
Conceptualization Gamification Using Identifiable Decision Contexts

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ABSTRACT

Although using game mechanics for engagement and entertainment or hobby are not new, "gamification" has emerged as a popular, yet often criticised, digital-age, strategy in both education and corporate training. Despite skepticism surrounding its effectiveness and potential for exploitation, its adoption continues to rise. To be effective, gamification must be purposefully designed rather than merely applied as a surface-level trend. Addressing the need for further research, this paper defines and conceptualizes gamification, providing a framework for evaluating its, design, in educational settings.

Keywords: Decision Contexts, Gamification, Games, Conceptualisation, Studies, Platforms

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1. INTRODUCTION

The long-standing definition that has been employed, despite the lack of an agreed-upon meaning for the term, is the application of game design in non-gaming contexts. Research into gamification is fraught with difficulty due to the lack of a universally accepted definition of game elements. Some academics define gamification as an approach to improving user experience by adding elements reminiscent of gaming.

This definition fills a need in the field of gamification by bringing together academic and practitioner perspectives. In contrast, gamification encourages the desirable behaviours and problem-solving skills in a two-pronged manner. Game mechanics are the parts of a game that allow players to convert their actions into results, such as levels, score systems, badges, and leaderboards. Game dynamics refer to the features of the game that control how players engage with the game mechanics, such as accomplishments, competitiveness, rewards, and self-expression. Table 2.1 arranges the definitions in a conceptualised way that allows us to define gamification as either a design feature or a process approach. Various sources have used this term, including Deterding et al. (2011), Werbach & Huotari (2012), Zainuddin, Z., Chu, S. K. W., Shujahat, M., & Perera, C. J. (2020)., and Fitz-Walter (2015).

According to Table 2.1's definitions, gamification is not hard to apply. On the other hand, gamification seems to necessitate a greater amount of game mechanics and game thinking, according to the definitions. Because of this, implementation often fails, particularly in the realm of education. Fitz-Walker (2015) asserts that the absence of game thinking is the primary cause of the majority of educational gamification projects' failures.

Designers are compelled to reconsider the pedagogical procedures and curricula by this method. Therefore, it is important to incorporate game elements into activities after determining the target audience's gamification preferences. Gamification is not just developing a game that imparts a lesson; rather it is applying game thinking to how the research impart that lesson and develop it based on the feedback from the players (Folmar, 2015).

It should be noted that GIS is not the only innovation tailored towards user motivation and behavioural change in a non-game context. Instead, GIS indicates a component of persuasive technologies. Persuasive technologies represent a broader concept that describes technologies that attempt to reinforce and shape behaviours, promote knowledge sharing (Wiafe *et al.*, 2020) and foster the use of game design elements. In this regard, Fogg (2003) defined **Persuasive Technology** as *a device or computing system designed intentionally to change an individual's behaviour in a predetermined way without using deception or coercion.*

2. GAMIFICATION REVIEW

The need to situate this study in an education context led to the review of relevant and current materials. The purpose of the review is to better understand gamification in all spheres and organise the literature around gamification in education. Most of the insights in this Chapter and the next spun from this methodological approach. The process for the review is as follows. First, a search for the review materials was conducted in the Scopus database. Scopus was preferred because it indexes all the potentially relevant databases such as Springer, IEEE, ACM and AISel (Pare *et al.*, 2015). Furthermore, the database was queried using the following terms: TITLE-ABS-KEY (gamification education, gamif*, gamification in Africa, gamification in developing economies). The steps taken to choose the papers for the review are illustrated in Figure 3. The search was conducted between January 2010 and January 2020. This is due to the fact that gamification became popular in the academic setting in 2010, despite the fact that it was first introduced in 2008.

Inclusion and Exclusion Criteria: Figure 1 shows that 1,978 results were returned by the first search. Additional screening was carried out to determine actionable outcomes. We removed duplicate articles and checked the abstract, keywords, and entire text for relevancy. We used the search descriptors to sort the publications we found by publication type and field of research. The process as a whole yielded one hundred and ten reviews in the form of complete empirical research papers.

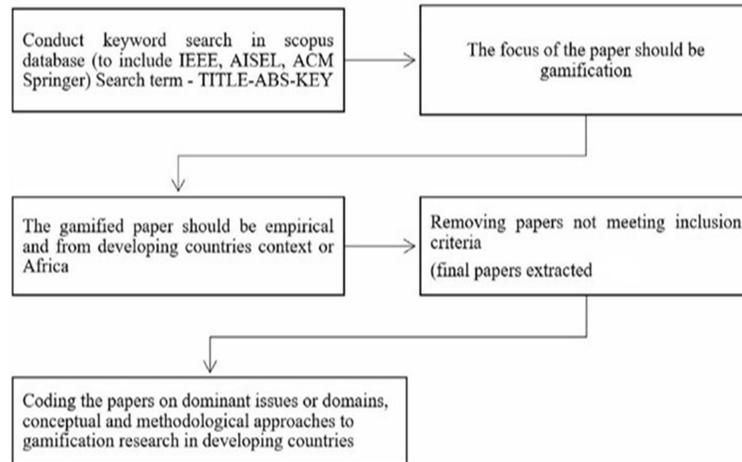


Figure 2.1. Process Involved in Selecting the Papers

This requirement was satisfied by empirical articles. 1. Proof of data collection 2. Data reporting 3. Data analysis and its outcomes. The researcher begins by conducting an analysis to determine the prevailing philosophical methods, research frameworks, fields, and methods pertaining to gamification in order to gain a deeper understanding of the topic and its applications in education. This will help identify the most pressing problems in gamification research in nations that are developing. In Appendix I (Tables 1-4), you may find a review of the information in question.

3. KEY COMPONENTS OF GAME DESIGN

After reviewing the relevant literature, we were able to identify five key components of game design that are commonly employed in developing economies for educational purposes. We will now go on to the components of the game.

Levels

The game level is a section of a game that players complete to move to the next stage. Games have different levels that give the players a sense of progression or movement. One level requires less effort to move toward the end of the game. At the same time, the other requires more experience, effort, and skills – degree of difficulty. Players gain more experience as they progress through the game. However, students learning abilities may not progress as a result of levelling, even though levelling serves as a form of reward or incentive (Goldhill & Roodt, 2018) to the learner for completing assignments or quizzes.

Points

The point system is recognised as a measure of how well a learner has performed or achieved. The points come in the form of rewards or feedback for further progress towards the assignment. For example, points (experience) provide immediate feedback for learners to correct errors and indicate their current standing and progress. The literature reviewed revealed that feedback influences learners' answers, activities, and behaviour. Hence, points must be designed to provide feedback and act as a roadmap for making the right decisions.

Badges

Badges function as a mark of accomplishment, social relevance, mastery, or achievement that can be displayed for colleagues to see – a digital symbol, medallion, or stamp. The use of badges helps maintain learners' motivation and engage them in future learning tasks. To preserve the value of badges, it must have a social relevance – thus, must be valued by the learner who earned them and the group or community of learners.

Leaderboards

An effective way to create a competitive environment among learners is the use of leaderboards – ranking per the highest score or points. The objective of a leaderboard is to keep the learners motivated and not demotivated, as it tends to demotivate the last 10 members in a group and motivate the first 10 in a group. *Advice:* Instructors or designers should only display the top 5 or 10 achievers to avoid demotivating other students. This motivates other players to compete for the top spot or scorers by closing the point gaps. An example of top five (5) players on a Kahoot! leaderboard is displayed in Figure 3 - **Player 10622901** leading the board. *Kahoot!* is a game-based learning application with an average of 50 million active users.

Storyline

In order to gamify instruction while keeping students engaged, multiple scholars have used stories. The plot, whether in a game or an account of events, is called the storyline.



Figure 1: Kahoot Leaderboard Player Display

Kahoot Leaderboard Player Display Exposition: Based on what we learnt about the five game design aspects, gamification is mainly about trying to get user feedback. See Appendix I, Table 2 for a discussion of the affective, cognitive, and social feedback that gamification provides. The game's affordances, including the kinds of game design components to employ to generate enthusiasm, pleasure, and interest, revolve around affective feedback. Gamification is more effective at influencing personal actions than group initiatives from a cognitive standpoint. For this reason, it is possible to view game design components as a decision-support system that supplies learners with cognitive and instrumental data regarding their actions. Lastly, gamification allows users to compare themselves to others through participatory educational goals, which improves learning settings and fosters a feeling of togetherness.

4. CONCEPTUAL APPROACHES TO GAMIFICATION RESEARCH

Educational technology behaviour theories support understanding of educational behaviour problems. These theories also help in developing educational systems and interventions based on predominant determinants that affect behaviours and examine the acceptance and effectiveness of such programs. Highly adopted and accepted behaviour change systems usually occur when the system is behaviourally theory-driven (Consolvo *et al.*, 2009). Therefore, gamified systems can be made optimally accepted, if informed by adoption and behavioural theories. Using adoption and behavioural models increases usability and acceptance of the intervention in realizing the desired goal (Granić & Marangunić, 2019). In this regard, theory helps researchers move beyond conceptualization to evaluating education behaviour interventions. Several theories and research have sprung on human behaviour and what motivates individuals to change their behaviours (Deci & Ryan, 2012).

These theories address education behaviour and have informed recent gamified education systems, for example, the Technology Acceptance Model, Theory of Planned Behaviour and UTAUT (Yang *et al.*, 2017). The most dominant and recently applied education technology theory is the UTAUT, shown in Table 2.2. This theory is explained in detail in Chapter 4, however, it remains one of the most widely used theories in technology adoption behaviour and focuses on why people reject or accept educational measures. From a classical educational perspective, it explains how and why the existing education system has evolved.

Decades of research on motivation and engagement have also resulted in many theories on human behaviour which includes self-determination and motivation opportunity ability theory. The most recent theory that has informed gamification design and evaluation is SDT (Deci & Ryan, 2012). The SDT explains human motivation in a social context that differentiates motivation in terms of controlled or autonomous (freewill) behaviour. However, the MOA theory remains one of the few employed theories of human behaviour which postulates that, for any occurrence or non-occurrence of behaviour, the learner is affected by the characteristics and the external environment (MacInnis *et al.*, 1991), as shown in Table .1.

Table 1 Gamification Research Findings

Research Outline	Research Objectives, Methods, and Technology Background	Features of the Study	Foundational Theory and Framework	Important Research Gaps
Theories from Technology Acceptance				
Baptista and Oliviera (2017)	Determining how game design strategies can influence the adoption of mobile services	Qualities of the learner Characteristics of individuals	The UTAUT2 is the Unified Theory of Technology Acceptance and Usage.	<i>Suggests broad demographic, behavioural, or technological variables. There were no particular elements concerning the use of gamification in the field of education.</i>
Yang Asaad and Dwivedi (2017)	Recognition	Conditions that are conducive to learning	<i>The gamification acceptance development phase</i>	<i>In order to advance the user acceptance model in forecasting user attitudes, new constructs like institutional-based trust or risk must be introduced.</i>
In 2015, Fitz-Walter		The impact of society Learner characteristics Personality Type	<i>Quantitative approach to study design</i>	<i>Culture can impact gaming tactics and the hedonic way of applying them, thus it's important to know what works in different contexts and make plans for acceptable user interactions.</i> <i>We need to bring in new ideas and reevaluate our dependence on technology acceptance model structures.</i>
Samar and Mazuris (2019) study	Investigating the factors that impact the user's propensity to suggest a particular mobile application to others	What motivates and drives people to adopt new technologies	A Unified Theory of Technology Adoption and Use	The requirement for a unified model that incorporates both UTAUT components and self-assurance
Rahi and Ghani's (2019) study			<i>Quantitative approach to study design</i>	Influence personal circumstances on the routinization of technology – nevertheless, no variables linked to the aim to gamify online education have been investigated.

Table 2: Theories from Motivation				
<i>Theories from motivation</i>				
<p>van Roy and Zaman's (2018) study</p> <p>Vanduhe, Nat and Hasan's (2020) study</p> <p>Jeno et al's (2019) study</p>	<p>Asking learners on their interactions regarding game design</p> <p>Motivation and engagement</p>	<p>Type of game elements</p> <p>Task or assignment characteristics</p> <p>Challenges or competition</p> <p>Rewards systems</p>	<p>Principles of Autonomy</p> <p>(Refer to section 2.3.2 incentive and gamification)</p> <p>Analytical mixed-methods approach</p>	<p>sought to investigate how exactly gamification components in learning activities lead to increased levels of personal satisfaction.</p> <p>Timeliness of prospective feedback must be carefully considered.</p> <p>To tackle the issue of generalisability, it is necessary to investigate additional emerging settings.</p>
<p>Suh, Wagner and Liu's (2018) study</p> <p>Wiggins' (2016) study</p>	<p>Determining what aspects of game design contribute to player participation</p>	<p>Independence, skill, and social connectedness (SDT) personal development</p> <p>Variety in discourse and tasks</p> <p>Critical Thinking and Evaluation Theory (CET)</p>	<p>Cognitive Evaluation Theory (CET)</p> <p>Quantitative research evaluation</p>	<p>In a gamification setting, it is necessary to study how various competition models impact competency.</p> <p>I need to provide specific instructions on how to use gamification in the classroom.</p> <p>There are no clear factors that influence whether gamification is used in education again.</p> <p>Great opportunity to enhance the effectiveness of gamification across different learning environments</p>

Due to a lack of focus on thoroughly establishing and creating the gamification instruction, its implementation in college or university settings can be a tough procedure. This is why the researchers are interested in laying out a theoretical foundation for creating the gamification treatments that developing-world HEIs need to alter student behaviour. Using theory for executing gamification is important because it increases the likelihood that this treatment will be accepted and efficient by targeting and understanding the theoretical framework of changes as well as the causal factors of activity (Michie et al., 2008).

Crucially, a hypothesis-driven gamified treatment can help us figure out what is effective and lay the groundwork for creating an approach that's effective in the context of expanding finances, changing attitudes, and educational institutions. Theoretically informed gamified interventions also aid in assessments and estimations of efficacy for outcome improvement, since they allow for the development and testing of theory. Reviewing the literature on behavioural explanations led us to the opinion that UTAUT, SDT, and MOA are all viable individual theories with the potential to affect the desired behaviour in DE healthcare institutions.

Each of the study's questions has an answer in these ideas, and they may also be used to figure out what the audience being studied does. The purpose of this study is to provide a thorough guideline for incorporating gamification into schools from a DE perspective, since no current integrated theoretical framework in IS has addressed the acceptance, inspiration, ongoing usage, and hedonic value of gamified systems. The following section outlines methods for gamification research design.

4. DIFFERENT METHODS FOR DEVELOPING GAMIFICATION STUDIES

The conceptualisation of literature on gamification falls within the early adopters of the dominant research design. Since gamification is a new research area in DE, the objective of the review on research design is to generalise from a sample to a population to make inferences about some characteristics or behaviour exhibited in GIS.

The review showed the dominance of deductive quantitative approach (Nelson, Todd & Wixom, 2005). The preferred survey was cross-sectional with self-administered questionnaires – data collected at one point in time, compared to the longitudinal data collected over time. The choice of the research model and quantitative reasoning of this study was informed by this review. As shown in Table 2.3 is an elaboration of gamification decision choices on quantitative design. Based on the applicable gamification elements, the quantitative method outcomes revealed both the intended and unintended outcomes of gamification in addressing behaviours. In this regard, Table 2.3 indicates how the researcher followed the established criteria for a quantitative design in unravelling the potential of gamification in a DE context.

5. CONCLUDING REMARKS

In conclusion, three primary decision contexts were identified by assessing the selection according to gamification and quantitative method results: a) the research approach, b) methods to collect information and evaluate statistically, and c) generating and testing hypothesis to create a prediction. This research delves into how gamification might be customised to match the needs of certain individuals or groups in order to bring about the desired change for educational practice in DE HEIs.

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