

MODEL FOR IMPLEMENTING GAMIFICATION IN HEIS

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ABSTRACT

The paper focuses on the topic of gamification in higher education, with specific emphasis on different models of gamification that can be utilized. Gamification in HEIs has been a prominent topic in recent years, with many researches outlining the benefits that can be achieved. However, to ensure a successful implementation, the general recommendation is to follow existing models which comprise from several phases. The research continues by presenting existing models for implementing gamification in education, which provide the foundation to build upon when introducing a new model focused solely on higher educational institutions, since existing ones are focused on broader educational levels, including primary, secondary and tertiary education. Since higher education has differentiating characteristics, it is necessary to propose a tailor-made solution that will address potential differences and challenges. The proposed model is based on three key principles: (1) the advancement of existing models, with the goal of overcoming their inherent limitations and serving as an improved successor; (2) the development of a clear and well-organized framework, tailored for educational institutions that are new to gamification, to ensure that it can be easily understood and implemented even by individuals who are unfamiliar with gamification concepts; and (3) a strategic emphasis on sustainability. In contrast to existing models that mainly depend on operational specifics that may be rendered outdated by technological progress, this particular model employs a strategic perspective, hence reducing the potential hazards associated with obsolescence.

Based on traditional project management methodologies, the model is composed of four primary phases, namely analysis, planning, implementation, and control. By setting a clear structure for implementation and strategic goals, the proposed model aligns with wider business implementations, hence enabling a smooth comprehension for individuals responsible for designing and implementing gamification solutions within the context of higher education. Further testing of the proposed model can be performed to evaluate its efficacy in HEIs in North Macedonia and broader regions.

Keywords: *Gamification, HEI, Model, Implementation*

JEL classification: *I21, I23*

1. INTRODUCTION

The concept of gamification involves the utilization of game-like components in domains outside of gaming, with the objective of augmenting user engagement, motivation, and overall experience (Deterding et al., 2011). Gamification is a strategy that leverages the fundamental aspects of human behavior and the captivating nature of games. It involves the incorporation of design features, such as challenges, incentives, and narratives, into tasks that are typically perceived as dull or uninteresting. While gamification strategies initially gained popularity in the commercial sector, the educational domain quickly acknowledged the potential advantages of incorporating these approaches. Within the realm of education, the concept of gamification serves as a means to connect the distinct domains of formal learning and entertainment, so furnishing learners with a captivating and dynamic educational encounter. The primary objective of this endeavor is not just to disseminate information, but rather to foster a more profound involvement with the subject matter, thereby cultivating essential competencies such as critical analysis, cooperative interaction, and the ability to resolve complex issues (Caponetto et al., 2014). The underlying assumption posits that students who possess intrinsic motivation, similar to the motivation exhibited by gamers in a game, are more inclined to actively engage in the educational process, resulting in improved retention and comprehension of the content (Hamari et al., 2014).

According to Aparicio (2012), the integration of gamification in the educational field necessitates the consideration of several activities that extend beyond the conventional realm of corporate applications. These assignments encompass both intra-classroom and extra-classroom activities, hence expanding the range of potential activities suitable for gamification. According to Aparicio (2012), the gamification process consists of four essential components:

1. **Identification of the main tasks** – refers to all activities related to the subject that could be gamified. Unlike the business sector, where it only refers to workplace activities, gamification in the education sector is extended to classroom and class activities (participation, interaction, etc.) and activities outside the classroom and class (homework, project activities etc.). Thus, the degree of tasks that could be gamified increases, as well as the potential of implementing a gamification system itself.
2. **Identifying complementary goals** – refers to other goals besides the main goal that would be interesting and attractive for students to perform the activity. Since the existing student motivation systems refer to points that affect the grade of the subject, in the case of gamification it is about adding additional goals that do not increase the number of points, but introduce elements of fun when performing the activities.
3. **Selection of gamification mechanisms** - depending on the main goal and complementary goals, the mechanisms that are selected are directly related to internal motivators. In terms of practical implementation, the mechanisms used may be identical to those of the business sector. In the case of the education sector, the most commonly used mechanisms are narrative, group work and rankings (Silveira et al., 2018; Lim & Lim, 2015; Tsai et al., 2018).
4. **Analysis and control** - through tests with specific metrics, questionnaires or expert evaluation of applied gamified processes and mechanisms, in order to compare the results before and after the implementation of gamification in the activities. In the education sector, performance indicators are associated with an increase in interaction during and outside of class, as well as an impact on the final grade of the subject.

2. METHODOLOGY

For the purposes of the research, we rely on secondary information sources, including scientific papers, studies, books, academic journals, and case studies. These references are instrumental in providing a comprehensive view of e-commerce's historical progression, present state, and future trajectories. The research methodologies employed in this study include:

- **Descriptive Method:** Used to define and elucidate fundamental terms associated with the research topic.
- **Analytical Method:** Employed to scrutinize existing studies and research.
- **Logical Method:** Utilized to validate and underpin the final conclusions and suggestions.
- **Generalization Method:** Specific observations are leveraged to draw broader conclusions anchored in real-world observations.

3. LITERATURE REVIEW

Successful implementations of gamification focuses on creating a complete user experience, which will be tailored according to the participants in the system. A significant aspect observed in previous attempts to implement gamification in the education sector is that students become disinterested in the last weeks of implementation, usually because they are far behind their classmates or because the tasks and rewards are repetitive (Tsay et al., 2019). To minimize this problem, interest cycles and progressions should be implemented (Van De Boer, 2011):

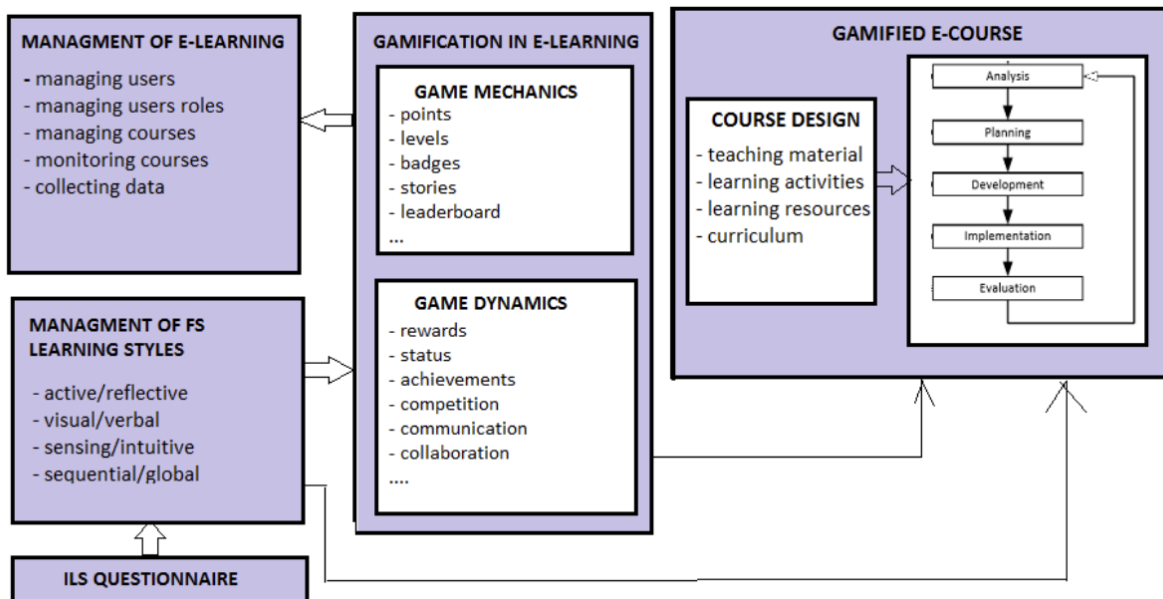
1. **Cycles of interest** – contain 3 components: motivation, action and feedback, which move in a circle. The cycle starts initially with motivation, which leads to a specific action and results in feedback (results) that further encourage new motivation. Interest cycles are important to encourage students to engage in the initial phase and start doing tasks, following an infrastructure that is set up by the system.
2. **Cycles of progression** – relevant for personalizing the system and ensuring long-term interaction. Progression cycles create levels of difficulty for activities in the system, starting with the easiest and then moving to more difficult tasks and objectives. It is important to ensure that the earlier levels at the beginning are easy enough for players to engage, while the later levels of the gamified system are challenging enough to keep players engaged. In a higher education system, these cycles should guide the interaction during the semester, that is, follow the material that is processed in a certain subject, as well as encourage work in groups for certain tasks according to their complexity.

Gamified systems in higher education should also include four different dynamics to encourage learning and engage students (Stott & Neustaedter, 2013):

1. **Freedom to fail** – game design should encourage students to experiment without fear, giving them multiple chances to tackle a particular task
2. **Rapid feedback** - learners should receive real-time and continuous feedback whenever possible, such as visual cues or a progress bar
3. **Progression** – gamified courses should include the most interesting elements at the beginning, to attract students' attention. However, the difficulty should increase as the course progresses to maintain student interest throughout the semester.
4. **Storytelling** – since most games involve some type of story, gamified objects should not deviate from this concept. Including a story can be an engaging experience for students and should increase their engagement and motivation levels.

Academic research so far results in several existing models for the implementation of gamification in education, as well as more specifically in higher education. Zaric et al., (2017) develop a conceptual model of e-learning for gamification based on students' learning styles. This model entails the development of e-learning environments that include elements of gamification and are tailored to each student's unique learning styles. For example, visual learners may benefit from game-based activities that include pictures and videos, while auditory learners may benefit from interactive lectures. The model is shown in graph 1.

Graph 1. Conceptual model for gamification

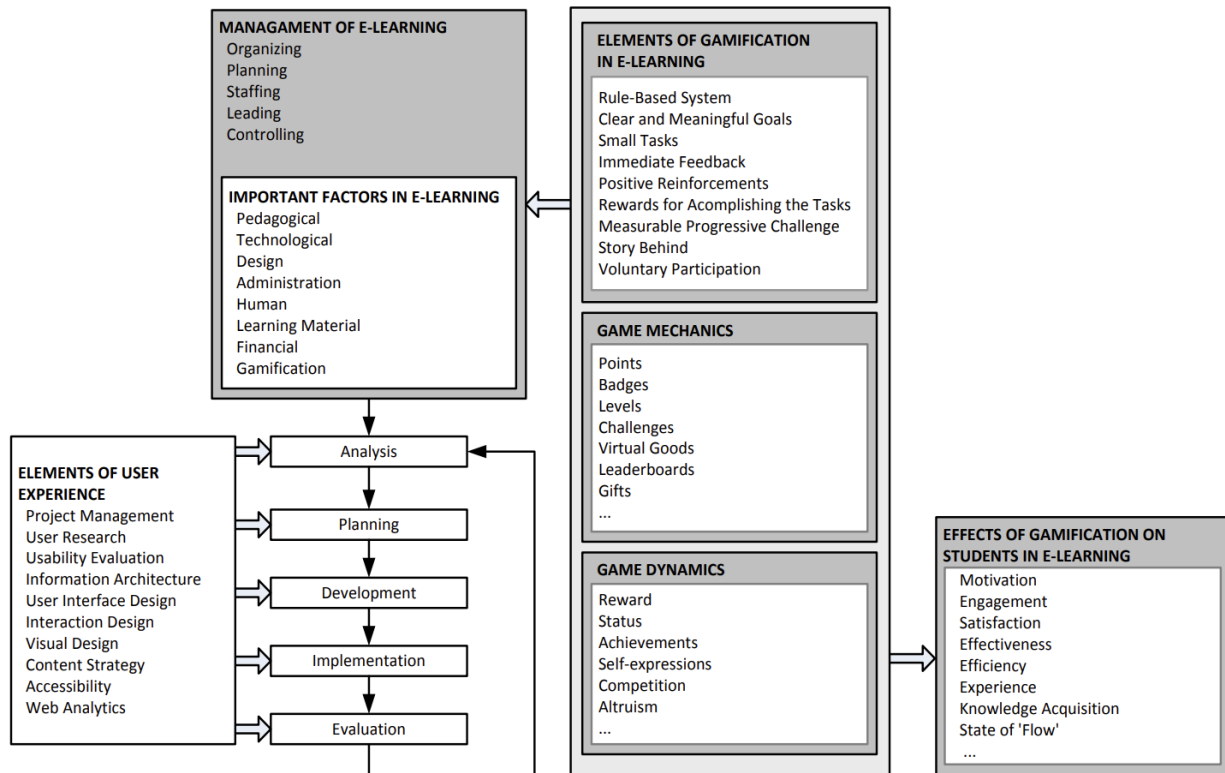


(Source: Zaric et al., 2017)

Based on learning styles, the model includes gamification elements such as points, badges and leaderboards in e-learning activities. The study found that gamification elements tailored to students' learning styles increased their engagement and motivation, resulting in better learning outcomes.

Uhr et al.'s (2015) model for incorporating gamification into e-learning is a process that introduces 5 steps for designing and implementing gamification in e-learning activities. The model emphasizes the importance of analyzing the learning objectives, target audience, and learning environment to determine the most appropriate gamification elements. It also emphasizes the iterative nature of gamification design and development, which involves testing and optimizing gamified e-learning activities in response to learner feedback. The model is shown in graph 2.

Graph 2. Model for gamification in e-learning

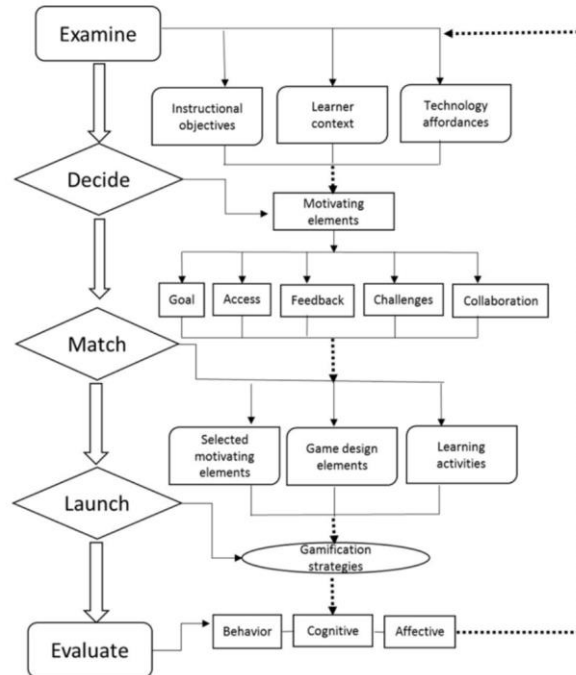


(Source: Uhr et al., 2015)

This model provides a framework for incorporating gamification into e-learning activities in order to increase learner motivation and engagement.

Huang & Hew (2018) propose a theory-based gamification model for flipped courses in higher education, which includes five stages: exploration, decision, connection, launch, and evaluation. The planning phase involves identifying the course objectives, target audience, and gamification elements based on relevant learning theories. The decision phase is related to the motivators that are part of the student learning process, while the connection phase makes a connection between them and the various components of gamification, such as points, badges and leaderboards, in order to improve motivation and engagement of students. The launch phase marks the application of the gamification strategies that have been designed in the previous steps. In the evaluation phase, the effectiveness of the gamified course is evaluated based on completion rates of out-of-class activities and the quality of student-produced artifacts. The authors find that the implementation of the gamification model has a positive impact on the rates of completion of activities outside of class, as well as the quality of completed tasks.

Graph 3. Five-step model for implementing gamification



(Source: Huang & Hew., 2018)

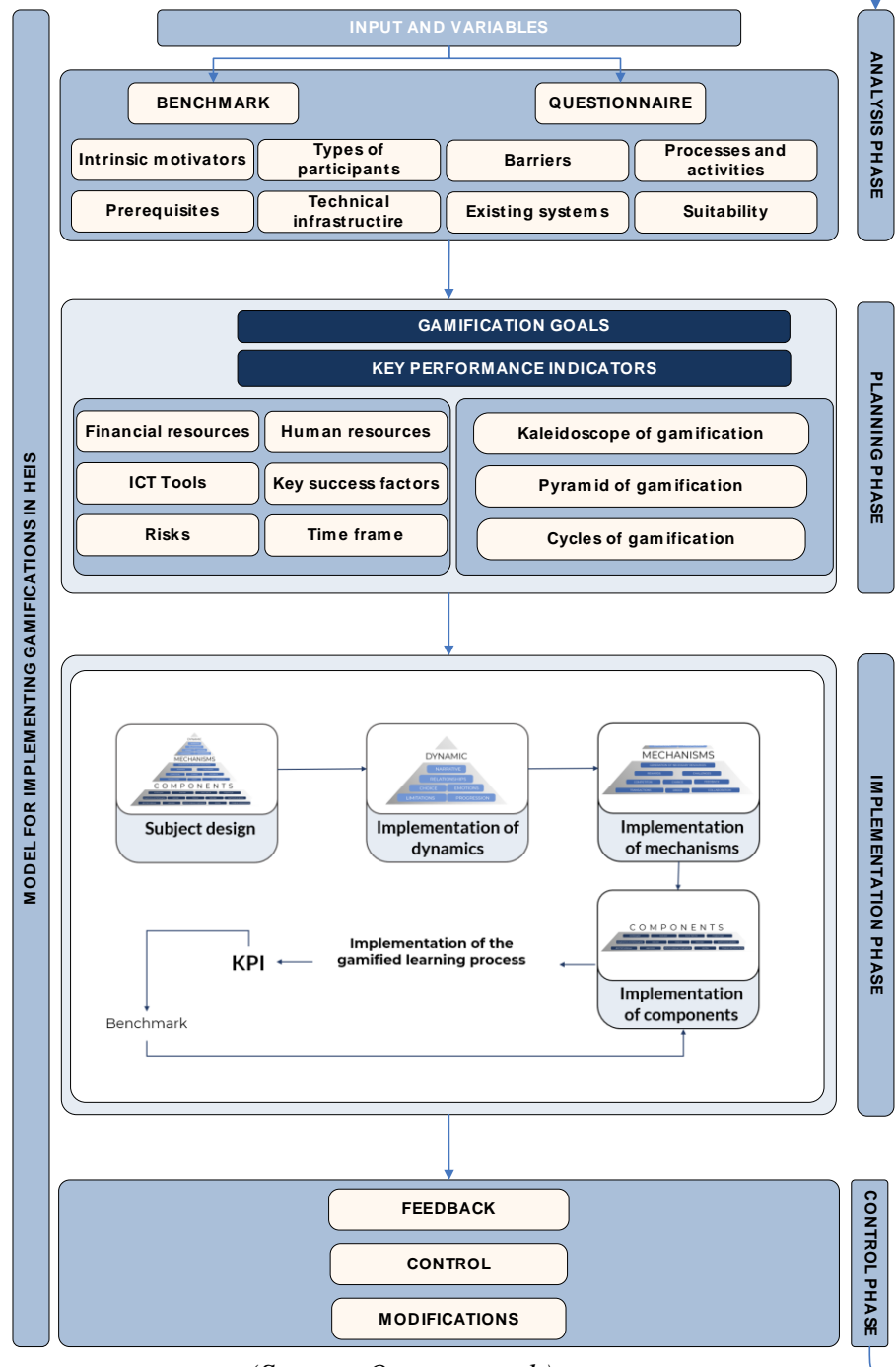
4. PROPOSED MODEL FOR GAMIFICATION IN HEIs

Based on the research from the scientific community, as well as the research in the previous chapters of this paper, on the next page a concept model for the implementation of gamification in higher education is proposed. The proposed model is based on three foundations:

- **Evolution of previous models** – researched models that are available in the literature represent a starting point for defining a new model. The purpose of the model is to overcome the potential limitations of the previous models from various aspects, starting from the analysis and planning, until the actual implementation of the model. The new model can be seen as an upgrade of the previous models, as a reference source for its design.
- **Setting a clear structure** – the existing models explored are chronological, but define a circular flow of activities, as well as potential points that can prompt a return through the steps of the model backwards. The idea behind the proposed model is to create a structure that is clear for implementation by administrative and IT staff in educational institutions, assuming that they use gamification for the first time in their educational environments. With this specific focus, all aspects of the model are designed to be understood and implemented by beginners in the gamification process.
- **Strategic focus and sustainability** – the stages that are part of the model are composed of strategic elements, which the institutions that will carry out the implementation should pay attention to in the process. Current models and implementations put a special focus on the operational level of gamification, but the components, platforms and technologies themselves are subject to change and technological evolution. In this case, the model could become obsolete in the short or

long term, forcing the upgrading or modification of certain parts before it can be used. With a strategic focus on the elements, the dependency at the operational level is eliminated and each phase defines aspects that will be significant in the implementation, regardless of the platform, technology or components that will be used.

Graph 4. Proposed model for implementing gamification in HEIs



(Source: Own research)

4.1 Analysis phase

The analysis phase represents the initial phase in the implementation of gamification. A large part of the implementations starts with planning, which can lead to improper design of the system because it is not properly personalized according to the needs and conditions of the institution, as well as the target participants. For this purpose, the model proposes the analysis phase as a separate step, which will direct the institution to collect the necessary data and information for correct decision-making and system design in the next phase.

The phase begins with gathering input and defining implementation-specific variables. Since each implementation is unique, the information required varies and depends on the following two elements that are required:

- **Benchmark** – defines the current performance of the institution in the educational process. It can refer to increasing interaction during classes, improving academic performance, participation outside of classes and other parameters. It is necessary for the institution to define the existing performance, in order to be able to assess the effectiveness of the implementation of gamification in the system.
- **Questionnaire** – by defining the necessary data for benchmarking the existing system, the institution creates a questionnaire that is shared with the target participants (students and/or teaching staff). The structure of the questionnaire depends on the information needed, thus recommending closed questions and a focus on quantitative performance indicators. The questionnaire serves as a basis for comparing the desired and obtained results in the last phase.

After conducting a benchmark and a questionnaire, the phase proposes 8 elements that need to be performed for a successful analysis of the implementation of gamification:

- **Intrinsic motivators** – the institution needs to select the appropriate internal motivators, including autonomy, skills, purpose, progress and social interaction (Ede, 2022). Through a focus on the appropriate motivators, it will be possible to properly plan gamified activities for their activation and a corresponding increase in student productivity. The institution can select one, more or all motivators, which changes the very complexity of the gamification model. It is not possible not to select an intrinsic motivator, because in that case the gamification would not be appropriate.
- **Types of participants** – the analysis phase defines the types of participants in the process. Through the selection of the appropriate types of participants, 10 components are defined in 3 categories – Achievements, socialization and degree of involvement. The institution can select one, more or all types of participants. It is not possible for any type of participant not to be selected.
- **Barriers** – refers to identifying the main barriers that appear during the implementation of gamification in education. Each barrier brings specific challenges, and an institution may identify one, more, or all barriers. Additionally, the institution may not identify any barriers to gamification implementation.
- **Processes and activities** – identification and selection of possible gamification activities. Since the number of activities is large, the focus should be directed to the three general elements of the study: in-class activities, out-of-class activities and learning material. Through the selection of appropriate activities, the institution can perform appropriate planning and design of the system.
- **Prerequisites** – refers to the prerequisites that must be met for the implementation of gamification. In an ideal scenario, all prerequisites will be fully met. In all other scenarios,

there will be partial or non-fulfillment of prerequisites. If none of the prerequisites are met, the appropriateness of the implementation is considered as a separate element in the analysis process.

- **Technical infrastructure** – includes an analysis of the existing technical infrastructure in the institution. The need for technical infrastructure elements varies depending on the requirements of each individual implementation.
- **Existing systems** – the integration of gamification is always in an existing system of education, with its own specific mechanisms and reward systems. It is necessary to make an analysis of the existing systems.
- **Suitability** – the analysis phase ends with an assessment of the suitability for the implementation of gamification. If part or all of the prerequisites are not met, the institution must make a decision on the appropriateness of the implementation

4.2 Planning phase

The next stage is the presentation of the planning, which is carried out based on the elements from the analysis stage. The phase is divided into four separate segments, in order to structure the initial activities and a kind of hierarchical flow of elements. The recommendation is to start with two elements in the model:

- **Goals of gamification** – according to the analysis made in the previous phase, it is necessary for the institution to determine appropriate goals that are expected to be achieved with the implementation of gamification. It is necessary for the institution to select one, more or all objectives for gamification.
- **Performance indicators** – closely related to the goals of gamification, that is, they are defined according to them. Each implementation of a gamified system in education is different, thus determining different goals and performance indicators. The institution needs to follow the rules for creating effective performance indicators, that is, they must be relevant, targeted, simple and measurable (Topal & Karaca, 2022).

In the next part the phase continues in two different directions. On one side is the definition of the necessary resources and elements, while on the other side the structure of the gamified system is defined. It is recommended to start planning the necessary elements for gamification in education, which include:

- **Financial resources** – for the implementation of a gamified system, it is necessary to analyze and plan the necessary financial resources that should be provided.
- **Human resources** – under human resources is meant all the employees of the institution who are needed for the effective implementation of gamification. Individual implementations vary in their needs, but generally support from teaching staff, administrative staff and the IT department is required.
- **ICT tools** – gamification planning includes the selection of appropriate ICT tools. It is necessary for the institution to determine the type of implementation of gamification (partial or full), and then to select the appropriate ICT tools and platforms.
- **Key success factors** – the key success factors should be based on the SAPS principle from Zicherman and Linder (2010), ie determination of activities that offer status, access, power and material things. It is necessary for the institution to include all key factors in the planning of the gamification system, with the aim of optimal design and further implementation.
- **Risks** – includes the identification of risks that could arise during the implementation of gamification.

- **Time frame** – is defined as part of the risks and strategies to minimize the risks. It is necessary for the institution to define the time frame for implementation, including the planning and implementation process.

The last part of the planning phase focuses on the design of the gamified system, through 3 separate segments:

- **Kaleidoscope of gamification** – system design starts with determining the four layers of gamification: motivated behavior layer, game experience layer, game design layer and incentive layer entertainment (Kappen & Nacke, 2013). Each of the layers has its own additional components that provide a clear overview of the institution for structuring the model.
- **Pyramid of gamification** – consists of three elements: dynamics, mechanisms and components (Van der Boer, 2015). The pyramid starts with determining the dynamics as an overall strategy of the system, then selecting the appropriate mechanisms and finally the components with which the participants will interact when using the system.
- **Cycles of gamification** – refers to the two cycles defined in the previous chapter: cycle of interest and cycle of progression. It is necessary for the institution to follow the rules set by these two cycles, in order to ensure that the model will be attractive to use for all participants in the long and short term.

4.3. Implementation phase

The third stage of the gamification model represents the implementation of the model in the learning process. The phase is structured as a process up to four main steps that are followed, as well as one additional step for the evaluation of the implementation, including:

- **Subject design** – the kaleidoscope and pyramid of gamification is determined in the previous planning phase. At this stage, it is necessary to connect the activities and existing methods of subject motivation with the selected gamified systems by the teaching staff. The goals that have been determined are transversal, that is, they can be implemented directly on the subject and act in a complementary way to the already existing goals that the students are aiming for. This step represents an important start for the implementation, as it lays the foundation for all future elements.
- **Implementation of dynamics** – refers to the implementation of the strategic elements of the system: narrative, connections, choice, emotions, limitations and progression. It is closely related to the previous phase, as it needs to support the selected goals and structure for designing the gamified object and activities.
- **Implementation of mechanisms** – includes activation of the mechanisms: provision of resources, rewards, challenges, competition, chance, feedback loop, transactions, order and cooperation. The mechanisms are the basis for the implementation of the components in the next phase.
- **Implementation of components** – the operational level of the implementation refers to the points of contact of the participants with the gamified system. It covers the components as: collections, badges, leaderboards, gifts, social interaction, missions, points, teams, virtual goods, achievements, avatars, content unlocks, combat and archenemies. The implementation of the selected components is supported by the appropriate ICT tools and platforms.

The model adds an additional step in the implementation itself, after the completion of the defined four main steps. After completing the initial implementation of the gamified system

in the learning process, it is necessary to make a reference and comparison with the defined performance indicators. This directly affects the process of implementation of components, that is, it gives the teaching staff real-time feedback for modifications of the components in order to optimize the implementation. The model introduces the benchmark at three levels – in the analysis phase, in the implementation phase and in the control phase. The goal is to separate control at the strategic level (analysis phase and control phase) and operational level (implementation phase). The operational level allows the teaching staff to be more flexible and agile in system modifications, because control at the strategic level refers to elements of the entire system, which define a longer time frame for implementation.

4.4. Control phase

The last stage of the gamification model represents control of the implemented gamified model in higher education. The control phase relies on three distinct elements:

- **Feedback** – defined in the phases of analysis and planning, means monitoring of the information received from the participants and administrators of the gamified system. The control phase assumes a two-way feedback loop, that is, from the participants to the instructors, but also from the instructors and the system to the participants themselves. This way of communication provides a basis for improving the system.
- **Control** – comparison of performance indicators with actual results after a certain time frame of system implementation. The benchmark defined in the analysis phase serves as a basis for comparing the results in this step of the final phase.
- **Modifications** – the feedback loop and the performed control result in the need for certain modifications to the system for its optimal operation. This step connects the control phase with the analysis phase, that is, there is a need to collect additional information about the necessary changes, then their planning and implementation.

The control phase completes the first cycle of implementation of a gamified system, with its completion providing significant information and activities for re-starting the modification process.

4. CONCLUSION

The basic structure of the model consists of four phases – analysis, planning, implementation and control. Compared to previous models, this represents a traditional approach from a project management perspective. The stages are carefully selected to be complementary with implementations from the wider business world, that is, to be easily understood by the designers of the gamification system in higher education. Through the traditional approach, these stages are well known to individuals and provide a clear overview of the elements that are part of them. Each of the stages is defined in detail in the next section.

Similar to any argument inside an academic context, this paradigm is not impervious to restrictions. The linear progression, although its intention to enhance clarity, may not adequately accommodate the frequently iterative nature of educational activities. In addition, the efficacy of the model is grounded on theoretical principles and would be enhanced by empirical confirmations in various educational settings and cultural environments. Subsequent investigations should endeavor to empirically evaluate the model across diverse educational contexts, encompassing both formal and informal settings, in order to ascertain its capacity for adaptation and effectiveness. Furthermore, it is necessary to conduct a critical evaluation of the model's ability to adapt to the evolving gamification technologies. With further refining and

adaption, it is expected that this model will function as a reliable tool for educators and institutions alike, who are aiming to use the potential of gamification in the field of higher education. Future research can focus in testing the model in various scenarios in HEIs across the region, with different independent variables such as country, age of students, field of study and others, to evaluate its efficiency in improving the learning process. Future revisions can be improved by gathering feedback from teaching and administrative staff, who are also involved in implementing the model.

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