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Descriptive Study of Motivation in Gamification Experiences from Higher Education: Systematic Review of Scientific Literature

Angel Torres-Toukoumidis[1,*], Paola Carrera[2], Ignacio Balcazar[1], Gabriela Balcazar[3]

[1]School of Communication, Salesian Polytechnic University, Cuenca 010105, Ecuador
[2]School of Economics and Management, University of Ferrara, Ferrara 44121, Italy
[3]Psychology Faculty, University of Cuenca, Cuenca 010112, Ecuador

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Abstract The use of playful elements in non-playful contexts has become popular during the first two decades of the 21st century, providing a new perspective of playful interaction in educational communities where a direct link with variables arranged from the psychological sphere has been expressed, highlighting motivation. Therefore, the general objective of this research is to examine the publications of high impact on gamification that deal with motivation, taking into account the identification of the elements of play, types of motivation incorporated, educational levels involved and patterns obtained from the findings. For this purpose, it is developed as a methodological design a systematic review of 248 manuscripts published in the Scopus database between 2000 and 2019 related to gamification, intrinsic motivation and extrinsic motivation based on 4 criteria: educational level, type of motivation, game elements incorporated into the experience, effect on teaching. The results obtained show that gambling experiences focus on higher education through intrinsic motivation towards the pursuit of fun, but at the same time include reward systems that promote autonomy during learning. The conclusions show a trend towards the development of intrinsic motivation, in addition to the use of points as the main component to promote motivation within the environment offered by higher education. It is recommended that future researchers continue to delve into other variables of the gamification imbued also in the Latin American context.

Keywords Gamification, Motivation, Higher Education, Reward Systems, Scopus, Innovation

1. Game Elements for Motivation

1.1. Notion of Gamification

In the current educational ecosystem, multiple alternatives of pedagogical development have been presented, highlighting for this study the notion of gamification. There are several authors who have developed concepts about gamification from different approaches considering the perspective of using games as a strategy to achieve something:

Table 1. Definitions of gamification

Authors	Definition
Deterding, Dixon, Khaled, & Nacke	The use of game design elements in non-game contexts (2011, p. 2)
Kapp	Using game-based mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems (2012, p. 11).
Zichermann y Linder	Implementing design concepts from games, loyalty programs, and behavioral economics to drive user engagement (2013, p. 12).
Huotari y Hamari	Process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation (2012, p.19).
Burke	The use of game mechanics and experience design to digitally engage and motivate people to achieve their goals (2014, p. 6).

Although these concepts were built under different perspectives according to the objective pursued by discipline or area, they have a close relationship that has served as a baseline for the development of other gamification concepts and their respective applications in today's world. The key aspects are motivation to act, the promotion of learning and problem-solving.

For example, when we talk about collective well-being, the purpose of gamification focuses on the commitment and motivation of people who participate in a fun activity that stimulates learning (Landers & Callan, 2011). In summary, gamification linked to the educational field must include three essential things: (i) motivate people's behavior, (ii) stimulate learning and (iii) game structures to achieve it.

Gamification selects game elements in order to create participatory strategies where fun is a complementary tool within gamification, but it is not a sine qua non-element. Although new technologies provide digital resources for gamification, it can be developed without a digital presence.

2. Gamification in Education

In the field of education, the results of applying gamification are considered positive because of the transformation of the learning process through strategies and tools dedicated to reinforcing experiences, producing commitment, unifying tasks in a fun and persuasive way, therefore generating changes in particular needs of the participants.

Game-Based Learning is the first approach to the use of games in order to obtain educational results. Mayer (2005) in his study verifies that "learning by doing" in a digital environment related to games cause students to be actively involved and more meaningful experience. In this sense, regardless of whether the environment is virtual or face-to-face, students combine the knowledge of different disciplines to choose a solution or to make a decision at a given time, checking how the outcome of the game can change based on their decisions and are also encouraged to contact other team members to discuss and negotiate the subsequent steps by improving their social skills (Torres-Toukoumidis, 2016). In the game, students got involved in what they do, motivating themselves to overcome learning levels and retain assimilated content. In short, the GBL seeks to integrate the game, in its entirety, to produce desired behaviors regarding educational objectives.

The distinction between GBL and gamification lies in the fact that the second does not use games to instruct and fulfill educational objectives but instead selects game elements that serve as tools to guide, reward and motivate student learning (Torres-Toukoumidis, Ramirez-Montoya & Romero-Rodriguez, 2018). In its beginnings, gamification was applied within the field of computer science and information technologies (Torres-Toukoumidis, 2016), progressively also ventured into disciplines derived from social sciences such as psychology (Landers & Callan, 2011).

In the terminological field, this link between gamification and education has several denominations in the academic environment: Gameducation (Al-Smadi, 2015), Gamification based learning (Pace, Dipace& di Matteo, 2014), or gamification in education. Indistinctly, students face an experience that tends to be immersive, changing traditional education principles to new learning parameters based on motivation and social identification (Torres-Toukoumidis & Romero-Rodr ǵuez, 2018). For this reason, gamification is a transformative educational tool adapted to the 21st century capable of fulfilling the aim of Game based Learning with greater pragmatism and accessibility.

3. Motivation and Gamification

Motivation plays an important role in gamification being the driving force for people to act, because of interests, needs or adaptation to their environment. Nonetheless, it is important to firstly understand that according to Deci and Ryan (2000: 55) Intrinsic and extrinsic motivation: "Intrinsic motivation, which refers to doing something interesting or enjoyable and extrinsic motivation, which refers to doing something because it leads to a separable outcome". Among the motivational theories associated with gamification, we can find Expectancy Theory, Goal-Setting Theory, and the Self-Determination Theory-Table 1-.

On the three motivational theories that are related to gamification presented by Callan et al. (2014), it is worth highlighting that each one stands out within a specific area, the Expectation Theory studies the relationship between behavior and rewards; the Goal Setting Theory, in the

development of feedback between people; and the Self-Determination Theory, on the other hand, in the structuring of intrinsic motivations. The different perspectives of motivation offer a sufficiently broad research framework to analyze gamification, optimize its use and incorporate it into different areas of society. Complementarily, Su and Cheng (2015) elaborate a system to measure motivation on gamified mobile applications oriented to learning. However, in this research, beyond going deeper into specific cases, it focuses on the connection of the gamification-motivation-learning triad within the academic community

Table 2. Motivational theories related to gamification

Theory	Description
Expectancy Theory	It is a cognitive process in which people believe that there is a relationship between the effort attributed to their work, the performance obtained as a result of that effort and the rewards gained. This means that people who are motivated tend to associate that the effort made leads to good performance that in turn has a reward (Vroom, 1964).
Goal Setting Theory	Start from a mechanism to select goals (objectives). These specific goals guide a self-established or accepted behavior by the people who will follow it (Locke & Latham, 2002).
Self-Determination Theory	It represents a framework for the study of motivation and personality that articulates the sources of intrinsic and extrinsic motivation for social development. People do not determine their behavior by extrinsic motivation, but, on the contrary, people are mostly linked by intrinsic motivation (Deci & Ryan, 2000).

4. The Fun and Gamification

The relationship between fun and gamification is clearly linked to the experience produced by the precise use of gamification elements. Lounis, Pramatari and Theotokis (2014, pp. 9-10) evaluated the fun experienced by the intrinsic and extrinsic motivation of people in gamification systems, concluding that the type of motivation was indifferent and was not a significant factor in the development of a gamification system. However, the factor with the greatest emotional involvement occurred when people collaborated with others towards a common goal, feedback. In other words, interaction with other people was the factor that provided the most fun in a gamified system. This resolution does not imply that it must be constant, but a priority when establishing fun in gamification.

When designing a gamification framework, fun should be included as an essential, urgent and diligent element so that a gamification system meets its objectives. The fun is composed of different patterns that must be constantly changing to maintain the involvement of people. Gamification offers the versatility of extrapolating different types of fun within the same scope in order to adapt it according to the circumstances. This means that in specific moments of activity the focal point may be towards an emotional response of social fun, and at others to the emotional response of easy fun. In this sense, gamification offers the freedom to provide the type of necessary fun depending on the interest generated at a particular time.

To sum up, within the introductory variables of gamification, those related to the field of psychology are presumably extended: behavior, learning, motivation, and fun as they reflect the functional basis of the gamification structure, interconnecting the viability of the game elements so that a gamification project fulfills its purpose.

Although there are multiple studies on systematized reviews of scientific literature on gamification as shown by Looyestyn, Kernot, Boshoff, Ryan, Edney and Maher (2017); Dicheva, Dichev, Agre and Angelova (2015) and of course Subhash and Cudney (2018).The particularity of this case is in deepening on the aspect of the motivation, element imbued in gamified experiences that in the previous reviews have not been taken into account.

5. Methodology

The general objective of the proposed research is to examine the published scientific literature on gamification and motivation, which were identified as specific objectives: [1] Identifying the type of motivation set out in each study; [2] Determining the trend in terms of applied gamification elements; [3] Demonstrating the educational level at which the publications are oriented; and finally, [4] Configuring patterns concerning the contributions issued in each research.

To achieve these objectives, the research proceeds through a qualitative approach with a design called systematic literature review-SLR- (Fink, 1998; Soaita, Serin &Preece, 2019) which consists of carrying out an ordered mapping of scientific publications to know the trend within a subject and to contrast conceptual differences in the scientific literature. Therefore, the phases for document review were established by Moher, Liberati, Tetzlaff, Altman and Prisma Group (2009): identification, screening, eligibility, and total documents included. For this purpose, it was first defined the following selection criteria:

1. Scopus is the database selected for research, being the main repository of quality and with the greatest coverage (Falagas, Pitsouni, Malietzis& Pappas, 2008), especially within the themes oriented to new technologies (Boell&Cecez-Kecmanovic, 2014).
2. Within the search characteristics, 3 formats were taken into account: 1. "gamification" Boolean operator "AND" together with "intrinsic motivation";

2. "gamification" Boolean operator "AND" together with "extrinsic motivation", and to finish with "gamification", Boolean operator "AND" followed by "extrinsic motivation" then "AND" was added again adding "intrinsic motivation".
3. The terms mentioned were evaluated when they were found in the preliminary data, also known as "title", "summary" and "keyword".
4. Concerning the language, only English was used since no results were obtained in Spanish.
5. Although the search was carried out without a date limit, the first publication combining such notions dates from 2011 to 2020.
6. As for the type of documentation, articles, conferences-proceedings- and books were included.

Depending on the selection criteria of articles presented above, it should be mentioned that the process was free of bias with an independent check of the authors' interests by objectively demonstrating the results obtained from the databases consulted. Overall, the total of 248 manuscripts were obtained from which 4 analysis criteria were applied:

- Educational level: Based on the study by Torres-Toukoumidis, Romero-Rodriguez and Perez-Rodriguez (2018), the educational level is organized into basic education, higher education and other learning context.
- Game elements: Currently there is a multiplicity of taxonomies on gamification, but this study will use those presented by Huang and Soman (2013), which have already been applied in gamification analysis (Romero-Rodriguez, Torres-Toukoumidis, and Aguaded, 2017). Such elements are medals and trophies, points, position tables, virtual goods, time restrictions, aesthetics, storyline, levels, and interactive cooperation.
- Type of motivation: Although the search criteria denote certain ease in shaping the typology by considering it intrinsic, extrinsic or both.The representation or expression of each of the motivations is also included. In other words, and as shown in the theoretical framework, intrinsic motivation is reflected in fun and extrinsic motivation in behaviors produced by reward systems (Buckley and Doyle, 2016).
- Finding of the study: In this last criterion, the contributions generated in each study are valued, glimpsing the benefits and effects on teaching.

6. Results

Concerning the 248 documents belonging to the intrinsic motivation, extrinsic motivation, and gamification, only 132 documents were evaluated due to a series of circumstances among which are the lack of registration and damaged document, which did not allow the download and visualization of the content. Starting from this point, the data obtained are as follows:

Regarding the education level on which the documents published in Scopus, it is evident that 45% (59/132) of the documents are focused on higher education students. Meaning that regardless of the discipline, number of participants or subject of gamification experience, the main findings are within the university context and the members of its community. While most of the publications focus on students 57/59 (e.g. Jurgelaitis, et al. 2019), there are also cases of gamification that are presented towards the training of university teachers (Rutledge, et al. 2018). Next, 34% of the documents analyzed are located in the section called "other learning environment" that addresses groups of employees (Dale, 2014), patients (Cechetti, et al. 2019), users of a specific application or platform (Hajarian, 2019), and seniors (Kappen, 2019). While these studies combine the analysis of motivation with gamification, they are ordered for highly specific cases with segmented age groups that also analyzed the interest produced by the gamified experience, incorporating individual perceptions and learning processes. Ultimately, 21% of the manuscripts point to the presence of primary students (Ioannou and Kyza, 2017) and secondary students (Sun and Hsieh, 2018), in which the role and influence of game elements on the behavior and evaluation of the new generations, both within the classroom (Joosten-ten Brinke et al. 2016) and outside (Bjering et al. 2015) of it.

As for the most commonly used game element elements in motivation as seen on table 2, it was found that points (69%), medals (35%), leaderboards (28%), these three elements that stand out for their repetitive use in play experiences are commonly labeled as components of reward systems, while cooperative interaction (27%) reports continuous feedback among participants, besides, aesthetics (17%) leads to the modeling of the interface and visual impact generated by the spaces where the relationship between players is generated. Consequently, the levels (16%) and challenges (12%) are linked to the progress of the players, providing new challenges to the activities, while the virtual goods (11%) are non-physical objects that stand out for their extrinsic quality in the motivation, rewarding the participant for the achievement of the objectives set by the gamification. In addition, the game elements with less evidence in the publications are the storyline (4%) and time restriction (3%), firstly, the storyline calls for a specialized narrative oriented towards a theme. The construction of a story is linked the participants, finally, the time restriction is released towards the pressure originated by the countdown in the gamified experience.

The third position is the criterion oriented to the type of motivation, 59% corresponds to intrinsic motivation, 31% to extrinsic and intrinsic motivation and finally 10% is for extrinsic motivation. Finally, as for the findings and educational contributions of the study, it was marked in four parameters, which are positive, negative,

positive/negative and none, obtaining in first position the "positive" tendency with 80% of the analyzed documents, glimpsing characteristics like the increase of the participation of the different age groups about the educational level, the involvement of the different users, as well as the type of experience in which it is found, both intrinsic and extrinsic and finishing as an improvement in the intuitive development of the development of the different games. In second position without any results is reflected in 10% of the total publications, reflecting the neutrality of the findings, taking as an example the individual attitudes of the participants, without reflecting an improvement in their performance. In penultimate instance the "negative" results mark a 6% as for the different variables of game and finishing with the union of "positive and negative" giving a 4% of the total documents generating different findings for example the permanent deception of the different actors involved in the study among others.

7. Conclusions

Over 132 documents on gamification and motivation were reviewed corresponding to scientific publications stored in the Scopus database, and based on 4 analysis criteria: type of motivation, game elements, educational level and study findings. This allowed us to know the trend within each of the mentioned themes, which was favourable for the objectives set at the beginning of the research.

As a fulfilment of the first specific objective, the type of motivation set out in each study was identified. Thus, a favourable trend towards intrinsic motivation was shown in 59% of the publications, which made it clear that learning responds to fun and, therefore, has a liberal vision.

To respond to the second specific objective, the trend was determined in terms of the elements of games applied; for this purpose, a multiplicity of taxonomies was identified, which in turn generated a wide range of games to be analysed. These were classified under the following taxonomic groups: medals and trophies, points, position tables, virtual goods, time restrictions, aesthetics, story line, levels and interactive cooperation. The results show a favorable trend towards those games that fall under the parameter called "points", a trend that is present in 69% of the documents.

To fulfill the third specific objective, the preponderant trend was observed concerning the educational level in which the different analyzed researches are developed. It was noted that higher education level is the most observed trend, since it occupies 45% of the total documents.

Finally, the patterns regarding the contributions obtained, which are under the criteria of positive, negative, positive/negative and none, are concluded by showing the majority presence of positive findings 80% among the total sample obtained; this allows us to verify that the games grouped in the different taxonomies derived in the motivation of the subjects of study.

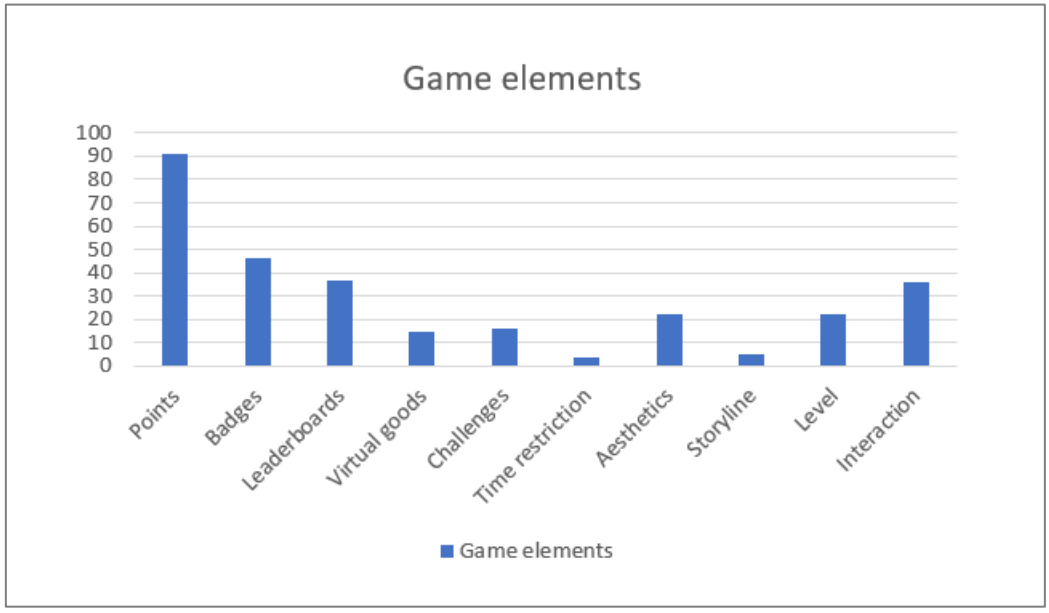

Figure 1. Proportionality of game elements in Scopus articles

We consider that the limitations generated in our work are the non-updating of the documents found, since it began in 2011, in addition to a classification in terms of the demographic population provided both in players and users who did not give a specific age and education level.

It is recommended for future research to work from a quantitative approach, considering the inclusion of new criteria such as gender, age, university and college, its applicability in work processes, as well as the importance of gamification in Latin American countries.

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