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Analysis of the Effectiveness of Gamification Elements in Mobile-Based English Learning Applications for Elementary School Students

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ABSTRACT

The limited engagement and motivation of elementary school students in traditional English learning methods present a challenge that mobile-based language learning applications can address. This research examines the gamification elements in three popular mobile-based English learning applications—Duolingo, Busuu, and Simpler—to evaluate their effectiveness in enhancing student motivation and learning outcomes. The study employs a descriptive comparative method, utilizing observation sheets as research instruments to analyze the presence and impact of gamification features such as points, leaderboards, levels, missions, and achievements. Data were analyzed using literature review and document analysis techniques to compare gamification strategies across the applications. The results reveal that Duolingo excels in utilizing gamification features comprehensively, fostering high user engagement through competitive and achievement-driven elements. Busuu integrates gamification with social interaction, emphasizing collaborative learning experiences, while Simpler employs minimal gamification with a focus on simplicity and accessibility. Overall, gamification enhances user motivation and supports language skill development, including reading, writing, speaking, and listening. This study highlights the potential of gamification-based mobile learning to address challenges in traditional education and provide engaging, effective learning experiences tailored to digital-native students.

Keywords: *Gamification, Language Learning, Mobile Applications, Mobile Learning Quadrant, Learning Motivation*

INTRODUCTION

Language learning is a crucial aspect of primary education. Mastery of language can enhance communication skills and open broader opportunities for students in the future. However, traditional learning methods are often less engaging for primary school students, necessitating innovative approaches to improve engagement and learning motivation. According to Jayawardana (2017), traditional methods tend to be monotonous and textual, making lessons less interesting and even boring for students. Traditional methods may not meet the learning needs of students living in the digital era. Students accustomed to technology and the internet might perceive non-digital learning methods as outdated and less relevant to their daily experiences. Consequently, learning methods that do not integrate technology can hinder students from developing their capabilities optimally. Language learning should integrate social and communicative interactions to enhance effective understanding and usage of language.

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Sufyadi et al. (2021) explained that traditional teaching styles are inconsistent with the guiding principles for learning and assessment issued by the Ministry of Education, Culture, Research, and Technology. These guidelines emphasize that Merdeka Curriculum learning should utilize teaching tools such as digital teaching modules, educational videos, and other forms like applications. Interactive learning processes align with the principles of learning and assessment in the Merdeka Curriculum. Wirawan et al. (2020) argue that interactive learning allows students to actively engage with learning materials through digital media, such as videos, audio, and animations. A prior study by Warsita (2010) adopted mobile learning as a learning model using mobile technology, where devices like mobile phones can be effectively utilized as digital learning media. According to Quinn (2011), mobile learning is a type of e-learning facilitated through mobile devices, offering the benefit of learning materials being accessible anytime by users.

Mobile learning (m-learning) is a suitable model for interactive learning methods as it can adopt multimedia formats that include text, images, and audio, while minimizing video and animation due to content size limitations. This makes it easily accessible via gadgets and provides engaging, comprehensible learning materials. This is supported by the article "Generation Alpha and Education 4.0" which describes Generation Alpha as those born in 2010 and beyond—the first generation born into a digital world, already highly familiar with digital technology. Based on data from Statistics Indonesia (BPS) in 2022, 33.44% of early childhood children in Indonesia use mobile phones or wireless devices, while 24.96% have internet access.

A hands-on approach in education emphasizes direct and practical learning experiences, allowing students to actively engage in language learning activities. This method enables them to apply theoretical concepts in real-world practices, potentially enhancing proficiency in the four primary language skills: reading, writing, speaking, and listening. According to Rismayanti et al. (2015), hands-on learning is better known as authentic learning or experiential education. This approach encourages students to actively explore information, ask questions, engage in activities, discover, and draw conclusions directly through learning experiences. In primary schools, this approach has proven significantly beneficial for students' learning. Jasni et al. (2018) stated that gamification involves the use of game elements such as points, badges, and rankings, which can enhance students' motivation and engagement, fostering a positive attitude toward language learning.

Referring to the book Mobile Learning Mindset (Hooker, 2016:200), classroom learning across generations has remained similar, focusing on reading and writing within the curriculum framework. Content is taught sequentially while students repeat tasks. Over time, traditional teaching styles have gradually adapted to modern developments. Repetitive tasks can incorporate gamification methods to foster critical thinking. Providing mobile devices to students will not improve learning outcomes or test scores without changes in student learning methods. Knowledge and application of the Mobile Learning Quadrant model involve four main components: space, time, content, and interaction.

According to Sobrino-Duque et al. (2022), the impact of gamification on an experimental study comparing groups using gamification and traditional methods showed that the gamification group exhibited better knowledge retention after one week of testing compared to the traditional group. Gamification offers significant benefits for learning applications in general. Firstly, it increases students' motivation and participation in the learning process by adding game elements that make learning more enjoyable and challenging, thereby increasing their interest in learning (Wibowo & Romdhoni, 2015). Secondly, gamification enhances students' creativity. By presenting challenges in the form of games, students are encouraged to think critically and strategically in solving tasks (Setiyawan et al., 2019). Thirdly, the use of gamification elements such as levels, points, and badges provide positive feedback to students, improving their learning experience (Hidayat, 2021).

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According to Chou (2019:23-25), effective gamification enables students to use their creativity and receive instant feedback, creating an environment where they feel motivated to solve problems and actively develop skills. Brockmann et al. (2017:8) explained in their book *Gamification: Using Game Elements in Serious Contexts* that gamification describes specific game components, including points, leaderboards, levels, missions, and achievements. At the data representation and algorithm level, according to Hunicke et al. (2004), gamification significantly influences user motivation and engagement. It is essential to note that gamification differs from game rules. Gamification emphasizes determining appropriate behaviors, such as applying game levels. Game levels are part of game mechanics that allow users to move up or down levels (e.g., increasing character status) within a system.

Based on the studies described above, gamification-based mobile learning can increase student engagement in learning in general. Given the rapid development of digital application usage, this research remains relevant. This study will focus on the use of gamification in mobile learning for language learning with a hands-on approach. This approach addresses the limitations of media, time, and space in traditional learning methods. The novelty of this study allows for the application of theory into practice, potentially enhancing proficiency in the four primary language skills: reading, writing, speaking, and listening, in primary schools.

In conclusion, integrating gamification-based mobile learning can enhance student engagement in language learning, thereby strengthening the effectiveness of hands-on activities to be more engaging and enjoyable. It encourages students to participate actively and develop creative thinking skills. Additionally, mobile learning enables students to access materials and learning tools anytime and anywhere through devices. This provides flexibility in learning and expands opportunities to practice language skills outside the classroom environment. This research offers advancements in language learning methods. This approach addresses the limitations of media, time, and space in traditional learning methods while increasing students' motivation and engagement in learning languages more effectively and interactively.

In her book *Design for How People Learn*, (Dirksen, 2015) highlights the importance of designing learning elements to maximize effectiveness. On digital platforms, elements such as leaderboards and automatic feedback are strategically placed to motivate and guide learners (Chapter 8: Design for Motivation, p. 215). In physical environments, real-world simulations, such as classroom layouts reflecting language use situations, support authentic learning experiences (Chapter 9: Design for Environment, p. 233). Material structure is designed using chunking methods to break information into small, comprehensible sections, improving retention (Chapter 4: How Do We Remember, p. 83). Proper placement ensures accessibility, engagement, and relevance for learners.

An analysis of gamification elements was conducted on popular language learning applications in Indonesia. Duolingo is well-known for its strong gamification approach, using elements such as leaderboards, achievement badges, and daily challenges to boost motivation and consistency (Abdillah & Kurniawan, 2021). Busuu emphasizes social interaction and community engagement, which can inspire increased user interaction in game-based learning (Winans, 2020). Simpler incorporates simple gamification elements, demonstrating that straightforward approaches can also succeed in language learning contexts. By comparing these three applications, it is hoped that gamification-based learning will provide students with in-depth insights into various gamification strategies and elements that can be adapted to align with language learning goals.

METHOD

This study adopts a descriptive method, used to address actual problems by collecting, organizing, classifying, analyzing, and interpreting data, as explained by (Narbuko & Ahmadi, 2002). The comparative method is employed to compare two or more data samples, aiming to

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identify similarities and differences between the observed objects. In the context of this study, data were obtained through a literature review involving several language learning applications. Descriptive and comparative methods were used to analyze the applications with a focus on gamification theory as the analytical framework. Three language learning applications—Duolingo, Busuu, and Simpler—were selected as samples due to their popularity and wide usage in Indonesia. By applying the comparative analysis method to these three applications, the study aims to gain a comprehensive understanding of the gamification strategies and features that can be implemented in the development of effective and engaging language learning applications.

The data collection techniques used in this research include literature review and document analysis. According to Creswell, J. W. (Gregar, 2003:25–50), a literature review is a research method that involves collecting, examining, and analyzing information from various sources such as books, scientific articles, journals, research reports, documents, or other materials relevant to the research topic. The study was conducted by reviewing written sources such as journal articles, books, and reports related to gamification and language learning applications. Meanwhile, document analysis involved direct examination of gamification features and elements in Duolingo, Busuu, and Simpler as the research samples.

The instrument used in this research is an observation sheet. According to Sugiyono (2013:145–147), observation sheets in comparative methods are used to record differences or similarities based on predetermined indicators. The instrument focuses on how a medium or tool is systematically used to collect data through direct field observations. The study was designed to document data related to gamification elements in each application. The observation sheets were structured based on gamification theory, encompassing aspects such as Points, Leaderboard, Level, Mission, and Achievement. To ensure data validity, this research employs source triangulation by comparing findings from various literature review references with document analysis results from the observed applications.

The collected data were analyzed through several steps. First, data were grouped based on the gamification elements found in each application. Subsequently, descriptive analysis was conducted to provide a detailed description of how each gamification element is implemented in the applications. Following this, the data were compared to identify similarities and differences among Duolingo, Busuu, and Simpler in terms of gamification strategies. Finally, the data were interpreted by relating the findings to relevant gamification theories to conclude the strengths and weaknesses of each application. Through this approach, the study is expected to provide an in-depth understanding of the implementation of gamification in effective and engaging language learning applications.

RESULTS AND DISCUSSION

Results

1. Application Criteria

A comparison of similar works on English language learning applications was chosen due to their familiarity and popularity among students in Indonesia. The three selected applications are Duolingo, Busuu, and Simpler. Below is a profile of each application based on specific criteria.

a. Duolingo

Duolingo is an educational technology company based in Pittsburgh, Pennsylvania, USA. The application is known for its intuitive and interactive UI, as well as its use of gamified language learning content to increase user engagement. Duolingo's main features include gamification, clubs, and content repetition. The app is available for free with a premium option and offers more than 30 languages. With a user rating of 4.7 on the App Store, Duolingo is considered enjoyable and addictive by many of its users.

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b. Busuu

Busuu, based in London, UK, takes a more social approach to language learning. Its UI is modern and minimalist, with a focus on social interaction through speaking exercises. Busuu offers a paid subscription and features a strong community as part of the user experience. The application provides 12 languages and has a 4.5 rating on the App Store. Busuu users benefit from the supportive community that enhances their learning experience.

c. Simpler

Simpler, from a Russian company, offers a simple and efficient approach to language learning, accessible anytime and anywhere. Its UI is designed for ease of use, with main features including concise materials and daily quizzes. Simpler is available for free with a premium option and offers 10 languages. With a 4.6 user rating on the App Store, the app is highly appreciated for its simplicity and user-friendliness.

No.	Kriteria	Duo Lingo	Busuu	Simpler
1.	UI	Intuitif dan interaktif	Modern dan minimalis	Sederhana dan efisien
2.	Fitur Utama	Gamifikasi, klub	Interaksi sosial	Materi Singkat
3.	Metode Pengajaran	Pengulangan adaptif	Latihan berbicara	Kuis Harian
4.	Harga	Gratis, ada premium	Berlangganan	Gratis, ada premium
5.	UX	Menyenangkan, adiktif	Komunitas Kuat	Mudah digunakan
6.	Ketersediaan Bahasa	30+ bahasa	12 bahasa	10 bahasa
7.	Ulasan Pengguna	4,7 (App Store)	4,5 (App Store)	4,6 (App Store)
8.	Logo			

Figure 1. Application Criteria

All three compared applications offer features that allow users to learn at their own pace. When reviewed through the MQC learning model, these applications incorporate the components of space, time, content, and interaction, combined with various multimedia elements. Below is a comparative analysis of Duolingo, Busuu, and Simpler based on the categories of functionality, reliability and usability.

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Kategori	Duolingo	Busuu	Simpler
Functionality			
Fitur Utama	Gamifikasi, klub	Interaksi sosial, tutor langsung	Pelajaran singkat, Pengulangan harian
Metode Pembelajaran	Level dan Tantangan	Pelajaran interaktif, latihan berbicara	Kuis harian, perlajaran permodul
Ketersediaan Offline	Ya (Premium)	Ya (Premium)	Tidak
Integrasi dengan Platform Lain	Ya (Google Classtroom, Schools)	Ya (LinkedIn,Google)	Tidak
Reliability			
Stabilitas Aplikasi	Tinggi, jarang crash	Tinggi, jarang crash	Sedang, beberapa laporan crash
Frekuensi Update	Rutin, setiap minggu	Rutin, setiap bulan	Kadang-kadang (tidak terjadwal)
Support dan Feedback	Responsif, forum pengguna	Responsif, dukungan tutor	Responsif, namun terbatas
Usabillity			
Antaramuka Pengguna	Intuitif dan interaktif	Modern dan minimalis	Sederhana dan efisien
Kemudahan Navigas	Sangat mudah	Mudah	Sangan Mudah
Pengalaman Pengguna	Menyenangkan dan adiktif	Komunitas kuat	Mudah digunakan, Langsung ke point
Tutorial dan Bantuan	Lengkap dan interaktif	Ada namun terbatas	Minimal, mudah dipahami

Figure 2. Functionality, Reliability, and Usability categories

2. Comparative Analysis

Language learning has become more accessible with the emergence of various applications such as Duolingo, Busuu, and Simpler. However, each of these applications offers different features and approaches, posing challenges for users in selecting one that aligns with their specific needs. For instance, Duolingo provides a gamification-based learning approach with elements like points and leaderboards but lacks support for direct interaction with native speakers. On the other hand, Busuu offers real-time feedback from a community of native speakers and structured lessons, yet its free features are significantly limited compared to the premium version. Simpler, with its straightforward and efficient approach, is suitable for quick learning but lacks support for speaking practice and community interaction.

Table 1. Comparison of Features in Language Learning Applications

Feature	Duolingo	Busuu	Simpler
Number of Languages	40+ (including rare and fictional languages)	14 (major world languages)	10 (fewer and simpler languages)
Gamification Elements	Points, badges, leaderboards, gamified progress	Points, badges, challenges	Limited gamification, quizzes
Interactive Lessons	Yes, small interactive lessons	Yes, structured context-based lessons	Yes, simple and short lessons
Speaking Practice	Limited speaking practice, vocabulary-focused	Yes, includes pronunciation and conversation	No significant focus on speaking
Feedback from Native Speakers	No feedback from native speakers	Yes, feedback from native speakers	No feedback from native speakers

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Community Interaction	No direct interaction with other learners	Active learner community for feedback	No interaction with other learners
Lesson Structure	Gamified units arranged in a pathway	Structured lessons aligned with CEFR	Simple lessons for quick learning
Offline Access	Available for premium users	Available for premium users	Available for premium users
Free vs. Premium Features	Free with ads, premium $7-$12/month	Limited free, premium $7-$14/month	Free with basic features, premium available
Primary Focus	Focus on beginners and gamified microlearning	Focus on grammar, vocabulary, and cultural context	Efficiency and accessibility for quick learning
Average Rating	4.6-4.7 (App Store & Google Play)	4.5-4.7 (App Store & Google Play)	4.6 (App Store & Google Play)

According to Brockmann et al. (2017:200), gamification used in serious contexts, including educational media, plays a crucial role in increasing engagement and motivation. The user interface design of all three applications shares similarities in their interactive and visually appealing designs, featuring bright colors and easily recognizable icons. Among the language-learning applications Duolingo, Busuu, and Simpler, several prominent similarities in design can be observed. Below is a comparative analysis of the gamification features in the three language-learning applications:

1. Point

Points are a gamification element that rewards users for their achievements. Duolingo awards points in the form of XP each time users complete a lesson, which are used to track progress and motivate continued learning. Busuu grants points when user complete exercises or lessons, with a stronger focus on evaluating language proficiency through scores that assess mastered skills. Simpler uses a point system to measure user progress, awarding points as rewards for each quiz or task completed.

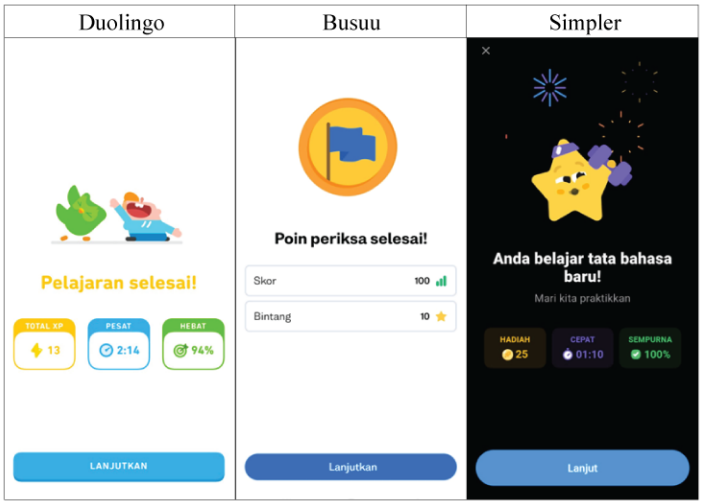

Figure 3. Gamification of Points in Language Learning Applications

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2. Leaderboard

The leaderboard is a feature that adds a competitive element to the learning process. The ranking obtained is not permanent, as users can maintain or lose their position within a predetermined time frame set by the system. Duolingo offers a leaderboard feature that allows users to see their global ranking, comparing their performance with other users to increase motivation through competition. Busuu's leaderboard focuses mainly on ranking among friends or within communities rather than globally. Simpler offers a unique leaderboard feature, motivating users to compete through persuasive visuals. Quiz scores and daily tasks are used to help users participate in launching a rocket to the evergreen planet.

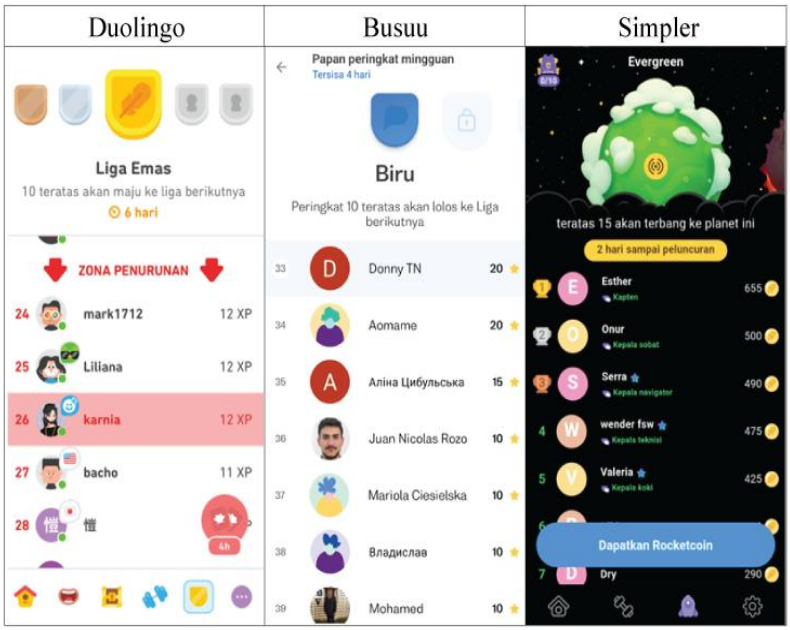

Figure 4. Gamification of Leaderboard in Language Learning Applications

3. Levels

Levels in gamified learning applications are typically associated with the learning module process. Each time a user completes a module, their level increases. This system not only provides knowledge from the learned modules but also creates a sense of achievement that enhances motivation. As users advance in their learning levels, they experience a sense of progress that encourages them to continue learning and complete more modules, making the learning process more engaging and challenging. Duolingo uses a leveling system that allows users to level up as they accumulate points and complete lessons, with separate levels for each language being studied. Busuu also implements a leveling system, but it focuses more on the achievement of specific language proficiencies (such as A1, A2, B1, B2), in alignment with the CEFR (Common European Framework of Reference for Languages). Simpler uses a more straightforward leveling system, where the visual representation of levels is not like a ladder but is divided into groups based on the number of quizzes completed and daily learning progress.

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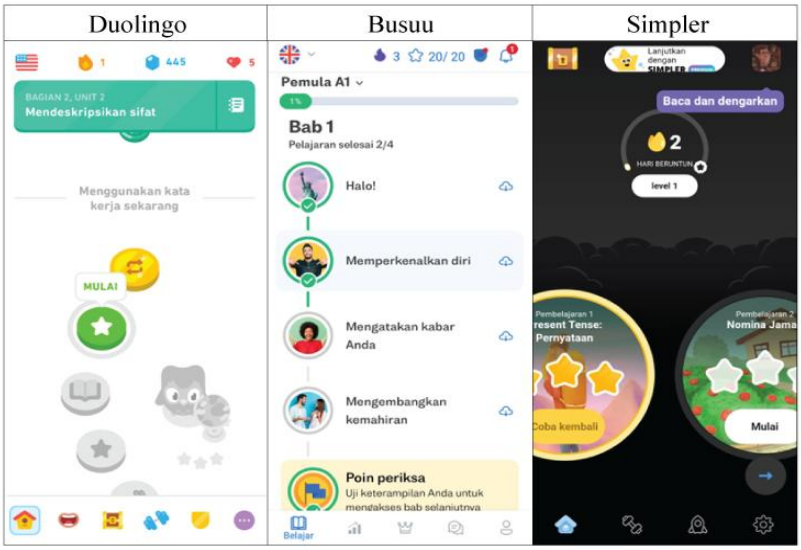

Figure 5. Gamification of Levels in Language Learning Applications

4. Missions

Missions are specific tasks that users must complete within the application, which can be done anytime and anywhere. Duolingo offers daily and weekly missions that provide users with specific goals, such as completing a certain number of lessons or earning a set number of points within a given time period. Busuu offers missions in the form of weekly exercises that users complete with friends or within a community, typically focusing on specific skills like listening or speaking. Simpler provides missions in the form of daily quizzes that users must complete, with the missions generally being simpler in nature.

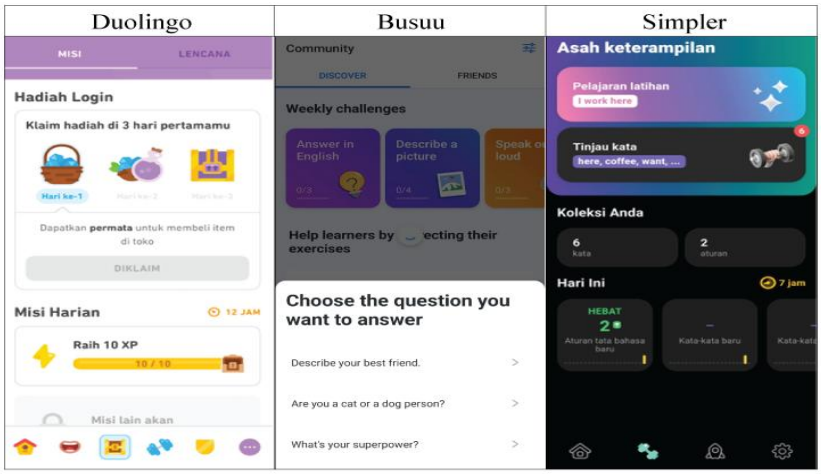

Figure 6. Gamification of Missions in Language Learning Applications

5. Achievements

Achievements are rewards given for completing missions or reaching certain levels. Duolingo offers various achievements that users can earn, such as streaks (number of consecutive days of learning) and the amount of XP collected, represented as badges. Busuu provides achievements that focus more on language proficiency, such as reaching a certain skill level or completing an entire course in a specific language, supported by badges and certificates. Simpler grants achievements based on quiz and daily task completion. Although no badges are awarded for specific missions, this app provides certificates upon successfully completing 300 tests.

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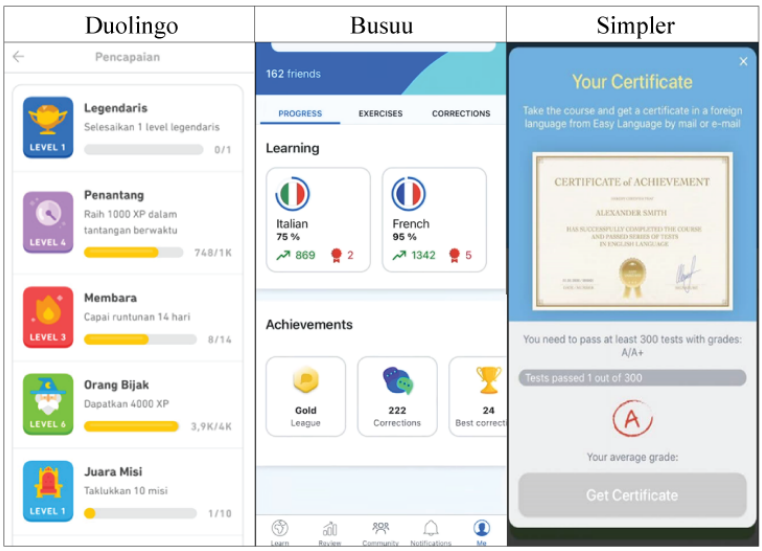

Figure 7. Gamification of Achievements in Language Learning Applications

Discussion

Based on the collected theories, a formulation for designing a gamification-based language learning application was derived. Duolingo demonstrates the most comprehensive and intensive implementation, incorporating points, leaderboards, levels, missions, and diverse achievements, creating a highly motivating and addictive learning experience. Busuu utilizes gamification elements with a stronger emphasis on language proficiency learning and assessment through social interaction and direct student engagement in learning. Meanwhile, Simpler employs simpler gamification elements with persuasive visuals, suitable for users seeking a distraction-free learning experience. Overall, Duolingo excels in gamification with complete features that encourage competition and achievement, Busuu offers a more integrated approach through collaborative learning with a community, and Simpler provides a structured and enjoyable learning experience, albeit with simpler features.

The integration of Mobile Learning Quadrant components and gamification elements creates a flexible, engaging, and motivating learning environment. By combining spatial and temporal flexibility, adaptive content, and rich interaction with gamification elements such as points, levels, missions, and achievements, language learning applications like Duolingo, Busuu, and Simpler can significantly enhance user engagement, motivation, and learning outcomes anytime and anywhere.

The results of gamification comparison in popular language apps can be applied to the development of language learning applications for elementary school students. Gamification elements can be tailored to meet students' learning needs across subjects. Below are the results of gamification implementation:

1. Point

   The points system rewards students each time they complete a level or mission provided by the system. Every time students complete a language lesson, they earn XP points, which track their progress and motivate them to keep learning.

2. Leaderboard

   The leaderboard is a gamification feature that shows students' rankings within a class. It motivates students through healthy competition among classmates and increases their

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interest in learning more diligently. Students can view their rankings on the leaderboard page in the user interface.

3. Levels

   The level system is applied to give a sense of achievement in the stages of language learning modules. Learning modules are divided into several levels that must be completed gradually, starting from basic, intermediate, to advanced, such as learning basic words, common expressions, and simple grammar. This system makes learning more engaging and challenging, according to students' needs.

4. Missions

   Daily and weekly missions can be assigned as specific tasks, such as homework assignments or memorizing vocabulary within a week. Completing these missions can award points that increase XP, motivating students to remain active in their learning. Daily missions help ensure that students stay engaged and maintain clear learning objectives.

5. Achievements

   Achievements are eagerly anticipated; badges or certificates as rewards provide a sense of special recognition by teachers in class. Special rewards can also be given outside the system, such as recognition for completing teaching modules at the end of the semester or certificates for accomplishments, which may lead to recommendations for competitions.

The integration of Mobile Learning Quadrant components and gamification elements creates a flexible, engaging, and motivating learning environment. By combining spatial and temporal flexibility, adaptive content, and rich interaction with gamification elements such as points, levels, missions, and achievements, language learning applications like Duolingo, Busuu, and Simpler can significantly enhance user engagement, motivation, and learning outcomes anytime and anywhere.

The findings of this study indicate that gamification elements such as points, leaderboards, levels, missions, and achievements applied in language learning applications (Duolingo, Busuu, and Simpler) generally support students' learning motivation.

A similar study conducted by Jasni et al. (2018) on gamification as a language learning method demonstrated that this approach could increase learners' motivation and engagement in the learning process. The research showed that gamification could stimulate learners' interest in studying Arabic, a language often perceived as difficult and monotonous.

According to a literature review conducted by Lutfina et al. (2023), the most commonly used gamification elements in studies are levels, points, badges, and leaderboards. The level element appeared most frequently, identified in eight journals, and serves to motivate users. Additionally, points and badges were also frequently used, appearing in seven and six journals, respectively, indicating that these elements contribute to increased motivation and student engagement in the learning process.

CONCLUSION

Mobile learning (m-learning) integrated with gamification elements is effective in enhancing student engagement, motivation, and learning outcomes in language education. In m-learning, spatial and temporal flexibility, content adaptivity, and extensive interaction enable students to learn anywhere and anytime in a more engaging and interactive manner. Applications such as Duolingo, Busuu, and Simpler demonstrate how the implementation of the Mobile Learning Quadrant—which encompasses components of space, time, content, and

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interaction—can be optimized with gamification elements like points, levels, leaderboards, missions, and achievements. Duolingo excels in gamification with comprehensive content features that encourage competition and achievement; Busuu offers a more integrated approach to collaborative learning through community interaction; and Simpler provides a structured yet enjoyable learning experience, albeit with simpler gamification features. The use of these gamification elements not only enhances student motivation and engagement but also helps them master the four essential language skills: reading, writing, speaking, and listening through the content provided.

By utilizing appropriate gamified learning designs, gamification not only makes learning more enjoyable but also helps students comprehend and apply language in real-life contexts. Below are recommended gamification mappings for language learning based on research findings.

Table 2. Recommended Gamification Method Mapping

Gamification Element	Implementation	Benefits
Point	Award points for each successfully completed exercise, such as quizzes or speaking tasks.	Enhance intrinsic motivation by providing immediate rewards.
Leaderboard	Display student rankings based on the points earned in learning activities.	Encourage healthy competition and motivate students to achieve more.
Level	Divide the curriculum into levels. Students advance to the next level after completing specific tasks.	Foster a sense of accomplishment and encourage students to complete more exercises.
Mission	Assign story-based tasks, such as "introduce yourself."	Promote learning continuity and recognize students' efforts.
Achievement	Award badges or achievements for specific milestones, such as "Complete 10 exercises in a row."	Build recognition and celebrate milestones to boost student engagement.

By implementing gamification elements in language learning applications, a more engaging and motivating learning experience can be created, helping students to understand and master a language while encouraging their involvement through enjoyable methods. Researchers recommend that developers of language learning applications adopt the Mobile Learning Quadrant components and gamification elements more intensively to create a more interactive and effective learning experience. Language learning application developers can focus on exploring the specific impact of gamification elements such as points, levels, leaderboards, missions, and achievements on students' learning outcomes to continuously improve the effectiveness and quality of language learning applications.

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