A GAMIFIED LEARNING PROCESS MODEL

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ABSTRACT

The concept of gamification is relatively new, but studies have shown positive results for achieving the set gamification goal objectives, which usually are enhancement of learning motivation, change of attitudes or affecting a behavior of the students. Researchers still have many questions to answer through research, creating models that systematize and explain gamification. Gamification uses game elements implemented in the learning environment to engage students in learning activities and achieve the set gamification goal. To successfully use gamification in the learning process, it is necessary to understand not only the concept of gamification, its components, and elements of the game but also the logical course of the gamified learning process. To achieve better results and so the gamification of the learning process would be more efficient, educators would benefit from a theory-based and empirically tested model that helps to implement gamification into the learning process to enhance the learning motivation for students. This research aims to develop a theory- based model that would be a guide for those who wish to gamify their lessons. To develop the structure of the gamified learning process, a systematic analysis of publications was carried out, evaluating gamification process designs and models available in "Scopus" and "Web of Science" databases. Via this literature review, a gamified learning process model has been developed and evaluated with the Delphi method. Three field experts evaluated the model in two iterations in order to shape it. The Gamified Learning Process Model consists of six steps describing how to include gamification and game elements into the learning process and 10 pedagogical principles to help enhance learning motivation.

Keywords: Delphi method; Game-based learning; Gamification; Learning motivation; Gamified learning process model.

Introduction

In recent years an increasing popularity in various fields has gained gamification which describes a process when game design elements and game methodology are used in a non-game context (Deterding et al., 2011; Doherty et al., 2017; Woodcock & Johnson, 2017). Karl Kapp, author of the book "The Gamification of Learning and Instruction" describes gamification as use of game-based methodology, thinking and aesthetics to engage people, motivate action, promote learning and solve problems, however, it must

be a deliberate and thoughtful game methodology using game elements appropriate to the situation (Kapp, 2012).

Considering that the concept of gamification is still relatively new and has only gained recognition among researchers since 2012 (Doherty et al., 2017; Dreimane, 2019), researchers still have many uncertainties and questions about the concept that they are trying to find answers to through research. The results of the studies carried out so far show a positive trend for the impact of gamification on the development of motivation, behavior change and attitude modeling (Domínguez et al., 2013; Luarn et al., 2023; Hursen & Bas, 2019). A technology-enriched learning process can improve learners' involvement in the learning process, and the use of games and gamification makes the learning process more interesting and increases learning motivation, which can consequently increase learning achievements (Turan et al., 2016; Simões et al. al., 2013). Some authors believe that modern education has to face a whole series of complications and problems related to the development of technology (Liu et al., 2020), but on the other hand, it can also be seen as an opportunity to attract the attention of learners, motivate, involve them and make learning more interesting by using tools they may find engaging. However, the researchers agree that a more serious research base is needed, as well as rapid approbation and implementation of research, because everything develops very quickly in a technology-driven society, and playing games has the potential to positively influence learning motivation not only for children or young people, but also for adults in various fields.

Despite the potential of games described by many researchers, studies reveal that games as a learning tool are not sufficiently implemented and researched in formal education (Gros, 2006). In order to successfully use gamification in the learning environment, it is necessary to understand not only the concept of gamification, its components, and elements of the game but also the logical course of the gamification process in a learning environment and the practical implementation of gamification. Accordingly, this research aims to develop a gamified learning process model for the development of learning motivation and the pedagogical principles of gamification.

In order to understand the concept's essence, development, and potential impact on the learning process and motivation, an analysis of scientific publications was carried out to review the gamification models and systematization of elements proposed by various authors.

Methodology

To achieve the set goal, this research was conducted in three stages:

Stage 1 – Literature Review

A systematic analysis of publications was carried out to better understand the structure of the gamified learning process, evaluating gamification process designs and models available in research databases. Publications were obtained via the "Scopus" and "Web of Science" databases using the keywords ""gamification" and "model""; "gamification

model"; "model of gamification" focusing on process models. To select the required articles, the "open access" was used. Additionally, the articles to be reviewed were restricted to the English language and full-text accessibility. Altogether, four process models from the literature review were selected for the further analysis: 1) Five-step Model (Huang & Soman, 2013); 2) The Process of Gamification Design (Antonaci et al., 2018); 3) The Mechanics–Dynamics–Aesthetics framework (Hunicke et al., 2004) and 4) Goal–Access–Feedback–Challenge–Collaboration model (Huang & Hew, 2018).

Stage 2 – Development of the Model

Based on the results of the literature review, a gamified learning process model was developed, consisting of six steps describing how to include gamification and game elements into the learning environment. Additionally, pedagogical principles of gamification were created so that the implementation of gamification would be easier and more efficient.

Stage 3 – Delphi Method

Afterward, the model was evaluated using the Delphi method. The Delphi method can be used when the research objective can be achieved as a result of collective discussion, subjective judgments, and group dynamics (Grime & Wright, 2016). It provides for the involvement of experts in solving and discussing problems and issues in order to achieve an optimal result. This method is often used when it is necessary to study and connect several complex concepts, and expert opinion is essential to improve theory or practice (Hult Khazaie & Khan, 2020), which in the context of this research is the development of learning motivation through a gamified learning process. The Delphi method is an iterative process that envisages the synergy of different expert opinions obtained during several cycles (Hult Khazaie & Khan, 2020), but the researcher is responsible for the process via selecting appropriate tools and techniques, attracting experts and promoting their involvement in the evaluation process, and collecting, gathering, and evaluating the information obtained (Grime & Wright, 2016). Usually, Delphi experts remain anonymous during the research and do not know who the other experts are, and interviews are conducted with each expert separately so that opinions are not influenced. The researcher collects the obtained information and opinions, presents it to all experts, and in the next iteration they are discussed again with each expert separately. This is advantage if all involved participants cannot meet at the same time and place to engage in discussion, evaluation, and analysis of the topic, which may be the case due to time zone differences or distance (Grime & Wright, 2016).

Using a previously prepared questionnaire or criteria based on which expert opinions are obtained is recommended in the process of obtaining feedback (Grime & Wright, 2016). In the framework of this research, this was achieved by providing experts with an evaluation structure. The Delphi method was chosen so that the experts could evaluate the created model and give their opinions and feedback on its structure and content

remotely, and as a result of this synergy of experts' opinions, an optimal version of the model could be reached.

The Delphi method was conducted within two iterations in 2022. In order to evaluate the gamified learning process model developed, three experts in the field of psychology and education sciences were approached. A week before each iteration of the Delphi method, the experts were sent a description and visualization of the model's current version and a structure for evaluating it so that they could better prepare for the conversation. The interviews were conducted remotely via Zoom for each expert separately.

Results

Literature review

To understand the concept's essence, development, research, and potential impact on the learning process, an analysis of scientific publications was carried out to review the gamification models proposed by various authors.

One model that explains the gamification of the learning process is the **Five-step Model** designed by Wendy Hsin-Yuan Huang and Dilip Soman. This five-step model for the gamification of certain processes includes (1) identifying the target audience and context, (2) setting learning objectives, (3) planning the process step by step, and (4) allocating resources. In a sense, the fifth step creates a dissonance between a developed plan for the gamification of the learning process and the selection and adaptation of the gamification elements additionally described in the fifth step (Huang & Soman, 2013). The fifth step seems to be an approbation of the developed gamification strategy and thus incurs the need to add a sixth step, which would involve obtaining feedback and evaluation and understanding successes and failures so that the strategy can be adjusted and adapted in the next cycle of the process.

The Process of Gamification Design was created in 2018, offering a gamification methodology and design that could be used in various fields and situations. This model's authors, inspired by another process design model, adapted it and created six steps in the gamification design process: (1) Use scenario analysis; (2) Problem identification; (3) Theoretical framework; (4) Selection of game elements; (5) Development and realization; and (6) Evaluation. After step six, the model returns to the first step and restarts the cycle from the beginning (Antonaci et al., 2018). This model sets out important steps; however, in the context of a gamified learning process, one should start by identifying the problem before assessing the situation, environment, and audience in order to better find a solution to the problem at hand. Using the model of gamification practically in his everyday life, the teacher will not always have time to search for theoretical justification; therefore, the third step of this model could turn out to be impractical. However, this does not prevent us from looking for a theoretical basis in another step to find a more successful solution. It would be essential to introduce an additional step before selecting gamification elements, which would involve developing a gamification strategy first. Based on this step, as well as on the first and second steps, one can choose the most

appropriate gamification elements for the situation. Implementation and evaluation are also valid steps in this model and could be included in a gamified learning process model.

The **Mechanics–Dynamics–Aesthetics framework** was developed in 2004 by Robin Hunicke, Mark LeBlanc, and Robert Zubek to explain the relationship between game design and the player by dividing the gaming experience into three components: (1) mechanics, (2) dynamics, and (3) aesthetics. The Mechanics–Dynamics–Aesthetics framework supports a formal approach to explaining game design and helps to make judgments about game design and its goals and predict the impact of each component on the player, game process, and game outcome (Hunicke et al., 2004). Although the experience of the game is an essential aspect, when gamifying the learning process, it is necessary to understand that it is a complex process where, several steps before creating the game design or thinking about the dynamics and aesthetics of the game, it is necessary to evaluate the situation and the audience, define the purpose of the process and problem, and find a theoretical framework to solve the problem.

In 2018, based on five selected theories of motivation (Flow Theory, Goal-Setting Theory, Social Comparison Theory, Self-Determination Theory, and Behavior Reinforcement Theory), Biyun Huang and Khe Foon Hew proposed the **Goal–Access–Feedback–Challenge–Collaboration (GAFCC) model**. The authors tested the theory-based GAFCC model in two quasi-experimental studies involving university students in flipped learning classes (Huang & Hew, 2018). This theory-based gamification model offers five stages of game design strategy that focus on the use of technology and gamification elements; gamification strategy creation, which is one of these stages, involves awarding points and tokens to students for completing tasks. If a teacher creates a lesson and wants to gamify it, the various characteristics of the audience and environment, as well as motivational techniques, should be taken into account in order to ensure the greatest possible involvement of students and a higher-quality gamification process.

The second stage of the research was conducted based on the analysis of the models mentioned above, and the first version of the **Gamified Learning Process Model** was thus created by the author of this article. The final version was created after two iterations of the model by Delphi method (see Figure 1) and is described further below.

The Model of Gamified Learning Process

After evaluating all the available gamification process designs and models, a gamified learning process model was created that corresponds to the structuring of the gamified learning process on which to rely when creating a gamification strategy. Afterward, the model was evaluated and perfected within two iterations by the Delphi method, and the final version of the model was approved by the Delphi experts. The Gamified Learning Process Model is depicted in Figure 1 and includes six sequential steps:

1. The first step is to **identify the gamification problem**. It is necessary to understand what one wants to achieve with the help of gamification – to promote the development of motivation, to change attitudes, to encourage behavioral changes, to arouse interest, etc. It is necessary to clearly define what problem exists in the learning

environment in order to be able to develop an appropriate gamification strategy. At the same time, learning goals must also be defined, and one must not forget about high-quality and meaningful learning content and learning outcomes. Nevertheless, the goal of gamification will not be the same as the learning goals because gamification is oriented toward developing motivation, thus helping to achieve the set learning goals. If a problem is recognized but not fully defined and randomly selected gamification elements are used without considering further steps in the Gamified Learning Process Model, only shallow gamification may be achieved (Deterding et al., 2011; Lieberoth, 2015; Gurjanow et al., 2019).
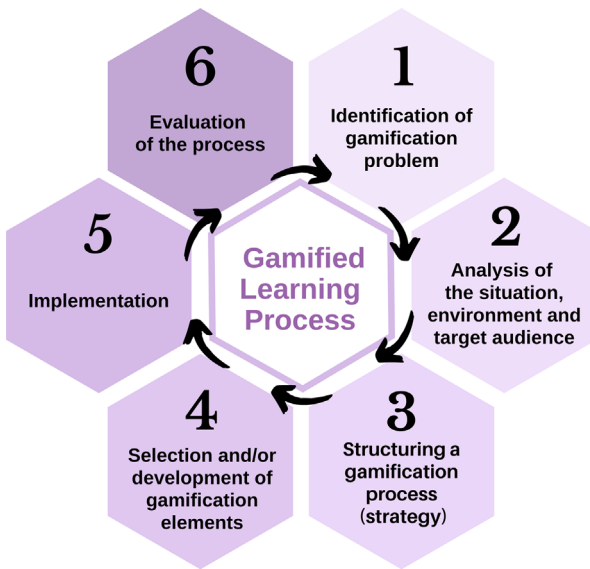

Figure 1   The Gamified Learning Process Model

2. Once the problem and the desired gamification goal have been defined, the next step is to **evaluate the situation, environment, and audience**, which is essential in order to select the appropriate gamification elements and create a strategy. First of all, the teacher needs to know the environment in which the learning will take place – will it be face-to-face or distance learning? What is the size and layout of the rooms? What possibilities does the remote site offer for organizing the learning process? What materials and technical support are available to the teacher and students face-to-face, and which are available in a remote learning environment? How much time is allocated for lessons within the academic semester? What is the lighting like? And other aspects that could be crucial when planning classes.

It is equally important to identify the audience, i.e., the students, their level of knowledge, previous experience, interests, expectations about learning or the teacher, and personality traits, as this can help to choose appropriate gamification elements. The more familiar the teacher is with the audience, the easier it is to do this. However,

in situations where one must deal with students for the first time, the teacher must be flexible and make assumptions based on the information available. After the fifth step (implementation), it is possible to draw conclusions and make changes in the developed gamification strategy in order to adjust the elements to the characteristics of the audience.

3. The third step is planning and developing the **strategy of the gamified learning process**. This is a vital step because all the activities to be carried out are planned for the day, week, or semester based on the information collected in the first and second steps. In this step, techniques are chosen to achieve the set gamification goal. It should be noted that the goal of gamification is known to the developer of the process, but the participants are introduced to another goal: that of the chosen activities and the game.

4. The fourth step is the **selection of gamification elements**, which follows directly from the previous three steps and the selected motivational elements of the learning motivation dimension.

5. When the learning process and the gamification strategy is developed, the fifth step of the gamified learning process involves the **implementation of the planned activities and tasks**.

6. As the sixth and final step of the cycle, there is an **evaluation of the process** in order to understand whether the chosen gamification strategy and elements were appropriate for the audience. Ideally, an evaluation step should be carried out after each implementation of the gamified learning process so that elements and tasks can be adjusted if there is a negative reaction or the desired engagement is not achieved.

The Pedagogical Principles of Gamification

Nine pedagogical principles of the gamified learning process were also developed in discussions with the Delphi experts.

1. Attracting and holding attention

A vital factor not only in the context of gamification but also in the context of the learning process is attracting attention and keeping it so that learning can take place. Attention, by its very nature, is a cognitive link between a limited amount of information manipulated by the human psyche at a given moment and the entire amount of information contained in a person's feelings, memory, and other cognitive processes (Sternberg & Sternberg, 2012). It is an active focus on a particular stimulus to the exclusion of other stimuli (Slavin, 2009) and helps to provide access to information that is in one's memory and to perceive and process new information.

In the process of paying attention, it is important to arouse interest and curiosity in participants. The ARCS (Attention, Relevance, Confidence, Satisfaction) model explains perceptual as well as cognitive stimuli that can be used to attract attention (Keller, 2010). But gamification is another way that can help the educator attract and keep students'

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attention, akin to a story, a challenge, or a reward. As also mentioned by Keller (2010), diversity in the use of these stimuli is essential to prevent habit formation because, in that case, the stimulus no longer fulfills its original function. However, the variety of such stimuli must be within the cognitive load because if there are too many new and interesting stimuli, the cognitive load is directed toward these stimuli, and the capacity of this load to learn something new lessens (Sweller, 1988). Diversifying game elements is also important so that they can arouse interest and achieve the set goal; however, they must not be too dominant or suppress the learning content.

2. Social aspect

Socialization is an essential aspect of the learning process, and social interaction between participants in the learning process must be taken into account when thinking about game-based learning. The teacher is responsible for providing a comfortable environment for all students as much as possible and finding the most appropriate social gamification elements for the relevant audience. For example, some might find competition fun, but for others, it is very stressful.

3. Feedback

Feedback is essential as it helps one to identify successes, failures, and mistakes and learn from them. This is not just the case for the teacher but for students' self-assessment as well. Feedback is a very important element in the gamification context and can be provided through many elements, such as the leaderboard, progress bar, narrative, or system avatar, as well as reward system elements, such as points, badges, or gifts.

However, points, tokens, badges, and other gamification elements representing task completion should not be the only form of feedback. They can indicate the completion of the task and provide an overview of the correct and incorrect answers, but this process must be supplemented with offering quality feedback on errors, providing an explanation for them, allowing the student to draw conclusions. As gamification elements that the educator can use to guide the learning process, the system avatar and narrative can be useful for this. If the tasks are done on a platform that offers, for example, points as feedback for correct and incorrect answers, the educator should also provide an explanation of the incorrect answers so that it is clear that the student has understood the mistake and will avoid making the same mistake again.

4. Making mistakes in a safe environment

One of the positive features of the game in the context of the learning process is the ability to repeat actions, try to achieve the goal of the game repeatedly. Making mistakes or losing is a normal part of the game. Doing so allows one to practice and improve knowledge and skills to help prepare for a test or build self-efficacy and avoid making similar mistakes in a real-life situation when performing a similar activity or task or in an exam.

5. Endangerment of internal motivation

Intrinsic motivation is highly desirable in a learning context because it predicts longer information retention and deeper knowledge (Ryan & Deci, 2000, 2017). However, not only is intrinsic motivation more difficult to achieve, but its persistence is also very fragile. If a student is interested in the activity to be carried out due to his/her own initiative or is guided by gamification elements, additional gamification elements can sometimes disturb the flow, and internal motivation may cease. Perhaps the developed gamification strategy includes specific tasks and gamification elements, but upon seeing an increase in the audience's internal motivation level, which also ensures a quality learning process, the educator may have to consider making some changes during the process to help maintain this internally motivated behavior for as long as possible. External stimuli and gamification elements can contribute to faster task completion and direct the student to internal motivation, but at some point, external stimuli can cause psychological load and stress, threatening the preservation of internal motivation.

6. Loss of efficiency over a long period of time

The use of gamification elements implies the integration of combinations and variations of different elements, tasks, and stimuli in the learning process. This is necessary to avoid forming a habit of certain stimuli, which may no longer provide the desired result over time. Both gamification elements and tasks should be varied and offer as much variety as possible to have an element of surprise. Within the framework of the ARCS model, Keller (2010) foresees diversity in the use of incentives to promote the development of motivation. The loss of the effectiveness of gamification over time is a big risk, so variety, new tasks, new elements, new combinations of them, and the effect of surprise are essential to avoid habits forming. However, the age and abilities of the participants must also be taken into account so that the diversity does not burden cognitive processes (Sweller, 1988), does not force the learning of new rules and new platforms, and does not cause the positive aspect of gamification and the learning content to disappear.

The external stimuli used within the framework of gamification can help enhance the development of internal motivation, thus changing the level of motivation, attitude, or behavior. With time, the use of gamification in the learning process is no longer so essential and can be reduced, offering fewer and fewer external stimuli to ensure the progress of the learning process.

7. Game-based learning in a gamified learning process

Game-based learning and gamification are often seen as similar concepts, but there are important differences between them. At the core of gamification are game elements that are integrated into a non-game context, which, in the present framework, is a learning process with the aim of motivating and engaging. Game-based learning, on the other hand, combines the entertainment function of the game and the game as a means to achieve learning goals (Gros, 2006). However, game-based elements can be easily integrated into the game-based learning process and can help to implement selected

tasks – provide immediate feedback, offer a time limit for completing the task, or create automatic scoreboards or progress bars. Game-based learning platforms can be used perfectly to achieve the goals of gamification. For example, interactive tests for knowledge evaluation, which provide immediate feedback with correct or incorrect answers, can be used for training purposes so that the student is sure of what they have learned and the teacher understands what still needs more attention. However, such game-based knowledge testing platforms are also diverse, and one should not be limited to using only one of them. They also offer different combinations and amounts of game elements. For example, Kahoot provides feedback, points, a time limit, and a scoreboard, but a platform like Nearpod also offers an additional story, avatars, a progress bar, rewards, and the ability to hide the names of participants so that participants with lower scores feels safer. Such additional elements make the game experience more diverse; however, in the context of the previous point, it is necessary to take care of the diversity of gamification elements, as well as the various possibilities of using game-based platforms. Breakout rooms and other alternatives to game-based learning platforms can be used to achieve the goal of gamification and ensure progress toward the achievement of the intended learning outcomes.

However, there are also pedagogical risks, as focusing on correct and incorrect answers simplifies the process of analyzing information, and learners can take tests randomly. For this reason, the knowledge testing process should also provide other forms of evaluation, which require in-depth analysis of information and processes, as well as the use of critical thinking. This means that in the learning process, forms of knowledge assessment should not be based only on the use of gamification elements and game-based learning, although their application can occasionally contribute to the development of learning motivation and knowledge acquisition.

8. Assessment

When providing feedback as part of the gamified learning process, we can also talk about evaluation as a confirmation of a completed task and its compliance with the fulfillment of the set criteria. However, it should be noted that it is better to use formative rather than summative assessment in the context of gamification. The purpose of formative assessment is to evaluate the student's performance on a daily basis in order to improve learning. The purpose of gamification and the use of gamified learning is to support the development of motivation by allowing multiple attempts and errors in a safe environment, providing immediate feedback in terms of points and tokens, accompanied by supplementary and explanatory comments from the educator to support learning. Summative assessment can appear at the end of the learning process as an assessment of knowledge after the gamified learning process has provided an opportunity to develop and improve knowledge and skills in a safe and supportive environment.

9. Previous experience

An important factor worth mentioning in relation to pedagogical principles is the participants' previous experience, which can have a strong influence on their learning

motivation and level of self-efficacy. Performing a task unsuccessfully (for whatever reason) in the past can lead to a low level of self-efficacy (Bandura, 1994; Schunk & Pajares, 2009), as well as a low level of motivation to try to perform similar actions again. Negative previous experiences can also be related to verbal influence from the teacher, classmates, or fellow students. Negative comments from parents can have an impact on the student's level of learning motivation and, in the future, may be related to a specific subject topic or teacher. Sometimes, a reluctance to engage in certain learning activities can be directly related to negative previous learning experiences and fear of experiencing similar situations, humiliation, feelings of shame, etc. The voluntary principle of gamification, the possibility to use gamification elements that could create a safe social environment and involve as many participants as possible in performing the tasks of the gamified learning process, and the possibility to maintain anonymity without making all the results public can all help participants with less positive previous learning experiences to loosen up and engage in the activities.

A gamified learning process and game environment also serve as tools to help build on previous experiences. The game environment allows students to acquire knowledge and skills in a safe environment, allowing them to repeat tasks and practice so that in a real-life situation or a test, their level of self-efficacy is higher, and the result is more successful.

10. Positive Behavior Support

Gamification emphasizes the use of positive stimuli in the achievement of goals set in the learning process, avoiding punishments and stimuli that can cause negative emotions. However, in the learning process, one may have to face situations when not all of its participants are interested in gamification activities and show socially unacceptable behavior, disturbing other participants. In such situations, it is recommended to replace punishments with Positive Behavior Support Strategies, which could correct unwanted or unacceptable behavior, which in the context of the learning process and gamification can be a negative attitude, problematic behavior, a low level of motivation or its absence, as well as deliberately disturbing others.

Conclusions

The use of game elements is fun and entertaining, but if not properly considered, it can do more harm than good and can easily lead to shallow gamification, that is, a learning process where the game elements and game-based tools are used without a specific purpose or defined goal.

This research has provided an essential model for implementing gamification in the learning environment that, step by step, helps to shape and adjust the gamification strategy. Accordingly, the learning process should be designed not only to achieve the set learning goal and achieve learning outcomes but also to make the learning process more efficient and enhance learning motivation, which could provide better learning results.

The pedagogical principles of gamification, on the other hand, can be useful as a guide for the enhancement of learning motivation, thereby making the implementation of gamification easier and more efficient.

The Gamified Learning Process Model should be approbated in the learning environment and tested with students. And, of course, the Gamified Learning Process Model would require an evaluation criterion so that the process could be assessed and adjusted based on the observations.

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