provide comfort in interacting and using the educational media, so that the purpose of implementing educational media will be achieved and will not fail [10]. In [8] the Human Centered Design methodology has a 4 step method, namely Understand and specify the context of use, Specify the user requirements, Produce design solutions to meet these requirements, and Evaluate the designs against requirements.

3.3 Gamification

According to [11] in his book states that gamification in learning and education is a set of activities or processes to solve problems related to teaching and learning activities and education by applying elements of the game. Gamification has proven to be very beneficial for learning and teaching because it can increase motivation, student involvement, and learning achievement. The number of educators or teachers who mention that problems related to the interest and involvement of students in teaching and learning activities in the classroom are still lacking so that it has an impact on learning achievement. Several decades ago, teachers have tried various ways and strategies in teaching and learning activities to increase student motivation but have not survived in the long term. Then the existence of gamification in the world of education is a good solution and helps in solving problems related to the retention rate, participation and motivation of students..

4 Research Methodology

In general, the design of Go-Story educational media uses the HCD method where the things described are related to the design in the context of gamification content applied in the field of Education, not in software design and development in general. Then the development section in the next iteration will be explained in detail in each part which is the final result of the development of Go-Story educational media which has gone through the HCD methodology stage. At this stage, it is the stage of designing educational media including exploring design needs, wireframing, prototyping, up to evaluation with the appropriate Human Centered Design approach [8] and [9]. The Human Centered Design approach is very suitable in the development of Go-Story educational media because it focuses on students who specifically use podcast applications for History subjects as end user applications. In general, at this stage analyze the design according to the needs of students so that it can improve student learning outcomes, while these stages can be described as follows.

4.1 Understand and Specify the Context of Use

Preliminary analysis on the validation of problems that occur in History subjects for students of Class X SMA and equivalent using preliminary research (direct observations, questionnaires and interviews with students and teachers of History subjects) about problems and obstacles in the process of teaching and learning activities to the needs of educating participants educated in Class X IPS. The stages in this research aim to generate basic design ideas from the Go-Story educational media. This stage is used as the basis for the next stage to evaluate the design of the Go-Story educational media application. Aspects of user oriented or user centered, in this case, students are the most important thing so that their needs should be considered. The concept of a good media in the field of education in particular deserves attention from the beginning from the analysis to the final stage. Several sections such as Emphatize

& define, Ideation, scenario design of learning materials, and the concept of gamification elements that were tested will be described as follows.

4.1.1 Emphatize & Define

The important thing that needs to be considered in the design of Go Story educational media is the purpose of this study, as mentioned earlier, where appropriate educational media will be obtained and have an influence on the learning outcomes of Class X Social Sciences SMA students. The next important aspect is how students have very strong reasons to continue using this educational media and have motivation that has an impact on their learning outcomes.

Some of the important aspects of the design mentioned above are the initial definition of the purpose of the Go-Story educational media design so that it can outline the things that will be designed at the next stage so that the process of learning activities that lead to the transfer of knowledge can run as expected.

4.1.2 Ideation

In this research and development, the main ideas and concepts are the next step based on user orientation or according to user needs, in this case students of class X SMA. The main concept proposed is that students can use educational media that has been designed and can listen to podcasts well then there are elements or components in educational media that can provide motivation to learn so that it has an impact on their learning outcomes.

The basic ideas contained in the design of this go-story educational media are (1) the HCD method which is the main focus to be able to improve the learning outcomes of students in History class X SMA; (2) gamification elements that can increase students' learning motivation are supporting elements of Go Story educational media; (3) then the combination of podcast elements that are tested, namely intonation, long/short, backsound music, and dialogue/monologue are combined so that the maximum podcast element is obtained..

The basic design that will be displayed includes the design of the interface, icon, image, gamification, and audio design of the podcast and its elements. Visualization of Go Story educational media is also an important concern in this research and development by putting forward UI /UX based on the needs ofstudents.

4.1.3 Learning Material Scenario Design

The design of the learning scenario used where the X-grade students are guided to explore knowledge about the material that will be displayed in the education media Go-Story, material taken from the book [12] derived from the Ministry of Education based on the Curriculum 2013 IPS History Class X Semester 2. The material is only specific to the basic competency material (1) KD 3.7, namely Processing information about the process of entry and development of the Islamic sultanate by applying chronological thinking, and its influence on the lives of indonesian people today and presenting it in the form of writing; and (2) KD 3.8 that presents the results of reasoning in the form of writing about the values and cultural elements that developed during the Islamic kingdom and is still sustainable in the life of the Indonesian nation today. After selecting the material, it will be continued on theeducational mediadesign. The content presented is structured according to the

manual. The content of the material starts from the Sub Chapter of the arrival of Islam in the Archipelago to the process of islamic integration in the Archipelago. Then related to the main podcaster of this material is the History Teacher at SMA Negeri 1 Amuntai and researcher. One material will be created with different types of material arranged differently on different podcasters. At this stage, the selected material will be compiled and displayed on the mobile application. Then the concept of gamification is also added to contain game elements that are relevant to the world of Education, especially historical subjects such as Avatar, Points, Levels, and Leaderboard.

4.1.4 Gamification Element Concept

The concept of gamification elements to be tested is avatar, point, level and leaderboard. These four are elements that will be tested on research objects that are then adapted to the history material of class X and go story educational media. A good level design in the context of Historical Education Media [13] offers the appropriate difficulties of each level, namely fairness in each level which is neither too difficult nor offers the same difficulties as the previous level.

These elements have appropriate functions in KD(Basic Competence) 3.7 and KD(Basic Competence) 3.8 Class X SMA history materials. For example, the selection of Avatars used is tailored to the avatar images of the heroes in Indonesia. The avatars of these characters have distinctive characters and traits that can represent the preferences of the students. Questions that represent the personalities of the characters will be displayed and selected by the students when choosing their avatar. Then there are the levels that are the result of accumulated points collected. The level will increase every point meets 100 points. The level will determine the final score of the learner. Then the point obtained by the learners is from the level of completing the podcast and working on the practice problem. There is no maximum number of points so for students who have the highest points will be at the top of the leaderboard.

4.2 Specify the User Requirements

The analysis of the needs of learners in this study was obtained by digging from the students as the main user base and the main source (user oriented) as well as the history pursuer as a material expert. Like general software design, all aspects of requirement analysis will be used as the basis for the next stage of educational media development.

In the research and development of Go Story educational media, there is only 1 actor, namely learners as the only actors who become research centers. Actors or students in this case must register (Sign Up) and Login first before being able to use go story education media. Students as actors can choose which podcast audio to listen to, but before listening to the audio podcast students first answer the available pretest questions as many as 10 questions. After listening to the podcast students can answer the postest questions again in order to get points and levels that can affect the leaderboard. In addition, students can also choose the avatar of the hero they like so that they can change the avatar on their profile, it can be seen in figure 1 of the use case diagram below.

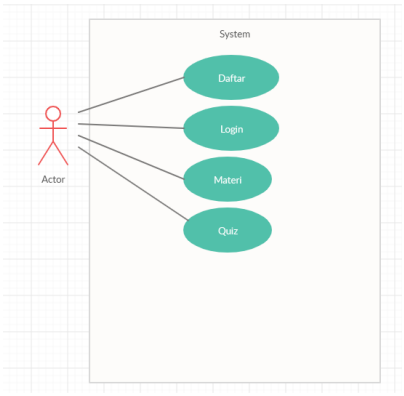

Fig. 1. Use Case Diagrams Of Educational Media

4.3 Produce Design Solutions to Meet these Requirements

The design solution offered in this sub-discussion is in the form of a basic design of the visual aspect (User Interface) and the user experience aspect. These sections are about general design, audio design, interface, icon, gamification elements and images. In general, the element of gamification is the highlight of this Go Story educational media. Based on the analysis of previous needs that have been discussed, the design solution in the form of the most basic design of go story education media asfollows.

4.3.1 Wireframing & Prototyping

The initial stage formed from the most basic design of Go-Story education mediais wireframing &prototyping based on preliminary research, issue digging (Understand and specify the context of use) and analysis of previous needs.

Wireframe design is a form of results from the previous stages of extracting issues and specifications of student needs. The design of this wireframe shape is used as the first basic reference for the design stage until the next. At this stage the resulting design is still very rough with a very low quality but has been able to meet the parts of the needs mentioned earlier, the results of this design can be said to have met the MVP (Minimum Viable Product). There are two choices of wireframe forms submitted to students and experts to choose from. Then Prototyping in this case the design of the wireframe design that has been disseminated to a small group sample and material experts which is then analyzed and continued again at this stage. The analysis and discussion of the results are contained in the results and discussions.

4.3.2 Testing

Testing activities in this case is spreading the questionnaire to a small group of 18 students and 2 experts related to the previous sub-discussion, namely wireframe and prototype education media Go Story. The online poll google forms twice, the first wireframe in the form of 5 questions wireframe A / B testing options, and the second is criticism and suggestions prototype design that has previously been chosen by students. The latter is spreading pssuq poll Version 3 of [14].

4.4 Evaluate the Designs Against Requirements

Things related to design such as wireframing and prototyping become a separate evaluation kethics there are shortcomings in the process. Some things that become evaluation after the process of disseminating questionnaires to 18 students and material experts will be discussed in the next chapter of analysis and discussion. The very important thing is the discussion of the results of the evaluation of usability of the design of go-story educational media. Usability evaluation questionnaire taken from PSSUQ (ThePost-Study System Usability Questionnaire) [14] version 3, table PSSUQ version 3 can be seen table 1 below.

Tabel 1. PSSUQ Version 3

No	The Post-Study System Usability Questionnaire Version 3	Score						
		1	2	3	4	5	6	7
1	Overall, I am satisfied with how easy it is to use this system.							
2	It was simple to use this system.							
3	I was able to complete the tasks and scenarios quickly using this system.							
4	I felt comfortable using this system.							
5	It was easy to learn to use this system.							
6	I believe I could become productive quickly using this system.							
7	The system gave error messages that clearly told me how to fix problems.							
8	Whenever I made a mistake using the system, I could recover easily and quickly.							
9	The information (such as online help, on-screen messages, and other documentation) provided with this system was clear.							
10	It was easy to find the information I needed.							
11	The information was effective in helping me complete the tasks and scenarios							
12	The organization of information on the system screens was clear.							
13	The interface of this system was pleasant.							
14	I liked using the interface of this system.							
15	This system has all the functions and capabilities I expect it to have.							
16	Overall, I am satisfied with this system							

5 Result and Discussion

5.1 Design Result

Wireframing design is the beginning of the design of the needs of students with educational media Go-Story so that it can be known to continue to the next stageof prototyping design. For wireframes there are two options namely option A and B which can be seen in figure 2.

Fig. 2. Wireframe Options A/B Testing

Table 2 shows that wireframe A design was chosen by students on question numbers 1, 3 and 4. While the wireframe B design was chosen by the students at numbers 2 and 5. The response of students to the choice of wireframe erection can be seen in table 6.2.

Table 2. Wireframe A/B Testing Results

No.	Question	A	B
1	Which Home design for podcast apps do you prefer?	66,7%	33,3%
2	Which Library design for podcast apps do you prefer?	33,3%	66,7%
3	Which Saved design for podcast apps do you prefer?	11,8%	88,2%
4	Which Channel design for podcast apps do you prefer?	70,6%	29,4%
5	Which Profile design for podcast apps you prefer	11,1%	88,9%

Fig 3. Prototyping

5.2 Usability Result

Analysis of the results in this case is used to determine the test value aspects of satisfaction and usefulness of educational media Go-Story by students as users. The instrument of PSSUQ Version 3 sheet that was distributed, adapted from [14] and used in this research. This instrument sheet is distributed to Class X IPS 2 as an experimental class and end users who use Go-Story educational media,namely as many as 31 students. The implementation is a large-scale trial to the population of Class X IPS, where Class X IPS 1 as the Control class and Class X IPS2 as the experimental class. The list of questions the PSSUQ sheet is asked is seen in table 1. The statistical result of the value of the usefulness aspect using PSSUQ has a fairly large average value of 86.84%. Detailed question results from PSSUQ can be found in table 3.

Tabel 3. PSSUQ Result

	N	Mean	Std. Deviation	Persentase
Q1	31	5.90	.908	84,33
Q2	31	6.06	.964	86,64
Q3	31	6.06	.892	86,64
Q4	31	6.10	.870	87,10
Q5	31	6.00	.856	85,71
Q6	31	5.90	.908	84,33
Q7	31	6.23	.805	88,94
Q8	31	6.13	.846	87,56
Q9	31	6.32	.748	90,32
Q10	31	6.48	.769	92,63
Q11	31	5.74	1.064	82,03
Q12	31	6.06	.814	86,64
Q13	31	5.94	.892	84,79
Q14	31	6.26	.855	89,40
Q15	31	5.94	.929	84,79
Q16	31	6.13	.846	87,56

6 Conclusion and Future Work

Human Centered Design (HCD) method allows the development of Android-based applications that suit the needs and user oriented. The test results using The Post-Study System Usability Questionnaire (PSSUQ)method resulted in a final score of 86.84. The score shows excellent results that indicate an improvement in the ease of the learning process. These results also show that HCD methods and gamification concepts can be applied to the development of mobile go-story based applications for educational purposes. This method will improve the usability of the application which is a major factor

for the designated user. Further research can be done using the same method but in different materials on the context of historical learning. This research is focused on target users in class X IPS SMA /equivalent. Research on different materials will provide useful information about how effective this method is in different materials or subjects

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