Entrepreneurial Innovation in German Language Education: Integrating Gamification on the BRIX Application-Based Platform

Ibrahim Asmorodina [1], **Erin Alida Damayanti** [1], **Muhammad Iqbal Ikhsani** [1], **Yovika Indrisani** [1], **Desti Nur Aini** [1]

[1] *University of Malang*
Jl. Cakrawala No 5, Sumbersari, Lowokwaru sub-district, Malang City, 65145, East Java, Indonesia

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Corresponding Author:
Ibrahim Asmorodina
ibrahim.asmorodina.2002416@students.um.ac.id

Abstract. The landscape of German language learning has undergone a transformative shift propelled by technological advancements and innovative methodologies. Mobile learning (M-Learning) through purpose-built applications and software has emerged as a powerful tool, significantly enhancing students' language proficiency. Among these innovative approaches, the integration of gamification elements has proven to be interactive and practical in language education. Framed within a development research paradigm, this research focuses on infusing gamification elements into German language learning using the application-based platform "BRIX". The research methodology encompasses various phases, including needs analysis, design of the BRIX platform, development, limited trials, evaluation, and the launch of the BRIX application model. The findings indicate a positive impact on the German language learning process for senior high school students in the Malang Region. Furthermore, recommendations are made for future enhancements, emphasising the involvement of multiplayer elements to foster a social and supportive learning environment. This entrepreneurial initiative revitalises language education and explores avenues for collaborative and innovative learning experiences.

Keywords: m-learning; German language; gamification; platform.

INTRODUCTION

German language learning is an additional subject in the curriculum applied at the high school level. However, German learning problems often need to be understood and addressed. One of the problems is limited access to inadequate learning resources. In addition, student motivation is usually low, especially in understanding the benefits of German in everyday life. German teachers also face difficulties motivating students to learn German, mainly if they have limited teaching resources. These challenges often hinder learning German in Indonesia, especially in the Malang Region.

In the Society 5.0 era, information and communication technology are integrated and closely related to daily life. According to Mayumi Fukuyama, the Industry 4.0 era focuses more on the production process. At the same time, Society 5.0 emphasises humans as the centre of innovation (human-centred) while technological advances are used to improve the quality of life and social responsibility and develop sustainability. The Society 5.0 era, characterised by the deep integration of information technology in daily life, has affected all aspects of human life, including education. Within the framework of 21st-century educational opportunities, education is no longer limited to a physical classroom environment with conventional textbooks as the primary source of learning. Instead, innovation in learning methods has become necessary, especially in foreign language learning such as German.

The exploration of learning that applies the 6C strategy (Communication, Collaboration, Critical thinking, Creativity, Character, and Citizenship) is expected to answer the increasingly complex

demands of 21st-century education. Implementing 6C in German language learning is essential to equip learners with relevant skills per the demands of the Society 5.0 era, which is filled with complexity, uncertainty, and high dynamics.

Gamification is an approach that combines game elements in a non-game context, in this case, education. Game elements, such as points, achievements, leaderboards, missions or tasks, and rewards, are integrated into learning media to make the learning experience more exciting and fun. These constructive advantages make gamification an attractive option in teaching and learning management activities.

According to [6], gamification can motivate students to complete tasks, face learning challenges, and compete in learning [7]. Students' responses in applying the gamification concept will be returned immediately after completing a task or challenge. This plays a significant role in helping students understand their mistakes, and students will try to fix them [6].

One of the forms of gamification in German is the BRIX (Bring Resource Innovative Experience) video game. The use of BRIX includes learning as the main element and involves games and multimedia, thus further encouraging students' interest in learning.

Figure 1

The game consists of 3 rounds at five different difficulty levels. By presenting questions with varying levels in each round, this game can be one of the interactive games that improve German language skills. It must be recognised that the application of gamification in education affects student engagement and motivation in learning and measures more detailed progress of skills.

Through the BRIX platform, this research aims to explore the role of gamification in the German language learning process at the high school level in the Malang Region. In this context, BRIX is a system or platform that will be used to apply the concept of gamification in German language learning.

As such, it will provide essential insights into the impact and effectiveness of using gamification in the context of German language learning in the region, with the potential to enhance students' learning experience.

MATERIALS AND METHODS

Gamification is utilising game elements and ideas in a non-game context to improve target behaviour and involvement [9]. This learning model emphasises the gamification method. The perspective from this method is that someone can be motivated in the learning process, i.e. to appeal to their interest in learning the German language. This learning model has essential elements.

Figure 2 – Basic Elements of Gamification

Gamification consists of 5 essential elements, including 1) points is, an indication that students complete gamification; 2) badges are given to the students who finish their assignment; 3) the level of reference that students required to do; 4) an indication of students ranking, 5) students' visual representation in gamification.

Data collection is the initial phase to be integrated into the BRIX platform, and the literature study will be from reliable official sources such as German dictionaries and textbooks. The research method includes several phases: need analysis, BRIX platform design, development, limited trials, evaluation, and application launching.

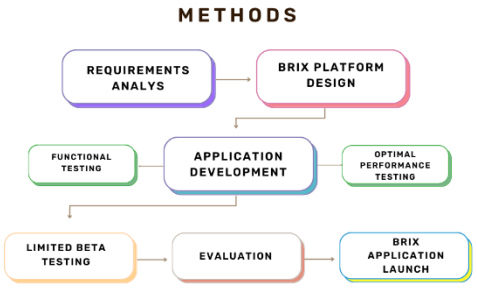

Figure 3 – Stages of BRIX Application Development

Need Analysis. In this phase, researchers examine BRIX platform users' effective and efficient media needs, which involves collecting observation results and discovering their needs.

The BRIX Platform Design Phase. The steps for designing the BRIX platform are clarified in this phase. This application includes the creation of models such as 1) the player module, 2) the login module, 3) the German Language given A1 module, 4) the scoring module, 5) the level module, 6) the question module, 7) the answer module, 8) the main menu module.

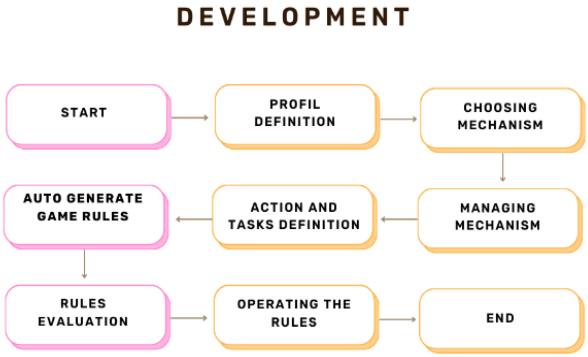

Figure 4 – Development stage flow

Development Phase. This phase is separated into two sections: functional performance testing and optimal performance testing. The functional testing ensures that the application performs as expected and corresponds with the predetermined functional criteria. There are multiple steps in functional testing, which involve test planning, case design testing, implementation testing, result analysis, retest and verification analysis, final testing, and testing for acceptance. Followed by optimal performance testing to guarantee that it could function correctly and deliver satisfactory performance to the users. The steps consist of performance testing planning, performance measurement, result measurement and analysis, application optimisation, retesting and validation, final testing and approval, reporting results and performance system maintenance.

The application can be considered to function optimally after going through the following sections,

1) start resource planning, budgeting, and schedule of the project,

2) profile: general description of the game, including learning content, difficulty levels, target audience, and learning objectives,

3) selecting the mechanism: choosing the types of game to be used depending on the learning objectives,

4) management mechanism: setting up the game's mechanism, such as points, lives, time, characters and levels,

5) action and tasks: informing players about the game rules,

6) game rule: the use of automated technologies to construct game rules dynamically depending on the game profile, the mechanism of the game, and predetermined actions/tasks;

7) rule evaluation: this is required to determine whether the game coincides with the learning objectives,

8) process of the game: players will interact with the game and complete the missions,

9) completion: monitoring and managing the application continuously.

Limited Trials Phase. Limited trials are conducted only for several beta users in integration, system, performance, and security testing.

Evaluation Phase. After the limited trials phase, the program will receive updates, fix bugs, improve speed, and bring new features.

The Application Launch Phase. This is the final development phase, and the application will be launched once all mechanisms and components have been installed and all phases have been completed. The evaluation will also continue, including bug fixes and performance improvements.

RESULTS AND DISCUSSION

Information Technology (IT) has a tremendous impact on broadening student's access to diverse learning resources [10]. Particularly in German language learning, one of the key benefits of IT access is that students can quickly receive the latest learning materials. They can read the latest ebooks on grammar, vocabulary, or specific themes in the German language as it evolves. This condition allows students to stay up-to-date on advancements and trends in German language learning [11]. IT access provides students with the opportunity to learn independently in addition to accessing different and up-to-date information [12].

The Society 5.0 era is defined by the rapid expansion and development of science and technology, and it is marked by the increasing integration of digital technology into all aspects of human life. Education is not exempted from these developments because it may offer students a new learning experience. Some of the learning experiences in the Society 5.0 era include 1) remote distance learning, 2) personalised learning, 3) interactive learning involving both students and teachers, 4) data-driven learning, and 5) project-based learning. Education must adapt to digital technologies and prepare graduates to gain digital skills in this Society 5.0 era. Education can become more economical, easily accessible, and adaptable due to digital technology.

In the diverse context of German language learning, the ease of access given by Information Technology increases students' learning experiences and helps them obtain deeper insights [13]. Digital learning media in the form of applications and software specifically intended for German language education have become one of the most successful and widely used instruments for improving students' language skills [14]. The fundamental advantage of media platform applications is the simplicity with which they can be accessed, allowing students to practice the German language whenever and wherever they desire, using their mobile devices or tablets. BRIX is one of the latest German language learning applications.

Various forms of information dissemination enable the discovery of opportunities for showcasing currently under-developed products and businesses. Market opportunities can be identified through the significant interest of the general public, including students and individuals, in studying the German language to improve their language skills [15]. As a result, the development of BRIX is based on the community's need to improve language skills, which positively impacts learning sustainability through various learning approaches, such as vocabulary exercises with gamification [6]. The primary benefits of the German language learning application are its simplicity and adaptability. Students can download this application anytime and anywhere on their smartphones or tablets [8].

The effectiveness of BRIX in enhancing German language proficiency includes aspects of learning, interactivity, skills assessment, and technology support. As an initial step, it was determined that learning should be understandable and tailored to the needs of learners in mastering the German language, focusing on listening (hören) and writing (*schreiben*). The users of this application trial were students from SMAN 1 (Senior High School) Bululawang Malang Regency, considering that there were significant learning challenges and issues related to listening and writing abilities that were complicated to master. The observation results indicate students tend to favour collaborative learning and gamification methods. This is due to the dynamic and entertaining experience in the classroom. Students are more motivated to learn and retain more of the vocabulary they have learned. The usage of educational media can assist students in understanding their studies while also creating a fun and engaging classroom environment [16, 17].

Learning media is a crucial instrument, particularly in the teaching and learning process. Using learning media during the instructional orientation phase improves the learning process and the delivery of messages and the lesson content at that time [18].

In addition to being a learning instrument, one digital learning media uses game platforms, which significantly impact children's physical and cognitive development. According to the research, some strategic games can dramatically influence children's problem-solving skills and socialising [19].

The following are some of the benefits of the BRIX application: 1) offline usage, it can be used without an internet connection, eliminating the need for an internet connection or internet quota while using it; 2) German language learning in both visual and audio methods, 3) interactive tasks such as multiple-choice questions, fill in the

blanks, and matching exercises to practice A1-level Grammar integrated with games, 4) this application features high-quality audio from native speaker with clear pronunciation, 5) the language in the application is translated by native speakers, ensuring the authenticity without the use of online translation tools, 6) it offers a simple yet engaging user interface, 7) users can access and use the application at any time and anywhere; and 7) the application provides evaluation in the form of points and is linked to teachers. However, the disadvantage of the BRIX application is it does not have a feature for speaking practice skills (*sprechen*). Furthermore, the selection of questions is limited to the A1 or primary level.

Before proceeding to the next trial level, BRIX performs an expert validation procedure to determine the media's usefulness as a learning medium. Both the content and the media are validated. Content validation comprises two significant aspects: content relevancy and presentation suitability. Content relevancy encompasses assessment indicators, including a) alignment with the learning objectives, b) material accuracy, c) up-to-date material, and d) stimulus for generating curiosity. Meanwhile, the presentation suitability aspect includes presentation technique indicator, learning presentation, coherence and the logical flow of thinking, and language presentation. Media validation includes content and objective, instructional, and technical aspects.

CONCLUSIONS

The BRIX platform provides various significant advantages for students in enhancing the learning experience of the German language. Gamification methods have been shown to increase student motivation and participation in the learning process. The platform's flexibility allows students to learn on their schedule while also providing a variety of interactive exercises that support the development of German language communication skills. Tracking progress and assessing objectively is valuable in increasing learning quality. The learning content should be enhanced with various extensive and interactive aspects to appeal to students' interests. Features focusing on speaking skills (*sprechen*) are being considered for further development to fulfil all four language skills in a single application. Additional recommendations for engaging multiplayer features are required to improve collaboration and extended social engagement, resulting in a friendly and supportive learning environment. By continuously developing and enhancing the BRIX application, students are assisted in efficiently increasing their German language skills while making language learning entertaining.

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