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SYSTEMATIZATION OF GAMIFICATION ELEMENTS

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ABSTRACT

Gamification is a relatively new concept that has gained recognition among researchers since 2012 and has shown potential in a variety of fields. Gamification uses game elements to develop motivation, change behavior and attitudes, and solve problems. The game elements are one of the main characteristics of gamification and distinguishes it from similar disciplines like game-based learning and serious games; accordingly, it is important to systemize them so that the implications in the learning environment are more efficient and easier for educators to use when creating a gamification strategy.

To achieve the aim of this research, the data mining was used as the research method to obtain the taxonomies, systematizations and models of gamification elements available on "ResearchGate" database. To mine the date, the keywords "gamification elements" and "taxonomy" or "systematizations" were used. Additionally, the data were restricted to the full-text accessibility. Altogether, 5 data units were detected within "ResearchGate" database that were suitable for the research and selected for the further analysis

Within the framework of the present research, collected gamification elements were analyzed, systemizing the gamification elements mentioned in the works of various authors, the taxonomy of game elements, and their explanations in the context of the gamified learning process. In total, 32 gamification elements are systematized into four dimensions (1) game design elements, 2) motivational elements, 3) social elements and 4) technical game elements), considering the meaning and impact of the elements on the gamification process and its participants. The systematization of gamification elements aims to help to better understand the role of each element in the gamified learning process and to choose the right combination of elements appropriate for a particular situation.

Keywords: *Gamification; gamification elements; game elements; systematization; systematization of gamification elements.*

Introduction

In 2002, N. Pelling named the way to apply game elements in the learning process gamification. In 2002, the academic environment showed no scientific interest in this concept. Only in 2012, the concept gained popularity and gamification research

began in various fields (Dreimane, 2019), with different authors giving their version of the definition of gamification (Karagiorgas & Niemann, 2017; Kapp, 2012; Landers, 2014). Considering the growing interest in gamification, the definition of gamification has been accepted in the scientific community as a concept that uses game design and game elements in a non-gaming context (Deterding et al., 2011; Doherty et al., 2017; Woodcock & Johnson, 2017, Seaborn & Fels, 2015; Werbach & Hunter, 2012). In the context of the learning process, gamification uses game elements, game-based methodology, thinking, and aesthetics to engage people, motivate actions, and solve problems, thus influencing learning outcomes (Deterding et al., 2011; Doherty et al., 2017; Kapp, 2012; Landers, 2014; Woodcock & Johnson, 2017).

As can be seen from definitions of gamification, one of its components is "game elements", which is an essential part of characterizing gamification, which distinguishes gamification from its similar concepts – game-based learning and serious games, which are associated with fully developed games with a specific goal (Sailer et al., 2017), which is usually the acquisition of knowledge without entertainment in case of serious games (Landers & Landers, 2014; Karagiorgas & Niemann, 2017; Sailer et al., 2017), and acquisition of knowledge in entertaining and fun setting in case of game-based learning (Prensky, 2001; Gros, 2006). Gamification aims to change attitudes and behaviour and motivate participants (Kapp, 2012; Landers, 2014). It can be achieved by using audience appropriate game elements in a considerate way, to achieve previously set goal objectives.

As mentioned, game elements are one of the most important characteristics of gamification. A well-designed taxonomy is useful for using structured knowledge to achieve a goal. Several taxonomies, systematizations, and lists of gamification elements that can help to create a more successful gamification process have been developed; however, many of them are still incomplete, cover a small number of game elements, or are not designed for the gamification of the learning process. For this reason, researchers are trying to build their taxonomies and systematizations, looking for better ways to structure knowledge of the elements of gamification. This research aims to collect and systemize the elements of gamification and taxonomies of game elements mentioned in the research of various authors and provide an explanation of these elements in the context of the gamified learning process so that the gamification of the learning process would be more efficient and easier for educators.

Methodology

The data mining technique was chosen as a research method to achieve the research goal. Data mining allows a researcher to gather unstructured data that comes in many formats – text, images, videos and documents and discover relations within those data (Rasid et al., 2017; Zengin et al., 2011). This research method allows the gathering of useful data from a massive amount of information on the internet or other sources (Hodhod & Fleenor, 2018). The source of data mining within this research was the "ResearchGate" which is a professional network providing a platform for collaboration and access to

a wide range of research. To mine the date, the keywords "gamification elements" and "taxonomy" or "systematizations" were used. Additionally, the data were restricted to the full-text accessibility. Altogether, 5 data units were detected within "ResearchGate" database that were suitable for the research and selected for the further analysis: two taxonomies, one concept map, one model, and one systematization of gamification elements.

Results

One of the best-known taxonomies of gamification elements was published by Armando M. Toda and colleagues in 2019 and is designed for use in education (Toda et al., 2019). The authors collected game elements in the context of the field of education by analyzing the literature. The taxonomy consists of a total of 21 elements divided into five categories (see Table 1).

Table 1 Taxonomy for Gamification Elements in Education by Toda et al. (2019)

Category	Game elements
Performance	Progression, Levels, Points, Stats, Acknowledgement
Ecological	Rarity, Economy, Imposed Choice, Chance, Time Pressure
Social	Social Pressure, Competition, Cooperation, Reputation
Personal	Novelty, Renovation, Puzzle, Objective, Sensation
Fictional	Storytelling, Narrative

Although the taxonomy offers elements that are essential and very useful in creating a gamification strategy, its structure and categories are not helpful in developing a gamification learning process. Reputation, feelings, recognition, novelty, and puzzle do not seem to be included in the systematization of gamification elements created in this paper because reputation, feelings, recognition, and novelty are elements characterizing motivation – they are not elements of gamification that the educator can include in the learning process. A puzzle, on the other hand, can be defined as the challenge of solving engaging and challenging tasks. Also, the element of forced choice does not seem appropriate when discussing the use of gamification in the learning process because it may not contribute to the development of learning motivation. Free choice and autonomy are two of the prerequisites for the formation of internal motivation based on the principles of Self-Determination Theory (Deci & Ryan, 1994).

In 2014, Yu-Kai Chou developed the Octalysis Framework, or the Eight Core Drives of Gamification, explaining the importance of each core and the relevance of game elements to each one. Four of them are intrinsic motivation cores, and four are extrinsic motivation cores. They are also divided into four positive and four negative cores (white and black hat gamification). Chou emphasizes that these eight cores focus on motivation, and the dimensions that promote and develop people's motivation are explained through them. The Octalysis Framework is designed as a universal model that can be

used in various fields to analyze a product, workplace, marketing strategy, or lifestyle and promote the motivation of customers or participants for development. Although Chou's model is not designed to gamify the learning process, there are things worth keeping in mind when creating a systematization of gamification elements because the Octalysis Framework offers a wide range of game elements.

Although Chou has done a lot of work describing and analyzing gamification, its elements, and the various dimensions related to motivation and audience differences that influence the process, the Octalysis Framework is designed to analyze the business environment of gamification, not the learning process. The learning process is significantly different from the business environment and the situations encountered in it. Learning goals differ from business goals, and the environments of these two areas are also different and require a different approaches to the gamification of the process, strategy, and element selection.

Black hat gamification, which Chou explains as negatively biased elements of the game, is intended to be used in situations where it is not necessary to build a long-term relationship with the customer but to promote the consumption of a product or service at any given moment (Chou, 2014). This does not correspond to the goals of education, which forms a long-term commitment with learners. A positive stimuli should be selected in the gamification of the learning process so that negative associations with the activity, subject, topic, teacher, etc. are not formed. However, it is important to understand that the elements themselves are neither inherently good nor bad; rather, the way they are used, i.e., with what purpose, intensity, and periodicity, determines how they will affect the game-based process and individuals' long-term results or involvement.

Sofia Schöbel and Andreas Janson created their own taxonomy with the aim of facilitating the gamification of information systems using design thinking (Schöbel & Janson, 2018). The authors brought up the question of the taxonomy's adaptability to different audiences, which is relevant in the context of this work. Manuel Schmidt-Kraepelin and colleagues also developed a taxonomy of gamification that explains and helps to evaluate gamification-related concepts contained in health apps (Schmidt-Kraepelin et al., 2018). It consists of 12 dimensions, each with two to three mutually exclusive characteristics. The dimensions proposed by the authors are too broad and do not provide a list of game elements that would be relevant and usable during the learning process; however, it is helpful when systematizing game-playing elements.

Martin Sillaots, Triinu Jesmin, and Andreas Rinde (2016) conducted a literature analysis within the framework of which they identified 103 game elements, which are summarized in a concept map. The map shows the central elements of the game, or the most frequently mentioned ones, and their mutual relations with other game elements. Although the list of elements is a valuable contribution to the research of gamification elements, this map is very complicated, and in the context of the learning process, it might be difficult to track and select situationally appropriate gamification elements from the available visualization. The systematization of gamification elements requires a different type of structure that explains the possibilities of using the elements, taking

into account the environment, the target audience, the purpose of gamification, and the promotion of motivation.

Another systematization of gamification elements was done at Tallinn University by David Upshall, who developed a taxonomy of gameplay elements. Upshall conducted a literature analysis, collecting the existing taxonomies of game elements and listing the mentioned game elements, as well as a network analysis, which serves as a basis for structuring game elements into four groups. The taxonomy consists of a total of 16 game elements divided into four groups, with a brief explanation for each element. The taxonomy is very simplified, but it is another collection of gameplay elements that can serve as a basis for creating a wider and more complicated systematization or taxonomy of gameplay elements.

Although all these taxonomies and lists of elements are important contributions to gamification research, none of the mentioned taxonomies are designed to be used in an educational context to create lessons. Further research reveals systematization of gamification elements so that their implementation into the learning environment would be more efficient.

Each game is based on a specific, pre-determined **goal** that must be achieved during the game. This element of the game differs from play. During the game, it is possible to set one big, long-term goal that the player must achieve, which is the goal of the game to be achieved. It is also possible to include several small goals that prepare the player for achieving the big goal and help maintain their attention and interest during the game (Kapp, 2012; Ibrahim et al., 2021; Toda et al., 2019).

The game sets out the **tasks** that the player must complete in order to achieve the set goal of the game (Schöbel et al., 2020). During the execution of tasks, restrictions are set that must be observed in order to achieve the goal. The game by design is a set of rules. The **rules** inform players about how many players can participate in the game, what tasks need to be completed, how many points can be earned for completing certain tasks, what actions are forbidden, and what the consequences of not following the rules are (Kapp, 2012).

Strategy assumes that the player will develop a plan of action to accomplish the task more successfully or to suffer the least possible losses (Butler, 2014). This implies greater involvement in the activities to be performed, thus the sense of autonomy can be higher, which, in turn, can also increase the possibility of internal motivation to develop.

The **story and narrative** are essential elements of the gamification. The story, as an element of the game, makes sense of the game experience and enhances it. It allows the player to feel more involved in the game, stimulates and engages the imagination, and allows a personal experience and perspective (Kapp, 2012). This element of the game can also be used in situations where it is necessary to enhance the player's experience and form associations to facilitate information processing and recollection. The story needs heroes, developments, little tension, and resolution (Panis et al., 2020; Toda et al., 2019).

The **narration** differs from the story, or the narrative, in that it accompanies the player during the game, providing feedback and telling them about the progress of the game

and further events using voice or text (Ibrahim et al., 2021; Toda et al., 2019). If the player encounters the narrative of the game at the beginning and understands what awaits them, the narration helps them to move and understand the game.

Games involve **challenges** provided by either game tasks or other players (Ibrahim et al., 2021). Kapp (2012) mentions that the game system can be one of the sources that make the game challenging for its participants, which means that if a player is playing not against other players but the game itself, different elements of the game are used to make it harder, more challenging, and more exciting. If there are several players, then the challenge is to beat the others and not lose the game.

Competition is an element of the game that explains how at least two players compete with each other to achieve the same goal (Schöbel et al., 2020; Toda et al., 2019). However, it is the rules that set the boundaries for actions that may interfere with the opponent, and during the competition, players focus on their performance and how to improve it in order to beat their opponent (Kapp, 2012). The player has the opportunity to show that they are faster, smarter, and more cunning than other players. However, it is important to understand the players' personalities and interests because not all people like the competition and the pressure it creates, while others do not seem to be motivated enough without it. This has been identified by Richard Bartle's types of players and theories put forward by other authors about the different interests of players in the game (Bartle, 1996; Oliveira & Bittencourt, 2019).

Collaboration is the joint action of two or more players to accomplish tasks and achieve a common goal (Kapp, 2012; Toda et al., 2019). This is a social aspect of the game that might seem appealing to people who are not motivated by competition as an element of the game. Collaboration can also provide players with an opportunity to unite the group (Schöbel et al., 2020).

There are two types of **avatars** as game elements – **player avatars** and **system avatars**. Player avatars are used as visual representations of players that personalize their look or character, or the player can choose an alternative embodiment of their personality. System avatars are personalized images of the game that provide guidance to the player or feedback on the outcome of the game (Ibrahim et al., 2021; Panis et al., 2020; Schöbel et al., 2020). Toda's avatars are not highlighted as a separate element of the game, but the element of 'forced choice' is explained by the game's setting to choose a visual representation to start the game (2019).

A **reward or penalty system** is a powerful motivator for any activity. However, in the gaming context, positive incentives are practiced, so a system of penalties is not desirable in order to maintain a positive association with the action to be taken.

Penalties involve penalizing a player for failing or misbehaving. Penalties usually mean taking away anything the player has gained or earned during the game. However, there is also a neutral type of penalty that informs the player of incorrect actions or answers but does not deprive the player of anything.

Rewards characterize the rewarding of the user for the successful performance of certain actions (Schöbel et al., 2020). Within the game, it is possible to offer players

different types of rewards for different tasks. Remuneration is awarded for the performance of certain tasks, which are usually related to the achievement of a small or large goal. Another way to gain engagement and retention is to reward players, for example, not only for completing complex and challenging tasks but also for simple activities (Kapp, 2012). However, limiting oneself to a remuneration system that is not directly related to the objective is not advisable. The reward system includes:

(1) **points** – an element that rewards certain behaviors or the successful completion of tasks with points, summing them during the game. It is possible to award points for actions found in the rules of the game or to award additional points or surprise points for particularly successful actions during the game (Kapp, 2012; Panis et al., 2020; Schöbel et al., 2020; Toda et al., 2019; Yamani, 2021; Yaşar et al., 2020);
(2) **badges/tokens** – a visual icon that indicates a player's achievement. The badge usually visually represents the skill that was needed to complete the task or the activity that was done;
(3) **bonuses** – an element that means that the player is awarded additional rewards or recognition for the success of their action, such as extra points;
(4) **prizes/gifts** – a reward that a player receives during the game with which they can pay for other things that will be useful for the game, for example, a stronger weapon or a clue to help solve the task (Kapp, 2012; Panis et al., 2020; Schöbel et al., 2020; Yamani, 2021; Yaşar et al., 2020); and
(5) **praise/recognition** – a verbal or written appreciation from the game system or other participants.

The rules usually determine what a player gains for completing certain tasks and the point at which the points earned can be converted into some other reward or the player can choose a bonus. The reward system is an external incentive that promotes the development of external motivation; therefore, it is desirable to combine it with other elements of the game in order to achieve greater player involvement.

Feedback is an element of the game that gives the player instructions that lead them to achieve the goal. Feedback is designed to facilitate the correct performance of actions by providing information that shows how correctly or incorrectly a player has completed a task but does not predict the correct answer (Kapp, 2012; Yamani, 2021). Feedback helps to increase motivation, as the player knows what to look for, learns what mistakes have been made, and helps them to move toward the goal. The scoreboard and progress bar are two elements that provide the player with feedback on the progress of the game and its results (Ibrahim et al., 2021; Schöbel et al., 2020).

The **leaderboard** is one of the elements of the game that helps to provide feedback. Points, tokens, or other rewards earned during the game that show the players' level of achievement or knowledge can be summarized in a leaderboard that is available to all players and shows each player's achievements. Such a display of achievements on the scoreboard might only be interesting for those with the highest scores (Kapp, 2012; Panis et al., 2020; Schöbel et al., 2020; Yamani, 2021). However, not wanting to be at

the bottom of the leaderboard or wanting to get the best score can be strong motivators that echo competition as an element of the game.

The **progress bar** is another way to give the player feedback. This element is used to provide the player with information about the progress of the game, the number of points accumulated, the badges gained, the end of the game approaching, or the number of remaining lives (Schöbel et al., 2020; Toda et al., 2019). Unlike the leaderboard, the progress bar only shows the performance of one particular player without comparing it to other players' results.

Time is a powerful motivator whereby players have to solve game tasks within a set time limit. There are also various types of time manipulation within the game to keep the player's attention and increase motivation, reduce the time spent on an incorrectly completed task, increase stress, or give the player more time to complete the next task as a reward for completing a previous task (Kapp, 2012; Schöbel et al., 2020; Toda et al., 2019). In the game, manipulating time also means manipulating real-world events, squeezing time and making the process faster than could be possible in reality (Kapp, 2012).

Levels within a game are divided into two types – **game levels** and **player levels**. Game levels are designed to increase the difficulty for the player with each new level during the game. These levels integrate small goals, and achieving these and completing levels help the player to move toward the game's big goal. In turn, player levels mean that at the beginning of the game, the player can choose the appropriate level of difficulty (Kapp, 2012; Panis et al., 2020; Toda et al., 2019). Performing an action that is too simple or difficult reduces motivation, so such levels help players find the most appropriate level for their abilities and knowledge so that skills and knowledge can be balanced with the challenge of achieving the goal of the game.

The game's **aesthetics** and visual design play an important role in enhancing the player's experience. A visually appealing game helps to attract and retain the player's attention (Schöbel et al., 2020). Karl Kapp mentions that educational games, as well as serious games, often focus mainly on content and ignore the importance of aesthetics, which can make the player's gaming experience less engaging. Attractive appearance and consistent graphics are more important than making the graphics look as close to reality as possible as it immerses the player in the process (Kapp, 2012). In the case of serious games, the simulations must be close to reality, but for many, the experience of the game seems very engaging. However, the details of the game must not only be visually appealing but also include a meaning that is related to the game's objectives and goals. Toda's aesthetics are not singled out as a separate element but are called "feelings" that create new experiences through audiovisual stimuli (2019).

Repeatability means being able to make mistakes with minimal consequences, encouraging the player to explore, experiment, arouse curiosity, and promote discovery-based learning. The game can become a platform for trial and error through mistakes (Vasalou et al., 2017). The positive aspect of the game lies in the fact that it allows the player to make mistakes, understand these mistakes, and repeat actions

(Doherty et al., 2017), which is more difficult to achieve in real life and can have negative consequences because the player expects minimal consequences in the game environment (Kapp, 2012). Toda calls this element "restoration" but also explains it as an opportunity for the player to repeat the actions taken (2019).

Economics is an element of the game that explains the economic activities that take place with the currency offered by the game (Toda et al., 2019). Currency can be in the form of money or points accumulated during the game, with which players can buy weapons, necessary items, extra lives, accessories, etc.

Social pressure implies that game participants may be influenced by other game participants with comments or actions that evoke fear, shame, or some other negative emotion (Harteveld & Sutherland, 2017; Al-Smadi, 2015). Although it is mentioned in several typologies of gamers, it can lead to negations that go against the essence of the concept of gaming.

Social status is an element of the game that allows the player to brag or brag about their success in the game, status gained, or rewards to other players (Butler, 2014; Al-Smadi, 2015).

Surprise is another important element of the game. The uniform and predictable course of the game, or the result, can reduce a person's interest in the process, so unexpected turns and moments of surprise are essential to keep the player's attention and interest (Kapp, 2012; Sillaots et al., 2016).

Exploration and discoveries provide an opportunity to explore and explore the game environment, to look for hidden things, to discover something interesting or useful (Al-Smadi, 2015; Butler, 2014; Tondello et al., 2016; Holmes, et al., 2015; Tondello et al., 2017). This is a very appropriate game element for explorers (according to R. Bartle's typology) or seekers (according to BrainHex's typology).

Choice offers players a sense of autonomy in choosing levels, development scenarios, tasks, etc. (Harteveld & Sutherland, 2017; Tondello et al., 2016; Holmes et al., 2015; Al-Smadi, 2015; Butler, 2014), and autonomy is an essential prerequisite for the formation of intrinsic motivation, based on the Self-Determination Theory (Ryan & Deci, 2017).

In cases where the publication of the results may cause negations to the participants and reduce the level of motivation, it is recommended to use **anonymity** as one of the elements of the game. It allows the participant to remain anonymous in the game environment when the results are made public (Tondello et al., 2016). This can be very useful in order not to demotivate those participants who are at the bottom of the scoreboard.

Lottery is an unpredictable and unexpected element of the game, which provides prizes, points, goodies that can be used in the game environment, etc. in the round of draws. (Tondello et al., 2017). The unpredictability of this element can be hidden not only in winning the lottery, but also in the frequency of drawing the lottery, since it does not always have to be systematic or according to a certain schedule. It can help maintain attention, increase the level of motivation, if the teacher observes a loss of motivation in the audience.

Systematization of Gamification Elements

Having considered the information gathered from the works of various authors on the use of gamification elements in the context of education, the author has systematized these gamification elements in Table 2.

All elements are systematized into four dimensions (Figure 1), taking into account the meaning and impact of the elements on the gamified process and its participants, helping to better understand the role of each element in the gamified learning process and choose the right combination of elements. It should be noted that game elements can be placed into more than one dimension at the same time.

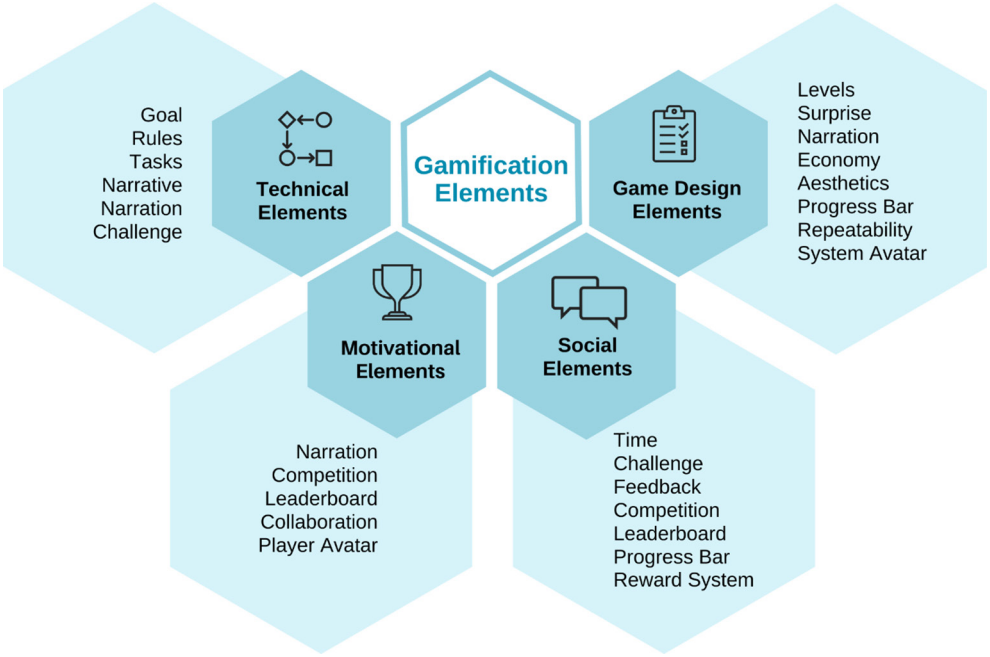

Figure 1 Systematization of Gamification Elements (author's concept)

The **game design** dimension describes the basic components on which any game is based, such as the goal, the rules, the challenges provided by the game, and the story or narrative that permeates the game and makes the experience more engaging and understandable.

Table 2 Systematization of Gamification Elements (author's concept)

	Gamification element	Description	Dimension			
			Game structure elements	Social elements	Motivational elements	Technical elements
1	**Anonymity**	Ability to remain anonymous in the game environment when results are published.		×		
2	**Aesthetics**	A visually appealing game helps to attract and retain the player's attention				×
3	**Badge**	A visual icon that indicates a player's achievement, a skill required to complete a task, or an action performed			×	
4	**Bonus**	Additional rewards or recognition for the success of an action			×	
5	**Challenge**	Can be provided by either the game's tasks or other players	×		×	
6	**Choice**	Offers a sense of autonomy in choosing levels, development scenarios, tasks, etc.	×			
7	**Collaboration**	The joint action of players to complete tasks and achieve a common goal		×		
8	**Competition**	At least two players competing against each other to reach the same goal		×	×	
9	**Discoveries**	Ability to expolore, search, discover something interesting or useful in the game environment			×	
10	**Economy**	Economic activities performed during the game with the currency offered by the game				×
11	**Feedback**	Indications of correct or incorrect actions that lead the player to achieve the goal of the game			×	
12	**Goal**	Predefined goal to be achieved during the game	×			
13	**Leaderboard**	Players' levels of achievement or knowledge are summarized and reflected on the leaderboard		×	×	×
14	**Levels**	At the beginning of the game, the player can choose the level of difficulty that suits them best; alternatively, the difficulty can increase with each new game level				×
15	**Lottery**	Unpredictable and unexpected element of the game that provides some prizes, points, goodies that can be used in the game environment, etc.				×
16	**Narration**	Gives the player feedback during the game, informs them about the progress of the game, and develops events using voice or text		×		×
17	**Narrative**	Makes sense of the game experience and enhances it	×			
18	**Player avatar**	Visual representation of the player		×		

	Gamification element	Description	Dimension			
			Game structure elements	Social elements	Motivational elements	Technical elements
19	**Points**	Rewards certain behaviors or successful tasks and are summed during the game			×	
20	**Praise**	Verbal or written praise from the game system or other participants			×	
21	**Prize, gift**	Rewards that a player receives during the game with which they can pay for or purchase other things useful for the game			×	
22	**Progress bar**	Provides information about the progress of the game, points earned, badges gained, the end of the game approaching, or lives left			×	×
23	**Repeatability**	The ability to make mistakes and try again in a safe environment				×
24	**Reward system**	Reward or penalty system as a motivator that includes points, badges, bonuses, prizes, virtual gifts, rewards, praise			×	
25	**Rules**	Restrictions imposed in order to achieve the goal	×			
26	**System avatar**	Visual representation of the system (game)				×
27	**Social pressure**	Participants of the game may be influenced by other participants with comments, causing a feeling of fear or shame		×		
28	**Social status**	Allows the player to be proud and brag about success, status or awards to others		×		
29	**Strategy**	It is expected for the player to develop a plan of action to more successfully complete a task or suffer as little damage as possible in the game environment			×	
30	**Surprise**	Unexpected twists and moments of surprise help to keep the player's attention and interest				×
31	**Tasks**	Steps to take to reach the set goal of the game	×			
32	**Time**	Time manipulation keeps the player focused and motivated			×	

Social elements are related to the participant's personal goal and level of involvement in the game experience, which is also determined by Bartle's typology of players. This means that the elements of the game that can be used to play the process are a form of competition or cooperation with other participants in the game or the game itself. Avatars can also be added to the social element dimension, allowing the player to create a personalized visual representation or choose an alternative embodiment of their personality if they want to distance or isolate themselves.

Motivational elements are used to achieve player involvement, task completion, and goal achievement in a short period of time. These include time manipulation, external incentives, the reward system, the scoreboard, and the progress bar. The elements of challenge and competition also fall into this dimension.

Technical elements in turn, complement the game experience and support motivation. These include levels, aesthetics, and the ability to make mistakes and repeat actions to improve knowledge and skills. The scoreboard, which shows the player's individual game score, the system avatar, and the narration that gives the player instructions and feedback are also included in the technical element dimension.

Conclusions

This research has analyzed gamification elements mentioned and gathered by various authors and systematized them so they can be used in the learning process when developing gamification strategies. Table 2 provides descriptions of each gamification element. It also gives information about which element belongs to which group, which helps to determine the purpose of each gamification element, better understand the role of each element in the gamified learning process, and choose the right combination of elements appropriate for a particular situation to fulfill the goals developed when creating a gamification strategy.

This systematization of gamification elements can be used when creating a gamification strategy and choosing appropriate game-based tools or developing one if there are none available that suit the situation or do not provide the desired gamification elements.

When creating a gamification strategy, one should first select game structure elements, as these form the core of the gamified learning process. Afterward, various social, motivational, and technical elements can be combined to enhance the learning experience.

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