



RESEARCH PAPER

Gamification in Higher Education: A Literature Review

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ABSTRACT

The contemporary educational landscape has witnessed a transformative shift away from traditional teaching methods in higher education. The primary objective of this literature review is to critically examine the gamification elements employed in higher education, seeking to understand their potential contributions to interactive and engaging learning environments. By synthesizing existing research, the study aims to identify key insights into the application of gamification in fostering ongoing connections between learners and academicians. The methodology used was a systematic literature review utilizing articles on gamification in higher education sourced from reputable databases such as Scopus and Google Scholar. The methodology involved a rigorous search process to identify relevant studies, followed by a thorough analysis of the selected articles to extract insights into the gamification elements, components, dynamics, and mechanics employed in higher education settings. The findings of the literature review highlight the positive impact of gamification components on higher education institutions (HEIs). By incorporating gamification, HEIs can create interactive and engaging learning environments that facilitate meaningful connections between learners and academicians. The integration of game-like elements enhances student motivation, participation, and collaboration, contributing to a more dynamic educational experience. Based on the results, it is recommended that higher education institutions consider the strategic implementation of gamification elements in their pedagogical approaches. Educators and administrators should explore innovative ways to incorporate gamified components into curricula to enhance student engagement and foster a more collaborative learning environment.

KEYWORDS Gamification, Higher Education Institutes, SMART Education Pakistan

Introduction

Gamification has gathered significant attention in educational research over the past decade, evidence of its ability to improve students' intrinsic motivation (Li et al., 2024). Humans, education, and technology are inseparable and tightly entwined. Game technologies create opportunities for higher education institutions to redesign and innovate their e-learning models to support learning experiences among learners (Khaldi et al., 2023). The abundant presence of technology in classrooms has stimulated a shift from old-fashioned classroom lectures to assimilated digital learning (Subhash & Cudney, 2018). Gamification offers online learning to students and provides them with knowledge, skills and learning without being physically present as a substitute for a conventional learning framework (Hassan et al. 2019). By using such applications, students can participate in interactive learning activities to gain a dynamic learning experience. Coping with the need for time, educational institutes are giving more space to technology in the curriculum. During COVID-19 pandemic, the whole world moved towards an online system including education sector so, blended learning techniques such as gamification were adopted to engage people and encourage participation (Khaldi

et al., 2023). The emergence and growing use of gamification in educational and learning environments have led to a thorough examination of initiatives that modify how students engage with the learning process (Garone & Nesteriuk, 2019). In last decade, education has evolved with great variation and improvement (Aloia & Vaporciyan, 2019). While face-to-face learning is still predominant, the availability of infrastructure allows for the incorporation of digital learning methods (Yildirim & Şen, 2019).

Literature Review

Online Learning and Gamification Applications during COVID-19 Pandemic

Due to Covid-19 crisis, higher education institutions have had to make a transition from conventional teaching methods to online teaching in order to facilitate continued learning for students (Sofiadin & Azuddin, 2021). The government needed to adopt virtual learning programs or online learning to continue learning process. The virtual education policy entails faculty and students to be imaginative and inventive to apply and develop technological capabilities (Prestiadi et al, 2020). The world went online, and software and applications like google classroom, google meet, zoom, etc. made it easy for students and faculty to do synchronous online learning. Additionally, faculty also took benefit of numerous other blended learning techniques like Learning Management Systems (LMS), especially in higher education (Hamari et al., 2018).

Gamification

The word “game” is defined as a system comprises of several interacting set of mechanisms and systematic conditions in which at least one individual is involved actively (Majuri et al., 2018). Gamification involves the use of game-like experiences and mechanisms to enhance user engagement (Koivisto & Hamari, 2019). As the concept of gamification gain popularity, it was said to be the usage of game design components within a desired system while keeping its instrumental functions intact (De et al., 2017). The most supporting argument for adopting gamification is that it makes learning more attractive and effective (Barber, 2021).

Table 1
Gamification Platform/Apps for Learning

Platforms	Headquarter	Launch Year	Total Users	Website
Quizizz	India	2015	65 million	https://quizizz.com/
Classcraft	Canada	2013	2.5 million	https://www.classcraft.com/
Quizlet	USA	2007	60 million	https://quizlet.com/
Kahoot	Norway	2013	50 million	https://kahoot.com/
Duolingo	USA	2012	49.2million	https://www.duolingo.com/

Game Elements/Characteristics

There is no clear set of characteristics for gamification but there are certain overviews of elements for gamifying an application (Hamari & Huotari, 2011). The framework describes elements of gamification in three layers which are dynamics, mechanics and components (Werbach & Hunter, 2012). Pedagogical considerations for enhancing gamification in education revolve around several themes. These include boosting students' learning motivation, facilitating the development of thinking skills and problem-solving abilities, actively engaging students in the learning process, facilitating interactions among students, and achieving specific teaching and learning goals (Li et al., 2024). These considerations highlight the important factors to consider when incorporating gamification into educational contexts.

Dynamics

It is the highest level of game elements and it is never directly implemented into an application because it is abstract. Some key features of dynamics are progression, emotions, relationships, constraints and narratives.

Mechanics

On the middle level of the framework are game mechanics which are the foundation for game progression. There are 10 game mechanics and one can incorporate either all or a few mechanics to achieve a gameful experience which is as follows:

Table 2
Description of Game Mechanics
(Werbach & Hunter, 2012)

Mechanics	Explanation
Challenges	Tasks that involve a determination to compete
Chance	Uncertainty or randomness
Competition	Teams compete; one win and the other lose.
Cooperation	Players strive individually or as a team to achieve the desired goal
Feedback	Response and comments regarding player progression and development
Resource	Acquisition of things that are required and useful
Rewards	Accomplishment and success
Transactions	Trading directly or indirectly among players
Turns	Sequential participation
Win states	The concept of winning and losing a game

Components

Game components are on the lowest level of the framework and a total of 15 important game components are described in various studies which are as follows:

Table 3
Description of Game Components
(Werbach & Hunter, 2012)

Components	Explanation
Achievements	Objectives and goals are demarcated
Avatars	Graphical illustrations of a player
Badges	Digital achievements such as trophies etc.
Boss Fights	Difficult tasks at the finale of a level
Collections	Accumulation of certificates, coins, badges, etc.
Combat	A clash for a win usually it's for a short time
Content Unlocking	When a player reaches the desired outcome new aspects are available
Gifting	Sharing of resources and collection with other players
Leader boards	Visual demonstration of users' development and accomplishment
Levels	Different stages in participant's advancement
Points	Mathematical illustrations of game progress
Quests	Tasks with purposes and prizes
Social Graphs	Participants' social network
Teams	Set of participants working collectively to achieve a shared objective
Virtual goods	Perceived or real-money value of game assets

Gamification in Higher Education

Gamification in an educational context is considered a set of processes and activities to resolve learning and education-related problems by using game mechanics (Kim, et al., 2017). So, the entertainment module of the game is incorporated in

educational perspective to solve the problem of corporeality in gaming environs (Bilgin et al., 2019). Although the definition in different contexts may vary, they always have two components: systemic component and experiential component. Systematic components explain how the game is constructed (game mechanism usage) and an experiential component explains human participation and outputs within the game. Gamification promotes student motivation, behaviors, collaboration, and participation which provide an exciting game experience.

The efficacy of gamification not only depends upon its game design but also on other facets like learner characteristics or the framework in which it is executed (Bilgin et al, 2019). Although gamification is a very popular and successful approach, several studies indicate that gamifying systems do not lead to successful outcomes and the main reason is inappropriate design approaches implemented by the organizations. The foremost goal of gamification in education is to improve the learning skills of the students when they are engaged in e-learning activities (Koivisto & Hamari, 2019). The process measures a player's progression towards goals which can be influenced by the overall strategies of gamification and their actions (Bayerl et al., 2019). Gamification in education provides opportunities to increase confidence, and knowledge measures learning development through practice opportunities and gives feedback for improving performance.

Transformation in Higher Education in Pakistan (Smart Education)

The concept of “Smart Education” was introduced in 2018 by the government of Pakistan that offered contemporary methods and techniques using communication and information technologies. The project is comprehended to influence and foil the current requirement of the world. The award of 2-in-1 detachable laptops is distributed among the brilliant students. The laptops will support students in their educational accomplishments inside and outside the teaching space (HEC, 2018).

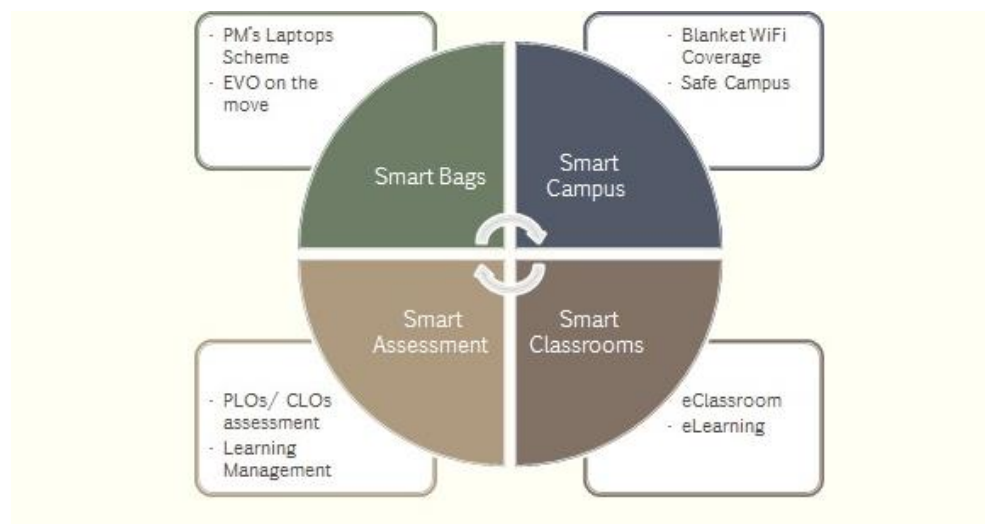


Figure 1 Smart Education through Smart Universities (HEC, 2018)

Furthermore, for global computing, HEC has initiated Smart Campuses in which unlimited Wi-Fi coverage and the incentive of Smart Bags which include (2-in-1 detachable) computers are provided. Subsequently, this transformation is accompanied by the introduction of Smart Classrooms at every public and private university.

Smart Classroom is an environment that provides learning incentives to students and faculty. It helps engage this digital generation in learning opportunities with exciting features and methods. It provides the best from ICT investments by enhancing faculty digital pedagogy. "Transformation towards Smart Universities" leading towards "Smart Education" is the key objective of this program (HEC, 2018). HEC has established smart classrooms at 50 universities around Pakistan. Smart classrooms are projected to make ICT an essential component of learning in universities.

The landscape of learning and teaching in Higher Education Institutions (HEIs) has undergone significant transformations, with the inclusion of gamified learning applications that include fun and play elements (Ishaq et al., 2021). These applications have been particularly effective in reinforcing knowledge and improving retention among learners in HEIs (Alsawaier, 2018).

Material and Methods

A systematic literature review is a way of looking at all the research available on a specific topic or question. The process involved planning, conducting the review, and reporting our findings (Kitchenham, 2004). In this paper, we followed a method to understand how gamification is used in digital learning for college and university students. We wanted to find out what game elements and techniques are used, and also explore how gamification affects higher education.

Results and Discussion

The landscape of learning and teaching in Higher Education Institutions (HEIs) has undergone significant transformations, with the inclusion of gamified learning applications that include fun and play elements (Ishaq et al., 2021). These applications have been particularly effective in reinforcing knowledge and improving retention among learners in HEIs (Alsawaier, 2018). Another reason why gamification or game-based learning scope is inculcated in higher education is the quick growth of mobile devices such as tablets and smartphone usage which provided students with extraordinary opportunities to disseminate gamification and endorse innovation in the educational sector.

Further in an educational context, gamification leads to a positive impact on student's motivation and level of engagement with a constructive effect on the cognitive, social and emotional aspects (Lee & Hammer, 2011). Goal orientation and activities based on learning objectives stimulate cognitive skills that provide challenges and abilities to overcome them (Andriamiarisoa, 2018). The institutions are putting in efforts to get away from the status quo and adapt the curriculum content which is absorbent to change. HEI's has incorporating gamification to ensure better engagement in the classroom and there has been a significant evolution in teaching and learning approaches, with a focus on student-centered methods.

Conclusion

It is crucial for HEIs to consider the design of applications that align with users' expectations from the early stages of development in order to encourage sustained usage. However, studies focusing on the continued intention to use gamified learning applications, specifically, are limited, creating a gap in existing literature. While research on digital learning has predominantly focused on assessing its impact on learners' performance, engagement, and motivation (Zainuddin et al., 2020), and the users

'acceptance (Wirani et al., 2022), there is a need for more studies examining the reasons influencing the continuous use of gamified learning applications. Addressing this gap in the literature would provide valuable insights into how to effectively promote and maintain users' interest in gamified learning tools.

Recommendations

By addressing these research gaps, future studies can contribute to a deeper understanding of the long-term impact of gamification, comparative analysis of different games and tools, effective implementation of gamification in virtual classrooms, and the importance of teacher training and support. This would provide valuable insights and guidelines for educators, policymakers, and educational institutions in leveraging gamification and digital teaching and learning tools to create engaging, interactive, and effective learning environments.

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