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Study of the Application of Gamification in Korean Language Learning Applications

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Abstract

This study aims to analyze the application of gamification in a mobile-based Korean language learning application. The increasing popularity of mobile devices and the demand for interactive learning experiences make mobile apps a commonly used tool in language learning. Gamification, applying game design elements in a non-game context, has increased user motivation and engagement. This study investigates how gamification elements such as points, badges and leaderboards can be integrated into a mobile language learning app aimed at Korean language beginners to enhance the learning experience. Qualitative research methods were used, involving developing and implementing a prototype app integrating gamification elements. The research participants were beginners who had just started learning Korean and were asked to use the app for a period of time. During post-use interviews, data was collected to evaluate the effectiveness of gamification in increasing engagement and motivation. The results showed that gamification elements significantly increased user engagement and motivation, improving learning outcomes. The addition of features such as progression levels and daily challenges was also shown to encourage users to be more consistent in learning. The spiral development method was applied to this application. This method involves iterative iterations between planning, development, testing and evaluation, allowing for improvements based on user feedback. Each development cycle focused on refining the gamification elements and improving the app's functionality.

Keywords: *Gamification, Korean Language Learning App, Game Design, Spiral Development Method, Educational Technology*

1. Introduction

The development of the times affects how qualified an individual or group is. For this reason, learning a foreign language is not unusual in today's era. Instead, it has become necessary for some individuals who prioritize education and a commensurate career. If someone can master at least one foreign language, it will benefit the individual who mastered it. A few years ago, Korea was not enjoyable, but in this 21st century, Korea has become necessary for international relations. This can be seen in the many economic attacks and Hallyu (Korean Wave), which made Korean a language that is in great demand and can be taken into account. To prove how many Korean language enthusiasts in Indonesia, it can be traced first how many Indonesians like K-Pop (Korean Wave). In the face of this challenge, technology is a solution that can enhance the learning experience. One technology that is currently widely applied in various educational sectors is gamification. Gamification uses game elements, such as points, badges and leaderboards, to increase participant motivation and engagement in a non-game context. By using gamification in Korean language learning applications, the learning process is expected to become more interesting and fun, and it can encourage beginners to be more active in following the learning material [1].

In addition to gamification, the spiral software development method is a practical choice for creating fast and flexible applications. With the spiral approach, Korean language learning apps can be developed faster and customized according to user needs. This method allows the creation of applications that are adaptive to rapid feedback and change, thus providing a learning experience more aligned with user needs.

This research aims to design and develop a mobile and web-based Korean language learning application that combines gamification and the spiral method. The app will be designed for beginners and include basic learning materials covering vocabulary, grammar, and essential phrases. This research aims to evaluate the app's effectiveness in improving Korean language beginners' motivation, engagement, and learning outcomes. Thus, this research is expected to create innovative solutions in technology-based language learning that are fun, efficient, and easily accessible to various groups.

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To research the design of android-based Korean language learning applications, researchers first look for sources that relate to the design that researchers will do. One is "Learning is a complex system whose success can be seen from two aspects, namely the product and the process aspects." [2].

2. Research Methods

The spiral model or spiral method is a form of evolution that uses the natural iteration method of the prototyping model and combines it with the systematic aspects developed with the waterfall model. The prototyping stage is a model where software is made a prototype (incomplete model), and the example is shown to the user or customer to get feedback. Suppose the prototype is in accordance with the user's or customer's wishes. In that Case, the process continues by making the actual product by adding and fixing the shortcomings of the prototype [3].

The spiral model is divided into several framework activities, also known as task areas, which range from three to six task areas. Such task areas include customer communication, which is necessary to establish effective communication between developers and customers; planning, which involves the definition of resources, scheduling, and other project-related information; risk analysis, which considers both technical and management risks; engineering, which consists in building one or more representations of the application; construction and rollout, which includes building, testing, installing, and providing services to users, such as training and documentation; and user evaluation, which aims to gather feedback from users based on the assessment of the software representation created during the engineering stage and implemented during the rollout stage [4].

In the spiral model, software is developed in stages. During the initial iteration, incremental releases may be paper models or prototypes. In subsequent iterations, a more complete version of the engineering system is produced [5].

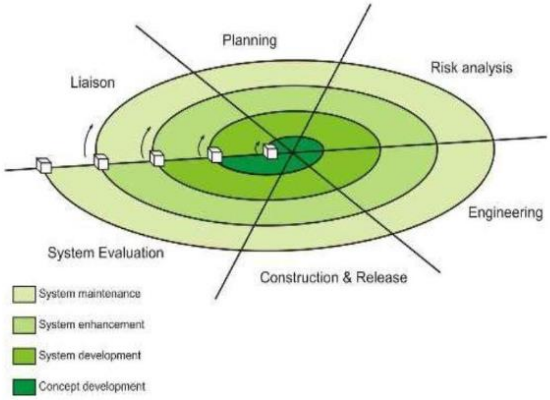

Figure 1. Spiral Methods

From the figure, the process starts from the core, moving clockwise around the spiral. The first pass of the round results in the development of product specifications. Subsequent rounds are used to develop a prototype and progressively more sophisticated software versions. Each trajectory through the planning area results in adjustments to the project plan. Costs and schedules are adjusted based on feedback concluded from customer evaluations. The project manager will increase the number of iterations as needed.

Stages of the Spiral Model:

a. Liaison
   The liaison stage (or consultation stage) is one of the stages in the system development process that aims to interact and communicate with stakeholders or parties.
b. Planning
   Planning Stage: The planning stage establishes communication between the person who will develop the software (system analyst) and the clients. The planning stage also includes estimating the costs used, time limits, setting schedules, identifying the work environment, and sources of information to perform iterations [6].
c. Risk Analysis
   We will conduct risk identification, evaluation, and risk mitigation strategy development at this stage. By conducting risk analysis at each spiral cycle, we can ensure that risks in system development can be adequately managed and do not hinder the achievement of predetermined goals.
d. Engineering
   At this stage, the system begins to be built or developed technically. This stage involves the system's design, development, and implementation in stages.

e. Construction & Release
At this stage, the system that was designed at the previous stage is fully built and implemented. This stage involves the testing process, system launch, and user training.

f. Evaluation
At this stage, we evaluate the system built and launched into the production environment. At this stage, the system development team will consider ensuring that the system runs well and meets user requirements [7].

2.1 Application Design System

a. Use Case Diagram
A use case diagram is a type of UML diagram that describes the interaction between the user (user) and the system in a particular environment. Use Case describes an interaction between one or more actors and the information system to be created. Roughly speaking, a Use Case is used to determine what functions have the right to use these functions [8].

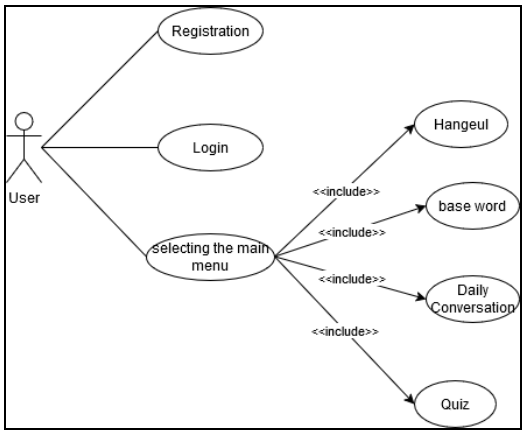

Figure 2. Use Case Diagram

Figure 2 describes the flow of application usage. When opening the application, users will be greeted with a splash screen and directed to the login page. If the user already has an account, they can log in immediately, and once their credentials have been verified, they can enter the homepage. Users who do not have an account can click on the "Register" text below the login button to register. Once the registration process is complete, users will be redirected to the login page and the homepage. The homepage has several main menus, namely Hangeul, Basic Words, Daily Conversation, and Quiz. Basic Korean language materials, such as Hangeul letter recognition, basic vocabulary, and daily conversation, can be accessed through these menus. To test the user's understanding, there is a Quiz menu containing 10 questions, where after completion, the user's score will be displayed immediately [9].

b. Entity Relationship Diagram
Entity Relationship Diagram (ERD) is a data model that contains detailed information utilizing a graphical representation, making it easier to complete the development of a system and helps meet the needs of system analysis [10]. An Entity-Relationship Model (ERM) is an abstract and conceptual representation of data in software engineering. Entity-relationship is one of the database modelling methods used to generate a conceptual schema for a system's semantic data types/models. Where systems often have relational databases, and the provisions are top-down. The diagram to describe this Entitiy-Relationship model is called an Entitiy-Relationship diagram, ER diagram, or ERD [11].

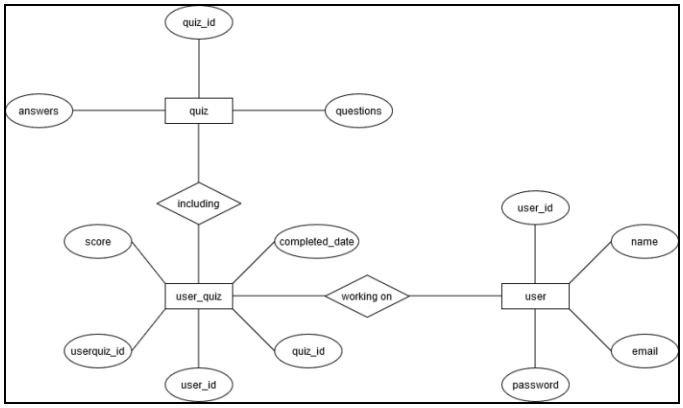

Figure 3. Entity Relationship Diagram

ERD has three essential elements: entities, attributes, and relationships.

1. Entity
   Entities are objects that will be of interest in a database. Entities can be people, places, things, or conditions regarding the data needed. The symbol of an entity is rectangular.
2. Attributes
   Attributes are information contained in the entity. An entity must have a primary key to characterize the entity and descriptive attributes. Attributes are usually located in the entity table or can be separated from the table. The symbol of an attribute is an ellipse.
3. Relationships
   Relationships in ERD are relationships between two or more entities. The symbol of the relation is rhombus-shaped. ERD, namely, can own several kinds of relationships:
   a. One to One
      One member of an entity can relate to one member of another entity.
   b. One to Many
      One member of an entity can be related to several members of another entity.
   c. Many to Many
      Several members of an entity can be related to several members of another entity [12].

3. Results and Discussion

The results show that applying the spiral method and integrating gamification elements in a Korean language learning application successfully increased user motivation and engagement. Users reported that the app made the learning process more fun and interactive. In addition, the evaluation results showed significant improvements in vocabulary and grammar comprehension. The iterative approach adopted made it possible to refine the app continuously based on user feedback. However, further research is needed to test the effectiveness of gamification on a more diverse group of users and over a more extended period.

1. User Interface
   User Interface is a display that interacts directly with the user. The user interface also aims to connect users with the system so that electronic devices such as computers, tablets, smartphones, and other devices can be appropriately operated [13].
   a. Splash screen
      The splash screen is the initial page when the user opens the application. This page will display the logo and application name for 3 seconds. The splash screen image can be seen in the following figure 4 [14].

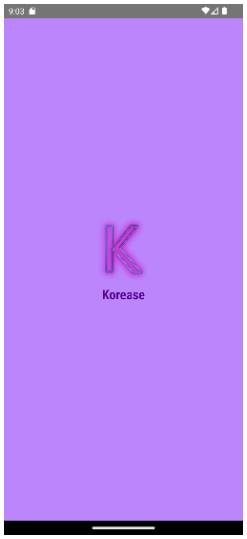

Figure 4. Splash Screen

b. Login Page
The login page is a display to enter the system. Customers can enter their email and password here after registering or when already registered. The login button is used to enter the system. The appearance of the login page is shown in Figure 5 [15].

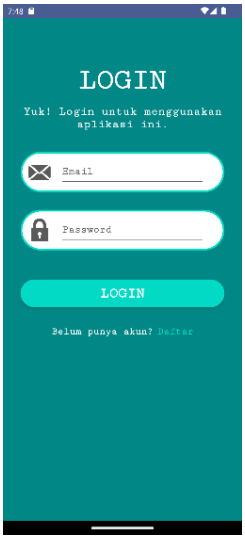

Figure 5. Login Page

c. Registration Page
The Register page is intended to provide access to certain features to new users who have not registered for the system [16]. Users must fill out a registration form consisting of name, email, password, and re-enter password.

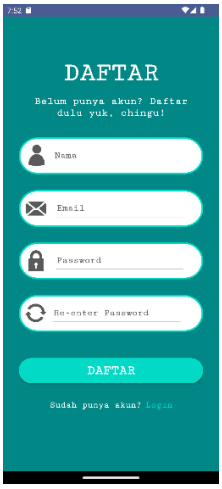

Figure 6. Registration Page

d. Main Menu

The main menu is a menu that displays sub-subs that can be viewed by members [17]. The contents of the main menu are the hangeul submenus, essential words, daily conversation, and quiz.

Figure 7. Main Menu

e. Hangeul Menu

This hangeul menu contains materials about hangeul letters. There are definitions, types of hangeul letters, and instructions on how to write and construct sentences in Korean. Hangul is an alphabet used to define the letters of the sounds or tones of the Korean language. The Hangul alphabet consists of 24 characters, 14 consonant characters, and 10 vowel characters [18].

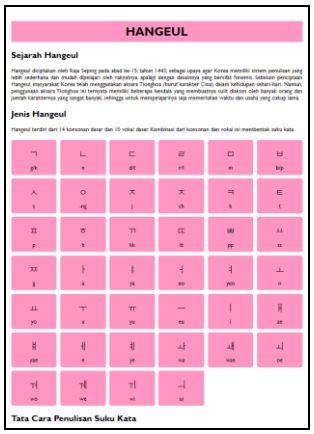

Figure 8. Hangeul Menu

f. Basic Words Menu

This menu contains material about some essential words in Korean, such as mentions in the family environment, pronouns of people, animals, fruits, vegetables, colours, foods, and objects.

Figure 9. Basic Words Menu

g. Daily Conversation Menu
This menu contains material about conversations or sentences often used for daily conversations. This can make it easier for beginners to chat with native Koreans.

Figure 10. Daily Conversation Menu

h. Quiz Menu
This quiz menu is used to test the ability of beginner learners. By using gamification, this quiz becomes more exciting and interactive. A quiz is a form of game or thinking where players (individually or in teams) attempt to answer questions correctly [19].

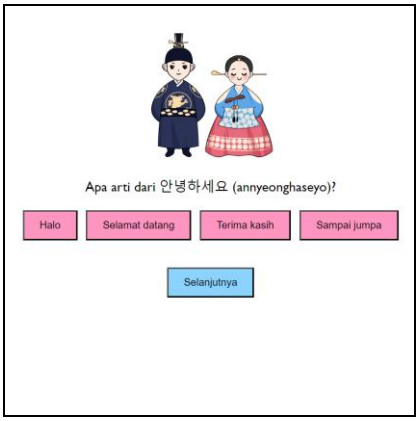

Figure 11. Quiz Menu

i. Profile Page
This page contains user profile details. Users can also edit inappropriate data such as name, email, and password [20].

Figure 12. Profile Page

3. Conclusion

This research successfully demonstrates that applying the spiral method and integrating gamification elements in Korean language learning applications is a practical approach to increasing user motivation, engagement and comprehension. The main advantage of this approach lies in the flexibility of the spiral method, which allows adaptation to changing user needs and technological developments. In addition, gamification elements create a more engaging and challenging learning experience, thus motivating users to continue learning. Nonetheless, this study has some limitations, including the limited sample size and duration and the lack of variation in user profiles, which limits the generalizability of the results to a broader population. For further development, research can be conducted on a larger scale and more extended period to confirm the results obtained. In addition, the development of artificial intelligence algorithms to personalize the learning experience and the integration of virtual reality or augmented reality technology could be an interesting direction in increasing interactivity and immersiveness in language learning.

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