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Systematic Literature Review to Investigate Game Design Element for Development of Game-Based Learning in Jawi Letter Connections.

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Abstract:
The use of game-based learning as a method to support students in reaching their educational goals is increasing in popularity. This can be attributed to the fact that students are becoming more proficient in technology at an earlier age, and the educational technology sector is producing more impactful products. This paper aims to thoroughly examine the effectiveness of game-based learning elements in teaching students to join Jawi characters by conducting a comprehensive literature study. Through an extensive exploration of academic papers, research studies, and educational materials, substantial evidence will be gathered to either support or refute this idea. Game-based learning has gained popularity for its ability to engage and motivate learners by incorporating gaming elements into educational experiences. The systematic literature review (SLR) conducted to explore game elements has shed light on a comprehensive list of 19 distinct game elements, which have been further classified into four main game components. This thorough analysis brings to the forefront our understanding of the various elements that make up an engaging and immersive game. For game developers, this research provides valuable insights into how these elements can be efficiently utilised to create captivating gameplay experiences. This research has the potential to make valuable contributions to the field of education by providing insights for teachers and curriculum designers seeking innovative and engaging methods to enhance the learning experience.

Keywords: Educational Game, Game-Based Learning, Game Elements, Game Component, Game Development, Jawi Characters.

1. Introduction

Digital game play is a cutting-edge method that has become increasingly popular and widely used in the educational field. It is utilized in various environments such as homes and schools, providing an innovative and engaging way for students to learn. This modern approach to education incorporates interactive digital games that not only captivate students' attention but also effectively teach them important concepts and skills. With the advancement of technology, digital game play has evolved from simple computer games to more complex and sophisticated platforms. These games are designed to align with educational objectives and curriculum, allowing students to explore different subjects in a fun and interactive manner. Whether it is practicing math problems, learning a new language, or understanding historical events, digital game play provides students with a dynamic learning experience that caters to their needs and preferences. In addition, the use of digital games in education also fosters creativity and critical thinking skills as students navigate through various challenges and problem-solving scenarios. Furthermore, the gamification of learning has shown to increase student motivation and engagement, making the learning process more enjoyable and effective. Overall, digital game play has revolutionized education by transforming traditional teaching methods into a dynamic and immersive experience that effectively equips students with the

knowledge and skills they need to succeed in the modern world. It is expected that authors will submit carefully written and proofread material.

For digital games to thrive in the rapidly evolving landscape of the gaming industry, it is crucial for the elements involved in their development to be in sync with the ever-changing demands and technological advancements. As technology continues to progress at an unprecedented rate, gamers around the world have grown to expect more immersive experiences, stunning visuals, and seamlessly integrated multiplayer options. Therefore, developers must ensure that they are well-versed in the latest gaming technologies and trends to meet these increasing expectations. Additionally, a deep understanding of the target audience and their preferences is essential to create games that resonate with players and keep them engaged. This requires extensive market research and analysis, as well as a strong grasp of cultural and social influences. Moreover, collaboration and teamwork play a vital role in game development, as teams of professionals from different disciplines, such as designers, programmers, and artists, need to work together seamlessly to bring a game to life. Overall, the success of a digital game in today's industry hinges on the ability of its developers to adapt to the evolving technological landscape, cater to the desires of the gaming community, and foster a collaborative and innovative environment.

Hence, a systematic literature review (SLR) was carried out to analyze the utilization of game elements in learning-based games. This SLR aimed to explore the element that is commonly employed in the creation of game-based learning and align it with the primary domain within the game development framework. The structure of the paper is as follows: Firstly, an overview of related research on game-based learning is provided. Next, the methodology for collecting and analyzing data for these studies is explained. The paper concludes with the findings and conclusions.

2. Literature Review

Games play a vital role in the fabric of human culture and society, offering both inspiration and active engagement. As a result, game mechanics are now being applied to various non-gaming arenas, including primary and secondary education, with the aim of promoting desired learning outcomes, improving behavior, and enhancing motivation. This trend has gained momentum as educators recognize the power of gamification to transform traditional educational settings. (Ioannou, 2019) and (Zainuddin et al., 2020)

In their study, Qian and Clark (2016) discuss the strong connection between serious games, game-based learning, and gamification. Game-based learning involves using game content and play to achieve specific learning outcomes while also enhancing the learning experience through problem-solving environments and challenges that provide a sense of achievement for learners who are also players.

The concept of "game-based learning" involves the utilization of specialized video game programs as an educational approach. This teaching method, known as "game-based learning," allows students to explore the various aspects of a video game that are relevant to the curriculum, all within a gaming mode developed by their teacher. At the core of game-based learning are learners who engage with digital games for instructional purposes. Through this process, a digital game serves as a tool for delivering information, improving cognitive

abilities associated with learning, and assessing content in a specific academic field (Pritami & Muhimmah, 2018).

As stated by Alsawaier (2018), the main objective of game-based learning is educational in nature. It involves the incorporation of a complete game, often referred to as a serious game. Serious games are specifically designed for various serious purposes, including industry, training, or stimulation. While serious games and game-based learning differ from gamification, which only applies gaming elements to the real world, all three concepts share the common goal of utilizing positive gaming experiences for serious purposes such as education or behavior transformation, rather than solely focusing on entertainment.

3. Methods

A systematic literature review was conducted for this research project to gather relevant information from various sources between 2012 and 2022. To accomplish this, a mapping process using game elements was developed for each domain. The study selection followed the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines, as depicted in Figure 1. A total of 313 literature reviews were identified with the keyword "game-based learning" or "digital game-based learning" or "game learning." These reviews were sourced from reputable platforms such as ACM Digital Library, IEEE Explorer, Scopus, Taylor & Francis Article, Springer, ResearchGate, Google Scholar, and ProQuest.

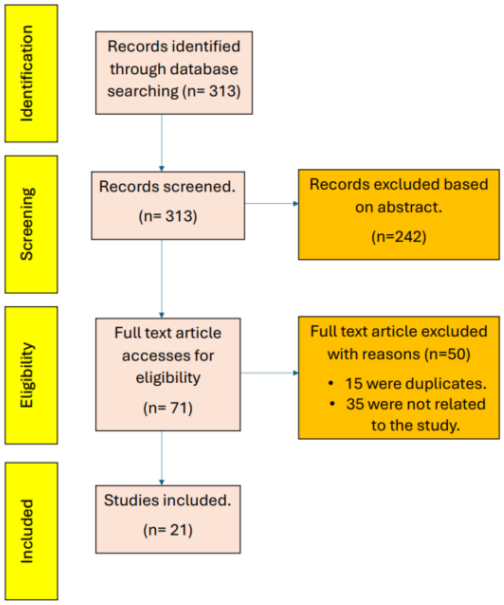

Figure 1: Articles selection Flowcharts

In the initial search, a total of 313 papers were discovered. These papers were then carefully examined, with their titles and abstracts being thoroughly evaluated. From this analysis, it was determined that 71 of these papers were relevant to the study at hand. However, it was noticed that some of these papers were duplicates and not related to the study, so these duplicates and not related were removed from consideration. After this elimination process, the remaining 71 papers underwent a thorough review. Following this comprehensive evaluation,

it was found that only 21 of these articles were still considered relevant enough to be further analyzed. This was a disappointing discovery, as these 21 papers did not provide sufficient information regarding the intended game-based learning activity. As a result, they were unfortunately disregarded and not included in the subsequent analysis.

This research paper provides an extensive and comprehensive analysis of 21 papers that specifically investigate the incorporation of game elements in the field of education. The study thoroughly explores various dimensions of this topic, such as different approaches employed in using game elements for educational purposes, the specific characteristics of these elements, and the effects they have on the learning process. By examining these 21 papers, the researchers aim to shed light on the potential benefits and drawbacks of incorporating game elements in education.

4. Findings

Through conducting a comprehensive literature review, the analysis has uncovered a range of game elements that are present in various games. These game elements have been identified and categorized, allowing for a deeper understanding of their usage patterns. By examining a total of 21 studies, valuable insights have been obtained regarding the frequency at which different game elements are incorporated into games. This information provides game designers and developers with a wealth of knowledge on how to enhance game design and create innovative new games.

Based on a thorough frequency analysis of game development, it has been observed that there are a set of key elements that are commonly utilized. These elements, which have been identified to possess a frequency value higher than 10, play a crucial role in shaping the foundation and success of any game. The identification and understanding of such elements can prove instrumental in the effective design and execution of games. By recognizing these frequently used components, game developers can strategically integrate them into their creations to enhance engagement, immersion, and overall player experience. Moreover, the application of these elements can aid in establishing a familiar and relatable environment for gamers, leading to higher levels of enjoyment and satisfaction. Through continued exploration and study of these frequently employed elements, the field of game development will undoubtedly continue to evolve and produce even more captivating and immersive experiences in the future. In the realm of game development, there is a systematic categorization of the entire process into four essential domains.

The paper by Ahmad et al. (2015) presents an innovative and groundbreaking framework that aims to improve the modeling and execution of educational games. To develop this framework, the authors conducted a thorough and systematic literature review, analyzing various aspects related to educational games. As a result, they identified four crucial domains: Game Environment, Game Play, Learning Theories, and Subject-matter.

Overall, Ahmad et al.'s framework provides a comprehensive and structured approach to enhance the modeling and execution of educational games. By considering the four essential domains of Game Environment, Game Play, Learning Theories, and Subject-matter, developers can create highly effective and impactful educational games that engage learners and promote meaningful learning experiences.

The optimal learning outcomes are achieved by utilizing the four domains of the multi-domain framework: Game Environment (GE), Game Play (GP), Learning Theories (LT), and Subject-matter (SM). By appropriately assigning game elements to these domains, a perfect balance is achieved between an enjoyable gameplay experience and efficient knowledge acquisition. Game element mapping under Game Play : Feedback, immersion, interactivity, context, identity/characters, goal, pedagogy foundation. Game Environment: Problem Solving, Exploration, Game Flow, Instructional, Level of Game, Fun/Reward. Subject Matters: Subject, Learning Outcome, Learning Progression/Skill. Learning Theories: cognitive, behaviorism, activity theory.

Conclusion

Immersive experiences, interactivity, timely feedback, seamless game flow, well-designed levels, measurable learning outcomes and progressions, identity formation, clear goals, and enjoyable rewards are some of the key elements that have a frequency of more than 10 occurrences in this study. This demonstrates that these components are capable of bolstering game-based learning products.

In the case that a game has a defined objective, such as problem-solving, it becomes essential to incorporate problem-solving elements. These elements can take the form of challenges and puzzles, which encourage learners to think analytically and creatively. As a result, learners can develop crucial cognitive abilities. By immersing themselves in dynamic and engaging scenarios, learners could practice and enhance their problem-solving skills within a safe environment.

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