

# Web-Based Gamification Development of Historiopreneurship Learning for University Students

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**Abstract.** The development of Lambung Mangkurat University (ULM) into an entrepreneurial university is one of the strategic issues in increasing the capacity and quality of education and teaching in accordance with the superiority of the wetland environment. Innovation in entrepreneurship learning at ULM through the development of historical entrepreneurship has been carried out, but the limited use of technology in the development of historical entrepreneurship learning tools is a problem that must be overcome. The use of technology in the form of gamification is an innovation design that needs to be developed in order to implement interesting and enjoyable historical entrepreneurship learning for students. The purpose of this study is to describe the gamification design for historical entrepreneurship learning tools (historiopreneurship). The research method used is the Design Science Research Methodology (DSRM) or Science-Design Research Method with a qualitative approach. In 2024, the research plan will focus on three stages of research as the research roadmap that has been made, namely: 1) Identification of Problems and Motivation, 2) Defining Objectives for Problem Solutions, and 3) Design and Development. The research subjects are Lecturers of Entrepreneurship, Educational Technology, and Computer Science Education, Students, and experts. Data collection techniques include Open Questionnaires, Focus Group Discussions, Field Observations, and Document Analysis. Data analysis techniques are qualitative analysis in the first and second stages, and Science-Design analysis in the third stage, namely development design. The results of the study indicate that the gamification of Historical Entrepreneurship Learning Devices (Historiopreneurship) can be used for entrepreneurship learning.

**Keywords:** Historiopreneurship, Gamification, Web-Based Gamification, Entrepreneurship, Learning Media

## **1 Introduction**

The development of Lambung Mangkurat University (ULM) into an entrepreneurial university is one of the strategic issues in increasing the capacity and quality of education and teaching in accordance with the superior wetland environment. This is in line with the target direction of the ULM Development Master Plan as the World Wetland Development Center in 2023-2027, namely to produce graduates who will become entrepreneurs and experts in the field of wetlands [1].

The existence of an entrepreneurship curriculum has a positive impact on self-efficacy and entrepreneurial intentions, so the curriculum needs to be reconstructed so that it has an impact on the entrepreneurial intentions of students, especially at ULM [2]. The still low influence of entrepreneurship learning on student independence suggests the need for innovation in the curriculum that is able to build entrepreneurial character [3] and increase interest and applicable entrepreneurial behavior [4].

The development of historical entrepreneurship (historiopreneurship) as an innovation in entrepreneurship learning in higher education that aims to build nationalism and entrepreneurial character, has been compiled in the form of a monograph [5] and a PjBL-based textbook (Atmono, 2021). This entrepreneurship learning innovation has the potential to build entrepreneurial creativity based on regional potential with historical objects as learning resources [6], [7] although it has not been widely implemented, especially in entrepreneurship lectures at ULM itself. In practice, historical entrepreneurship is an innovation that has meaning in the formation of entrepreneurial literacy and creativity through the utilization of historical potential based on local wisdom [8], [9]. The limitations of technology utilization in the development of historical entrepreneurship learning tools that can involve students actively and enjoyably are problems that must be overcome. The use of interactive technology in learning is very important because it can increase student participation and acceptance of learning materials [10], [11], make learning more enjoyable [12], and maximize learning outcomes [13]. The use of technology in the form of gamification is an innovative design that needs to be developed in order to implement interesting and enjoyable historical entrepreneurship learning for students. Gamification is an approach that uses game elements in a non-game context. Gamification elements include giving points, levels, challenges, prizes, and competitions designed to trigger students' intrinsic motivation [14], [15], [16]. The use of gamification in an educational context increases student motivation and participation [17]. Various large companies have used gamification such as SAP [18] and Microsoft [19] to gain its benefits. In the field of education, there have been many implementations of gamification in learning media such as in the fields of Science [20], Mathematics [21] and Programming [22], [23], but it has never been done in historical entrepreneurship learning (historiopreneursip).

## **2 Theoretical Background**

### **2.1 Gamification**

Educational gamification is a strategy to increase engagement by incorporating game elements into educational environments [24]. The goal is to generate levels of engagement comparable to those typically generated by games [25]. The main goals of gamification are to improve specific skills, introduce goals that serve learning purposes, engage students, optimize learning, support

behavioral change, and socialize [24], [26], [27], [28]. Stimulated by the effects that game elements can produce, many researchers have looked at the influence of gamification in educational contexts, and found beneficial results, such as increased engagement, user retention, knowledge, and collaboration [29], [30]. However, some studies have shown uncertain or detrimental results from gamification [31]. They found that rankings affect women in different ways and can have unexpected reverse effects. Hanus and Fox [32] reported that gamification not only does not improve outcomes but also decreases enjoyment and motivation. Haaranen et al. [33] noted that some users have negative feelings towards badges. The mixed results regarding the impact of gamification in learning environments raise doubts about the benefits of using it in educational settings. Furthermore, research on the effects of gamification elements on student learning, participation, and other effects has a broad purpose. The purpose should be limited to which game elements are efficient for certain types of students, engaged in certain activities [24]. Different layouts of game elements, used to add gamification to different activities, produce different effects, hampering the process of determining which elements or sets of elements are efficient in promoting engagement and learning for groups or types of users, performing certain actions [24]. Motivation [29], [34], [35], player profile [36] and personality [37] are the most investigated characteristics and preferences in gamified learning environments.

## **2.2 Historiopreneurship**

Historiopreneurship is a concept that combines entrepreneurship with history, where entrepreneurs utilize historical and cultural assets to create business opportunities that are not only economically profitable, but also provide positive social and cultural impacts. From the perspective of entrepreneurial theory, historiopreneurship can be seen as a form of innovation where entrepreneurs identify local historical, cultural, and traditional values as resources that can be developed for new products and services. Schumpeterian [38] theory of entrepreneurship suggests that entrepreneurship is an innovation process that involves the creation of new value, and historiopreneurship is in line with this idea, where history and cultural heritage are used as sources of innovation. For example, in developing a history-based tourism destination, a historiopreneur will create an experience that connects visitors with history through modern technology such as applications, virtual tours, or even educational games that bring past stories to life [39]. The theory of the creative economy by Richard Florida [40] is also relevant in the context of historiopreneurship, because it emphasizes the importance of creativity and cultural knowledge as key components in economic development, which can be achieved through the development of history-based and cultural products. Historiopreneurship also involves social aspects, where entrepreneurs not only create economic value but also contribute to the preservation of culture and strengthening of local identity, which in turn improves the quality of life of the community around the historical area [41].

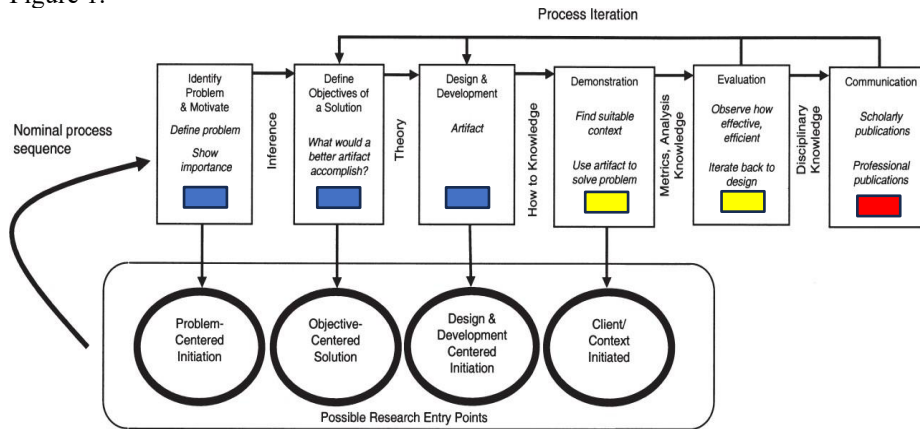
## **3 Methods**

The purpose of this study is to describe the gamification design for historical entrepreneurship learning tools (historiopreneurship).

The research method used is the Design Science Research Methodology (DSRM) or Science-Design Research Method with a qualitative approach. The research procedure with the DSRM method developed by Peffers, et al., [42] refers to six stages of research, namely:

- a. Identification of Problems and Motivation
- b. Defining Objectives for Problem Solutions
- c. Design and Development
- d. Demonstration
- e. Evaluation
- f. Communication / Dissemination

In 2024, the research plan will focus on three stages of research as the research roadmap that has been made, namely: 1) Identification of Problems and Motivation, 2) Defining Objectives for Problem Solutions, and 3) Design and Development. The research flowchart format can be seen in Figure 1.



**Figure 1.** Research Flow Diagram

A description of the research procedures, expected results, targeted achievement indicators, and analysis techniques at each research stage can be seen in the following table 1.

**Table 1.** Research procedures

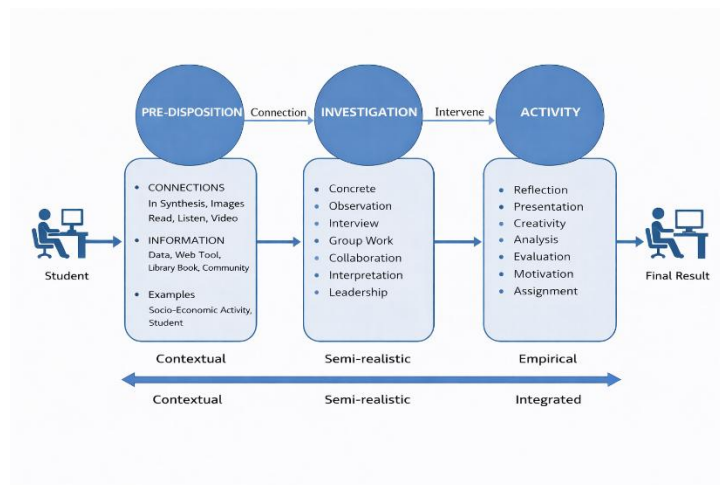
| No | Stage                                 | Result                                                                                         | Indicator                                                                                   | Qualitative         |
|----|---------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|---------------------|
| 1  | Problem Identification and Motivation | Identification of the main problems in historiopreneurship gamification and possible solutions | Description of Problem and Solution Framework related to Gamification                       | Analysis Techniques |
| 2  | Defining Goals for Problem Solution   | Identification of the objectives to be achieved                                                | Description of the purpose of the solution produced for the benefit of the framework design | Qualitative         |
| 3  | Design and Development                |                                                                                                | Gamification Framework refers to MDA                                                        | Science-design      |

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from the solutions that have  
 been set as the basis for the  
 design of the  
 historiopreneurship  
 gamification framework

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Related to the third stage, namely Design and Development, the MDA gamification framework is used as a reference framework in applying the gamification approach to learning media. MDA offers a good structure for designing gamification systems [43]. To apply the MDA gamification framework (Mechanics, Dynamics, Aesthetics).



**Figure 2.** MDA Framework

## 4 Result and Discussion

### Analysis Phase

Gamification was chosen to increase student engagement in the learning process and integrate competitive and interactive elements into history-based entrepreneurship materials. The MDA framework is the basis for designing this system to ensure that gamification elements, such as progress, badges, points, and leaderboards, can be integrated effectively and in accordance with learning objectives.

The MDA framework consists of three main layers, namely Mechanics (rules or technical elements), Dynamics (interactions that arise from the application of mechanics), and Aesthetics (experiences or emotions felt by users). The gamification elements applied in this study include:

- Progress: Visualizing student learning progress through graphs or levels. The goal is to provide ongoing motivation and show the achievements that have been achieved.

- b. Badge: Providing awards in the form of digital badges when students complete certain tasks. This badge is designed to increase a sense of achievement and encourage active participation.
- c. Points: Students collect points based on the learning activities they complete, such as answering quizzes or completing entrepreneurship projects.
- d. Leaderboard: Displaying student rankings based on points earned. This is designed to trigger healthy competitive motivation among participants.

The following is a table of the application of gamification elements with the MDA framework.

**Table 2.** Implementation of Gamification with the MDA framework

| <b>Gamification Elements</b> | <b>Mechanics</b>                             | <b>Dynamics</b>                                                | <b>Aesthetics</b>                                               |
|------------------------------|----------------------------------------------|----------------------------------------------------------------|-----------------------------------------------------------------|
| Progress                     | - Learning progress graph                    | - Students monitor progress independently - Increase focus     | - Sense of achievement - Satisfaction in seeing progress        |
| Badge                        | - Task leveling                              | - Students are motivated to achieve milestones                 | - Sense of pride - Recognition of achievement                   |
| Points                       | - Badges awarded after completing milestones | - Healthy competition to get higher points                     | - Intrinsic and extrinsic motivation - Competitive satisfaction |
| Leaderboard                  | - Point system for each learning activity    | - Students strive to improve their position on the leaderboard | - Competitive spirit - Social recognition                       |

Through the implementation of gamification, this study targets increasing student motivation, engagement, and learning outcomes. The progress element provides a clear visualization of achievements, allowing students to evaluate their learning progress independently. Badges act as a form of appreciation for student efforts, strengthening motivation to complete certain tasks or activities. The point system creates a healthy competitive atmosphere, encouraging students to be active in learning activities. The leaderboard provides a social dimension, where students can compare their achievements with other colleagues, creating a sense of pride and motivation to be at the top.

The development of this Historiopreneurship gamification learning tool uses modern technology to ensure interactive, responsive, and easily accessible media. The technologies used include HTML, Bootstrap CSS, JavaScript, MySQL, and Laravel. HTML is used to build the structure of the web page, while Bootstrap CSS ensures a responsive and aesthetic appearance across devices. JavaScript is used to implement interactivity, such as animation, form validation, and other dynamic functions. MySQL is used as a database to store student data, activities, and points, which is integrated with the Laravel framework to manage server-side logic, user authentication, and data communication. This combination of technologies ensures that the learning media built is not only user-friendly but also has optimal performance.

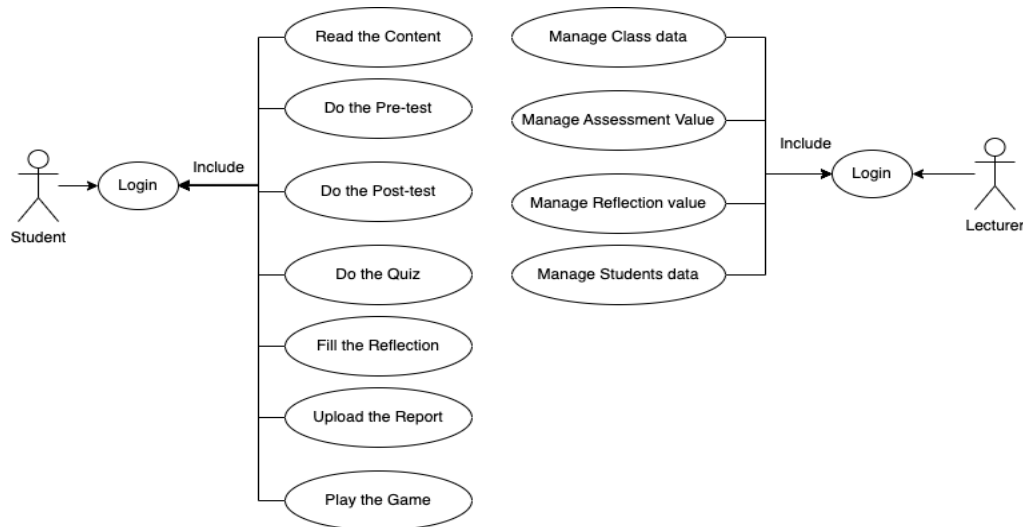
**Table 3.** Results of Technology Analysis

| No | Technology Name | Purpose of Use                                                                                                                                       |
|----|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | HTML            | Used to build the basic structure of a web page and ensure that the content is well accessible to users.                                             |
| 2  | Bootstrap CSS   | Provides a responsive, modern, and consistent interface design across devices and facilitates the interface development process.                     |
| 3  | JavaScript      | Enhances media interactivity, such as animation, DOM manipulation, form validation, and other dynamic features for a better user experience.         |
| 4  | MySQL           | Serves as a database to store user information, activity results, points, leaderboards, and other supporting data in a structured and secure manner. |

The use of this technology allows the Historiopreneurship gamification learning device to have a reliable system and support gamification features optimally. This ensures that the media can provide an effective and interesting learning experience for students.

#### Design Phase

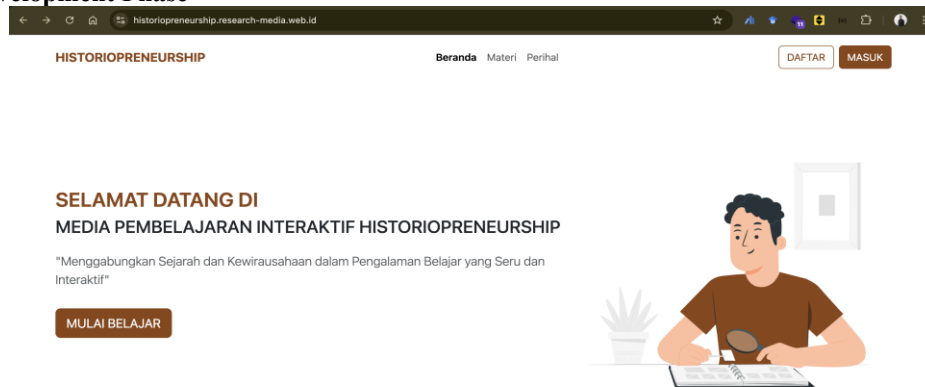
The use case diagram above illustrates the interaction flow between two main actors, namely Students and Lecturers, in an interactive learning system. Students have various main activities that can be done after the Login process, such as reading learning content, taking pre-tests and post-tests to evaluate initial and final understanding, taking quizzes to reinforce the material, filling in reflections as a form of feedback, uploading reports, and playing educational games as part of the interactive learning process. All of these activities aim to improve students' understanding of the learning material, while providing a fun learning experience. On the other hand, lecturers also have access to the system through the Login process.



**Figure 3.** Usecase diagram

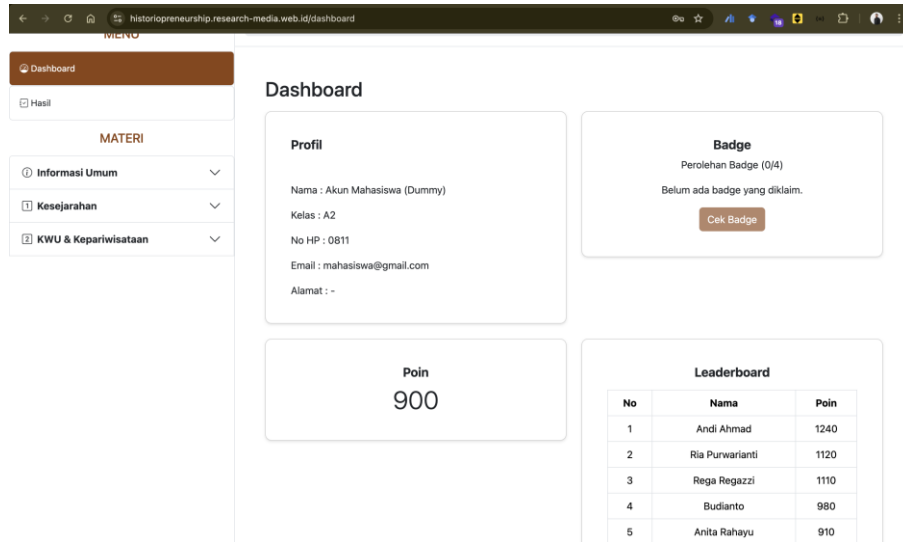
After logging in, lecturers can perform data management which includes managing class data, evaluation scores (assessments), reflection scores, and student data. These functions allow lecturers to monitor student progress, provide constructive feedback, and manage information relevant to learning. This diagram shows the integration between the roles of students and lecturers in the system, with a focus on supporting learning activities and efficient data management. This reflects a system designed to support the collaborative learning process between lecturers and students. This approach not only enriches students' learning experience, but also promotes historically relevant entrepreneurship-based learning, creating a competitive, innovative, and entrepreneurial young generation.

### Development Phase



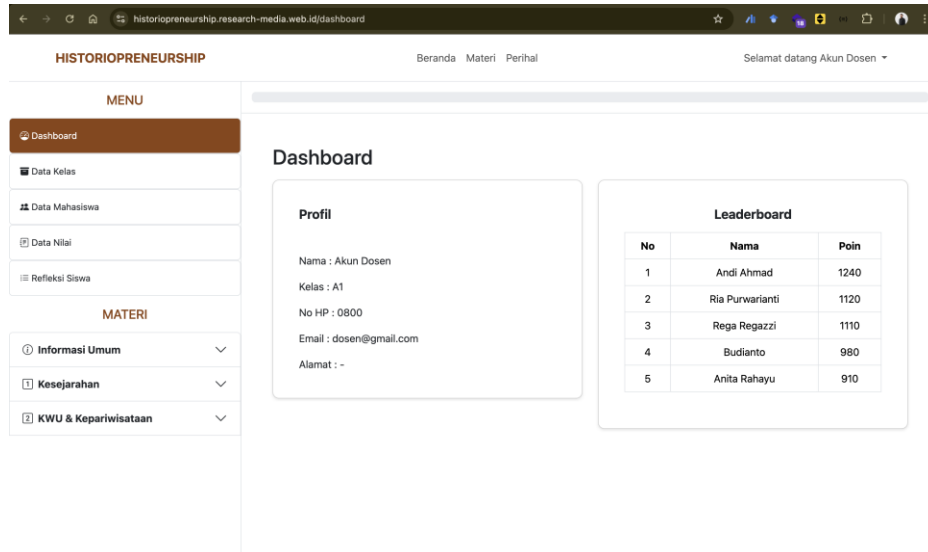
**Figure 4.** Home page

The homepage of the Gamification of Historiopreneurship Learning Device at Lambung Mangkurat University is designed to provide an attractive and informative first impression for users. The homepage displays a brief description of the objectives of history-based entrepreneurship learning, with intuitive navigation to key features such as materials, assignments, games, and leaderboards. The page is equipped with visual elements that reflect historical and entrepreneurial values, such as distinctive icons and an elegant color palette.



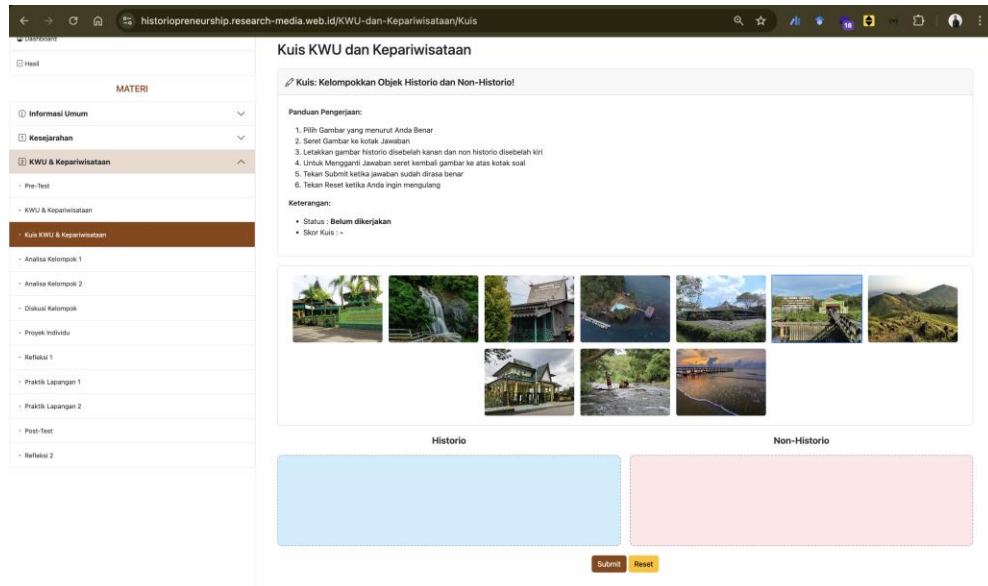
**Figure 5.** Gamification implementation page

Gamification elements are at the heart of the Historiopreneurship learning tool, providing a more engaging and motivating learning experience. Points are awarded for each activity completed, such as completing materials, answering quizzes, or playing games. Badges are given as symbols of certain achievements. Leaderboards display student rankings based on points, encouraging healthy competition between users. Progress bars are used to show how far students have completed the learning, providing a visual view of their progress and encouraging them to achieve overall learning goals.



**Figure 6.** Student management page by teacher

The lecturer page is designed to support efficient and comprehensive learning management. On this page, lecturers can easily manage student data, such as name lists, attendance status, and learning outcomes. In addition, lecturers can set and monitor assessment scores, both from pre-tests, post-tests, and quizzes that have been conducted. This page also allows for the management of reflection data, providing lecturers with insight into student understanding and feedback. The class data management feature allows lecturers to organize classes based on specific categories, facilitating more structured and personalized teaching.



**Figure 7.** Games in media

The games integrated into this learning tool are designed to provide a fun and educational learning experience. Each game is tailored to the content of entrepreneurship and history materials. In this game, students can apply the concepts they have learned, earn points, and improve their position on the leaderboard. The integration of games into the material aims not only to improve student understanding, but also to strengthen learning motivation through a creative and innovative approach.

**Table 4.** Results of media validation by experts

| Aspect                   | Expected Score | Achievement Score |             | Achievement Percentage (%) | Validity    |
|--------------------------|----------------|-------------------|-------------|----------------------------|-------------|
|                          |                | Validator 1       | Validator 2 |                            |             |
| Content Quality          | 10             | 4                 | 3           | 70                         | High        |
| Learning Goal Alignment  | 10             | 4                 | 4           | 80                         | High        |
| Feedback and Adaptation  | 10             | 3                 | 4           | 70                         | High        |
| Motivation               | 10             | 4                 | 3           | 70                         | High        |
| Presentation Design      | 10             | 3                 | 4           | 70                         | High        |
| Interaction Usability    | 10             | 4                 | 4           | 80                         | High        |
| Accessibility            | 10             | 3                 | 4           | 70                         | High        |
| Standards Compliance     | 10             | 4                 | 3           | 70                         | High        |
| <b>Total Achievement</b> | <b>80</b>      | <b>29</b>         | <b>29</b>   | <b>72</b>                  | <b>High</b> |

The validation results show that the interactive historiopreneurship learning media has a relatively high level of validity with a total achievement percentage of 72%. Each aspect assessed includes content quality, alignment of learning objectives, feedback and adaptation, motivation, presentation design, usability of interaction, accessibility, and compliance with standards. The percentage of achievement in each aspect varies, with the highest value of 80% for the aspects of "Learning Objective Alignment" and "Usefulness of Interaction", which reflects the strength of the media in helping students achieve learning targets and interact effectively. However, there are several aspects with an achievement percentage of 70%, such as "Content Quality", "Motivation", and "Accessibility", which although quite good, indicate that there is room for further improvement.

Thus, the results of this validation indicate that this media is generally adequate for use, but still requires development in certain aspects. In detail, the validation of the "Content Quality" aspect obtained a score of 70%, which means that the media content is quite relevant to the learning material, but there is still an opportunity to add more in-depth or innovative elements. The aspect of "Learning Objective Alignment" which achieved 80% shows the suitability between the material and the objectives to be achieved, but it is necessary to ensure that all media components support the achievement of competencies holistically. For the aspect of "Feedback and Adaptation", a score of 70% indicates that the media has provided good feedback, but there is still a need to adjust the adaptation features to be more responsive to the individual needs of students. The same thing applies to the aspects of "Motivation" and "Presentation Design", both of which achieved 70%, indicating the need for additional efforts in enriching visual elements and design to increase user appeal. In addition, the aspect of "Accessibility" also showed quite good results with the same percentage, but it is important to pay attention to the needs of students with certain disabilities.

The aspect that received positive attention was "Interaction Usability" with an achievement of 80%, reflecting that this media is easy to use and can support the learning process well. However, the aspect of "Standard Compliance" with a score of 70% shows that although this media has complied with most of the standards set, some adjustments are still needed to meet the standards optimally. Overall, these results provide an overview that this learning media can be categorized as valid and has good potential to be implemented. However, to improve its quality and effectiveness, further development of design elements, feedback mechanisms, and accessibility is recommended. In addition, further testing involving a wider group of users is also needed to ensure that this media has a significant impact on the learning process.

### **Implementation phase**

In the implementation phase of gamification learning tools, the first step that needs to be taken is thorough preparation, including analyzing student needs and selecting an appropriate platform. Educators need to understand student characteristics and their learning styles to choose the most effective gamification elements, such as points, badges, levels, or challenges. Learning designs involving these elements must be clearly structured so that learning objectives can be achieved optimally. After preparation, gamification tools can be implemented by integrating game elements into the learning process, such as giving points for achievements, creating a level and badge system to celebrate student success, and adding a leaderboard to motivate competition-oriented students.



**Figure 8.** Implementation of Post-test

In addition, the challenges and missions that students must complete are often packaged in the form of narratives or stories to make learning more interesting and meaningful. During implementation, it is important to monitor student progress through the platform used, provide constructive feedback, and make adjustments if necessary to maintain student effectiveness and motivation. Ultimately, evaluation of learning outcomes is essential to measure the impact of gamification on student motivation and achievement, both through analysis of learning outcomes and direct feedback from students to find out which aspects need to be improved. Thus, the implementation phase of gamification learning tools does not only focus on technical implementation, but also on continuous monitoring and evaluation to create a more enjoyable and effective learning experience.

## **5 Conclusion**

The implementation of gamification learning tools requires thorough preparation, starting from analyzing student needs, learning design, to selecting the right platform. Integrating gamification elements such as points, levels, badges, challenges, and narratives into learning can increase student motivation, engagement, and learning experience. During implementation, it is important to monitor student progress, provide constructive feedback, and make adjustments to ensure the gamification system remains effective. Evaluation of learning outcomes through analysis of student achievement and feedback from them will provide insight for improving the system, so that gamification learning tools can continue to develop and have a positive impact on the learning process.

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