Evaluation of User Experience on Learning Management System for Programming Course Through User Experience Questionnaire Method

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Abstract. The transition from the pandemic period to normal again requires adaptation to habits, one of which is in learning, which was previously carried out online, now the learning model is offline again. Students are accustomed to using gadgets in their daily lives. Even in the current conditions, although the situation returns to its original state, adaptation is needed, one of which is in the learning model and making learning media to support teaching and learning activities. Therefore, in this study we propose the idea that the application of gamification in mobile learning using Case Based Learning is expected to make it easier for students to understand the material, increase students' competitive spirit, and motivate students to learn. This research uses ADDIE which is an acronym for Analyze, Design, Develop, Implement, and Evaluate. The trial was carried out by material and media tests, small group tests, and field tests. Data analysis in this study used descriptive statistical tests and qualitative analysis. On the results of the UEQ questionnaire test, the Attractiveness scale obtained a score of 1.60, the Perspicuity scale obtained a score of 2.00, the Efficiency scale obtained a score of 1.61, the Dependability scale obtained a score of 1.00, the Stimulation scale obtained a score of 1.14, and the Novelty scale obtained score 0.90. Based on the results of the UEQ questionnaire testing, the design improvement solution obtained a positive score and showed improvement compared to the initial evaluation. The development of mobile learning apps is expected to be a source of mathematics learning materials that are practical in nature and can be used anytime and anywhere by students.

1 Introduction

Education is one of the important factors to advance a nation. Through good education, new things are obtained so that they can be used to create quality human resources. A nation if it has quality human resources, of course, is able to build its nation to be more advanced. Therefore, every nation should have good and quality education. Quality education must be

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able to achieve educational goals. The purpose of education is stated in the Law of the Republic of Indonesia Year 2003 concerning the national education system stated that: "National education functions to develop the ability and shape the character and civilization of the nation which aims to develop the potential of students to become qualified human beings with the characteristics of faith in devotion to God Almighty, noble character, healthy, faithful, capable, creative, independent, and become democratic and responsible citizens answer."

Efforts to achieve educational goals are not easy. There are many obstacles that must be faced by the education system in Indonesia. One of the obstacles is the lack of learning media that supports the learning process to make educational goals have not been achieved optimally and the subject matter cannot be maximally accepted by students. Learning media is a tool or intermediary that is useful to facilitate the teaching and learning process, in order to streamline communication between teachers and students. This greatly helps teachers in teaching and makes it easier for students to receive and understand lessons. This process requires teachers who are able to harmonize between learning media and learning methods.

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Lack of student motivation to learn algorithms and programming due to lack of creativity in teaching. In addition, the lack of learning media is also one of the factors that make students low learning motivation. The low motivation of students in learning algorithms and programming and the low interest of students to repeat the lessons that have been learned also have an impact on their learning outcomes. Based on these circumstances, innovation is needed that can be applied in handling problems. One solution to increase student motivation is gamification.

Gamification is the process of using thinking and game mechanics to bind users and solve problems. Gamification takes elements from digital games and applies them to non-gaming to increase student motivation and engagement. Usually siswa does not like long daily hours, but is willing to spend a lot of time playing games. This can be utilized in the learning process by applying the gamification process. Based on the previous things that have been described, Gamification-Based Learning Media for Algorithm and Programming Material for Vocational Students is expected to support and improve students' critical thinking in learning Algorithm and Programming material.

2 Literature Review

2.1 Learning Motivation

According to Mc. Donald (in Djamarah, 2008) learning motivation is a change in energy in a person characterized by affective (feelings) and reactions to achieve goals. The change in energy in a person is in the form of a real activity in the form of physical activity.

Motivation is the drive of oneself to act. Motivation is the force, drive, need, passion, pressure, or psychological mechanism that drives a person to achieve his goals. Motivation is something that pushes a person to get out of a certain state and drives him to take action to
achieve another state. It is concluded that motivation is the encouragement of a person or group to act in achieving goals. Learning is a change in one's behavior resulting from regularity in the environment. Learning is a process of behavior change that is the result of an individual's interaction with his environment. Learning is a process that creates permanent changes in behavior as a result of experience.

Judging from the understanding of motivation and learning, learning motivation is a driving force of behavior that appears in the process of every student who wants to carry out learning activities, so that students can achieve their learning goals, namely learning success.

Learning motivation is a guide to student learning continuity and efforts on learning goals set by teachers in the learning process. Motivation indicators are classified into four, namely attention, relevance, confidence, and satisfaction.

2.2 Mobile Learning

Mobile learning is defined as learning that utilizes technological developments such as mobile devices. An example of such a device is a smartphone. According to Surahman & Surjono (2017), mobile learning is one of the learning alternatives that maximize the function of mobile device-based media, so that learning can be carried out independently anywhere and anytime. In addition, O'Malley et al (2003) in (Suryanto, Kusumawati, &; Sanhoury, 2018) revealed that mobile learning is a form of learning where teachers are in a place that is not fixed, or learning where teachers benefit from mobile technology. Based on this explanation, mobile learning is a learning model that utilizes mobile devices such as smartphones. Mobile learning takes advantage of the availability of teaching materials that can be used at any time and have an attractive appearance.

Making mobile learning serves to create learning that runs all the time, students can read material anytime and anywhere, students are more enthusiastic in learning because learning is packaged with interesting and fun, it can increase the enthusiasm of learning students. In addition, mobile learning allows students to be able to open applications anytime and anywhere.

3 Method

Based on the background discussed in this study, a research methodology was developed and presented in Figure 1.

Literature review is conducted to find research references and theories that can support and be used as a foundation in completing this research. Researchers studied previous research on user experience through credible books, journals, papers, and websites that discuss user experience.

Next, the UX measurement and evaluation phase is carried out using UEQ to determine the level of user experience on the website and identify areas for improvement. The questionnaire was distributed to 25 respondents who were users of the sinau coding website. Before filling out the questionnaire, each respondent was briefed on the purpose and how to fill out the UEQ questionnaire to avoid misunderstandings.

The next stage is the analysis of measurement and evaluation results. Researchers analyzed the results of user experience measurements conducted by all evaluators involved. Data collected from 25 respondents using UEQ were calculated using Data Analysis Tools. The output of the calculation is in the form of a diagram showing the level of user experience on the sinau coding website.
After the analysis of the measurement and evaluation results, the researcher identified which areas or parts needed improvement. The parts related to usability issues and UEQ scales were grouped, and the researcher designed the improvement in the form of a High-Fidelity design or prototype.

The next stage was to measure user experience on the improvement design using UEQ. The same respondents and evaluators were involved in this measurement and evaluation. The results of the measurement and evaluation of the improvement design were then compared to the results of the old design.

The User Experience Questionnaire (UEQ) was used to measure the respondent's experience level after interacting with the application. A brief interview was conducted with the respondent to obtain their feedback on the application and the overall task scenario. The list of task scenarios tested is shown in Table 1.

Finally, a conclusion will be drawn based on the research findings to answer the research questions that have been presented in the introduction chapter. In addition to the conclusion, the author will also provide suggestions to address the shortcomings or errors made during the research and can be used as a reference for future research.
Table 1. Task Case Scenario Description.

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Job Description</th>
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<tbody>
<tr>
<td>1</td>
<td>The user accesses the sinau coding website by entering the Landing Page.</td>
</tr>
<tr>
<td>2</td>
<td>Before entering the dashboard page, users must register first.</td>
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<tr>
<td>3</td>
<td>The user navigates to the &quot;Courses&quot; menu and selects one of the available courses.</td>
</tr>
<tr>
<td>4</td>
<td>The user proceeds to learn the course material.</td>
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<tr>
<td>5</td>
<td>The user accesses the &quot;Discussion&quot; page and participates in the forum discussions.</td>
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<tr>
<td>6</td>
<td>The user navigates to the &quot;Live Code&quot; page and tries out the Live Code feature.</td>
</tr>
<tr>
<td>7</td>
<td>Finally, the user accesses the &quot;Evaluation&quot; page.</td>
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4 RESULTS AND DISCUSSION

4.1 Preliminary Analysis and Evaluation

In the Initial Analysis and Evaluation stage, it aims to assess the response and rating of user experience to the initial design of the sinau coding website. The participants, consisting of 25 respondents, were given tasks to perform and provide feedback on their experience with the website. Criticism and suggestions from respondents become valuable input for design improvement recommendations for coding websites. Respondents will be interviewed about their responses and experiences after completing the initial evaluation phase. From the results of the interview, the problems faced by users are identified. User issues are presented in Table 2 below.

Table 2. Problems In the Early Stage Evaluation.

<table>
<thead>
<tr>
<th>Number</th>
<th>Problem</th>
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<tr>
<td>1</td>
<td>The selection of inappropriate color combinations on the website makes users feel uncomfortable when using the application.</td>
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<tr>
<td>2</td>
<td>The discussion feature is not real-time, making it difficult for users because they have to refresh the page repeatedly to see the latest discussions.</td>
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<tr>
<td>3</td>
<td>The images and videos displayed on the material are of low quality making users not understand the material clearly.</td>
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<tr>
<td>4</td>
<td>Web pages are unresponsive on various devices. The website can only be accessed on a computer device, when accessed on a smartphone, the display seems poorly organized.</td>
</tr>
<tr>
<td>5</td>
<td>The fonts used on the website are not the same so that it makes users uncomfortable when using the web.</td>
</tr>
</tbody>
</table>
4.2 Making Improvement Design Recommendations

After an evaluation at the initial stage, improvements were made to the website design. Design improvements include dashboards, materials, discussions, live code, and evaluation. The results of the design improvements are presented as prototypes in Figure 2 to Figure 9. The next step after completing the sinau coding website design improvement in the form of a high-fidelity prototype is to test the design with the same respondents from the initial evaluation stage of the sinau coding website.

**Fig 2. Landing Page**

The landing page serves as a means to provide information about the sinau coding learning platform. It contains brief information about the features available on sinau coding. This helps to persuade new users to participate in or join sinau coding courses.

**Fig 3. Registration**

If the user does not have an account to enter the website, it will be directed to the register page. On this page the user must fill in his first name, last name, email, and password.
Fig 4. Login
After registering, users can log in to the login page by filling in their email and password.

Fig 5. Dashboard Page
Once users have completed their registration or login process, the first page that appears is the dashboard. The dashboard page provides information about the user's level, enrolled classes, course history, progress, and assignments. Users can track their learning progress on the sinau coding platform through this dashboard page.
Fig 6. Course Page

Fig 7. Live Code Page
Fig 8. Discussion Page

Fig 9. Evaluation Page
Apart from studying the course materials in the Course feature, users can engage in other interesting activities on the sinau cpdin website. As shown in Figure 7, Figure 8, and Figure 9, users can participate in discussions with other users or mentors if they have questions or need clarification on a particular topic through the discussion feature. Moreover, users can test their coding skills after learning the material through live coding features. In addition, users can also evaluate learning outcomes on the web sinau coding by utilizing the evaluation feature.

4.3 Results of Improvement Design Evaluation

The results of the evaluation of the user experience design solution using the User Experience Questionnaire (UEQ), tested on 2 respondents, are presented in the graph shown in Figure 10.

![Evaluation Results of UEQ](image)

In the results of the UEQ questionnaire testing, the Attractiveness scale scored 1.60, the Perspicuity scale scored 2.00, the Efficiency scale scored 1.61, the Dependability scale scored 1.00, the Stimulation scale scored 1.14, and the Novelty scale scored 0.90.

Based on the result of the UEQ questionnaire testing results, the design improvement solution received positive scores and experienced an improvement compared to the initial evaluation results. Therefore, based on the detailed comparison results, it can be concluded that the design improvement of the Sinau Koding website enhances user experience and assists users in achieving their goals.

5 CONCLUSION

Improving the user experience on a website can increase user satisfaction and impact website performance. This research focuses on designing the user experience on the Sinau Koding website using the User Experience Questionnaire (UEQ) approach. The UEQ method is used to measure the quality of user experience on websites across five dimensions: satisfaction, efficiency, learning, safety and stimulation. The aim of this research is to improve the quality of user experience on the Sinau Koding website, ensuring that users are more satisfied and effective in their learning process by using this website.

With advances in information technology, websites have been widely used in various fields, one of which is in the field of education. The Sinau Koding website is one of the platforms used by students to access information and course materials for basic programming materials. However, in its current condition, the Sinau Koding website still has some deficiencies in terms of navigation and layout, which can affect the quality of the user experience. Therefore, it is very important to apply the right UX design to enhance the user experience on the Sinau Koding website.
Evaluation of user experience design solutions using UEQ was carried out with the same 20 respondents as the initial evaluation stage. On the results of the UEQ questionnaire test, the Attractiveness scale obtained a score of 1.60, the Perspicuity scale obtained a score of 2.00, the Efficiency scale obtained a score of 1.61, the Dependability scale obtained a score of 1.00, the Stimulation scale obtained a score of 1.14, and the Novelty scale obtained score 0.90. Based on the results of the UEQ questionnaire testing, the design improvement solution obtained a positive score and showed improvement compared to the initial evaluation. Therefore, based on the results of the observations described, it can be concluded that improvements to the Sinau Koding website design improve user experience and assist users in achieving goals.

References

Online references will be linked to their original source, only if possible. To enable this linking extra care should be taken when preparing reference lists. References should be cited in the text by placing sequential numbers in brackets (for example, [1], [2, 5, 7], [8-10]). They should be numbered in the order in which they are cited. A complete reference should provide enough information to locate the article. References to printed journal articles should typically contain:

- The authors, in the form: initials of the first names followed by last name (only the first letter capitalized with full stops after the initials),
- The journal title (abbreviated),
- The volume number (bold type),
- The article number or the page numbers,
- The year of publication (in brackets).

Authors should use the forms shown in Table 3 in the final reference list.

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Here are some examples:


