Preface

Gaming is increasingly present in our society and everyday lives as a form of leisure, so we play in different contexts and situations to gain pleasant and single experiences for ourselves and others (Robson et al., 2015; Rapp, 2020; Hassan & Hamari, 2020). The gamification concept and its operationalization in non-gaming contexts have become a growing practice (Yang et al., 2017), with particular emphasis on education.

Gamification is considered a concept whose origin is associated with the digital industry, and its first use was in 2008; however, it has only started to be widely used in 2010 (Deterding et al., 2011; Huotari & Hamari, 2012; Rapp, 2020; Bai et al., 2020). According to the authors Deterding et al. (2011), the gamification is represented by a set of specific criteria, identified through the concepts: gamefulness – which means the quality of experience and behavior; gameful interaction – resources that provide a certain quality; and gameful design – design of the elements presents in the games. It is then possible to define gamification as "the use of game design elements in non-game contexts" (Deterding et al., 2011).

According to Huotari and Hamari (2012), gamification is based on "a process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation." The authors state that this definition highlights the aim of a gamified application or service, represented by the experiences it creates, not the methodologies used. This definition also stresses that gamification does not necessarily need to be successful and may only contribute to creating meaningful experiences for users, contributing to creating the same psychological experiences that games generally produce.

Hamari et al. (2014) complement that gamification is "a process of enhancing services with (motivational) affordances in order to invoke gameful experiences and further behavioral outcomes." It is further described in the literature that gamification represents a "process of applying elements of game design to a non-game context, where the interaction between the game mechanisms and personal disposition results in a fun and enjoyable experience" (Tobon et al., 2020).

Gamification uses numerous game elements to obtain a response or behavior from users within a specific context in which it is applied (Klock et al., 2020). Thus, one can consider that the process of designing gamified strategies is different from the design of a game structure, given that in gamification, the goal is to enhance the interaction of its users with a particular purpose or behavior, while in the gaming industry the aim is to create fun and entertainment for its players (Nasirzadeh & Fathian, 2020). According to Zainuddin et al. (2020), the gamification elements allow for an excellent way of learning because it enables a better orientation to individuals' objectives.

According to Xi and Hamari (2020), gamification represents one of the last decade's most significant technological tendencies, given organizations' interests. Gamification has slowly incorporated the new acceptance of executives in this area, so the value of the gamification market in 2016 was expected

to increase to $2.8 billion (Lucassen & Jansen, 2014), $5.5 billion in 2018 (Conaway & Garay, 2014) and $19.39 billion by 2023 (Xi & Hamari, 2019). However, Lucassen and Jansen (2014) state that the expected gamification concept adoption rate is not present in the literature despite the possibility of significant expected growth. This technological novelty is the basis for an innovative change in the any environment, and it is expected that until now, approximately 70% of the world's organizations seeking original methods will use gamification, according to Gartner's projections (2011) identified in the study of Hamid and Kuppusamy (2017).

Information systems enable learning and teaching to be successful for students. In this sense, gamification in the educational context draws on elements of game design to improve educational outcomes in order to make their activities and learning more engaging and enjoyable (Ofosu-Ampong, 2020). Several studies show that gamification is an innovative method of teaching and learning that encompasses various approaches, such as problem-based learning, design thinking, or competency-based learning, among others (Nadi-Ravandi & Batooli, 2022). The main purposes of gamification in education are to enhance learning ability, set goals that support learning, provide greater student engagement while enhancing their learning, induce positive behavioral changes, and foster their socialization skills (Smiderle et al., 2020).

This comprehensive and timely publication aims to be an essential reference source, building on existing literature in the field of gamification and education, while providing additional research opportunities in this dynamic and growing field. Thus, the book aims to reflect on this critical issue, increasing the understanding of the importance of the topics, and providing relevant academic work, empirical research findings, and an overview of this relevant field of study. It is hoped that this book will provide the resources necessary for academicians, interdisciplinary researchers, advanced-level students, technology developers, managers, and government officials to adopt and implement solutions for a more digital world. The book comprises 33 chapters, where every chapter explains different applications of gamification from an educational view.

The first chapter, "The Place of Gamification in the Educational Context," researches and analyzes new opportunities that modern information and communication technologies open up in education and lifelong learning. It also uncovers what place gamification in schooling holds, how it affects people, and what students take away from the progressive idea. Thus, it recognizes the possibilities and limits of its implementation in the education process. This chapter aims to inspire educators and designers in building gamified learning contexts.

Over the last decade, we have seen a large amount of research performed on technology. In Chapter 2, "A Bibliometrics and Text Analytics Review of Games and Gamification in Education," the authors aim to identify the main topics in these areas within the last ten years. The analysis in this work has focused on three main objectives: 1) Discover the main topics in games and gamification in education based on paper keywords and topic modeling; 2) Discover the evolution of said topics over the last ten years of research; and 3) Discover how papers and authors from different communities have interacted over the years from a network's perspective.

The next chapter, "Gamification in Healthcare Education: Demystifying a Trend," calls for reflection on one of the most promising technologies in healthcare education, the use of virtual patients and clinical virtual simulation as a pedagogical strategy to improve clinical decision-making and enhance clinical safety and healthcare quality. The chapter discusses the new challenges in healthcare education and the use of clinical virtual simulation in undergraduate healthcare education and lifelong learning, integrating gamification and serious games as strategies to increase intrinsic and extrinsic students' motivation.

"Gamification in Higher Education: Analysis of Your Strengths and Weaknesses" addresses the elements to consider for creating a gamified learning environment in Higher Education, specifically in the University classroom. It investigates various didactic proposals for gamification at the University by different authors in recent years, the variables they have addressed in their study, how they have been evaluated, and the most relevant findings.

The chapter "Gamified Learning Effectiveness Model" aims to evaluate the impact of online gamified learning among undergraduate medical students. The study developed a hypothetic model to investigate the effects of game characteristics, learning climate, and learners' self-efficacy on medical students' motivation, engagement, and improved learning process. Structural equation modeling examined the causal relationships between the observed and latent variables. The findings generated in this study indicate those game elements can positively influence students' performance and learning achievement through motivation and engagement.

Chapter 6, "The Efficacy of Gamification for the Involvement of Students in Distance Education," presents quantitative research that analyzes gamification's effectiveness in the distance learning undergraduate mathematics course. The research data suggest that gamification promoted students' engagement with learning. It is concluded that the categories presented in the study indicate that students perceive gamification as an alternative to create more dynamic classes and promote learning.

The following chapter, "The Game Pentade: A Design Model Proposal for Games for Education," considers the design of Games for Education, where players cultivate their knowledge and practice their skills by multiplying numerous hindrances during gaming. Educational elements are integrated into the gameplay, which players acquire while playing. The game's effectiveness depends on the players' ability to form a cheerful and encouraging environment to continue playing while increasing their interest in gameplay and improving academic performance.

"The Rise of Educational Escape Rooms: Designing Games as Formative Tasks" is the title of Chapter 8, highlighting the rise of escape rooms as a worldwide extended leisure activity is a reality. Such success has been achieved briefly and has motivated its use as a formative tool at various academic levels. Some authors have reported successful use of educational escape rooms in multiple topics. This chapter aims to provide background, information, case reports, and guidelines for using educational escape in various curricular disciplines.

Chapter 9, "Converting Course Material to Educational Escape Room Formats," considers that game-based learning and gamification concepts are growing as educators look to engage, motivate and create memorable learning experiences for their students. In this chapter, the authors provide a primer to bring teachers and academics up to date on developing educational escape rooms for their classrooms.

The escape rooms and breakouts are immersive games in which the participants are locked in a room and must solve a series of puzzles to escape. In virtuality, these games have also aroused interest in the educational field as a learning tool to transform students from passive spectators to active participants. Immersive learning allows students to learn about a topic while practicing teamwork and communication. In this context, the chapter "Escape Rooms and Breakouts: Novel Educational Strategies" aims to explain how these tools work and describe the implementation process using digital educational resources available on the Web.

"Development of Computer Games by Students," Chapter 11, describes practical tasks related to developing computer games in students' education. Game development uses modern platforms that provide ample opportunities. Students create 3D models, write scripts, and research interaction prin-

ciples between different applications. Such tasks will help protect the younger generation from misuse of computer games, improve programming and modeling skills, and develop spatial thinking and creativity.

The next chapter, "Creation of Distance Communication Channel With Gamification Elements," investigates the ways of a distance communication channel with gamification elements created in the electronic educational environment of maritime higher education institutions. The example of the gamified educational electronic environment on LMS MOODLE is presented in the chapter. The chapter also gives examples of gamified activities on LMS MOODLE to form communicative competency of future maritime professionals.

"Games and Gamification in Sustainability Learning: A Peer-Based Approach for Thai Design Education" explores the intricate socio-political-cultural factors affecting Thai design students' learning and examines the potential of games and gamification in sustainability learning as an unconventional design pedagogical approach in Thai higher education. This chapter's heart is an extensive participatory action research case study from the Sustainable Design course of two universities in Bangkok. The project allows students to learn from game design to raise awareness of sustainability-related issues and use the games to enhance their sustainability learning through peer interactions.

Chapter 14, "Gamification 101: An Exploration of a Gamified Instructional Approach," explores gamification implementation as an alternative pedagogical method and examines various elements of a gamified class structure at the university level. Other key features discussed in this exploration include the design and evaluation of course assignments, the use of locks on assignments, and the relevance of competition within gamified courses.

The following chapter, "Gamification in the Space Sector: How Gamification Activities Can Foster the Passion and Interest for STEM-Related Studies," discusses how the gamification approach is used within the space sector to develop online and offline resources to foster passion and interest in STEM-related subjects. The chapter also focuses on how gamification activities may promote the company's corporate brand for NASA and the European Space Agency and the digital divide, which might limit the gamification methodology in approaching disadvantaged socio-economic countries.

"Interdisciplinary Communication: Paving the Way for Gamification in Entrepreneurship Education – A Case Study From a Medium-Sized UK University" is the title of Chapter 16. This chapter presents a collaborative autoethnography study whereby two academics at a medium-sized UK university explore their experiences teaching entrepreneurship in different business and law school departments to combine expertise and resources to develop interdisciplinary gamification solutions. The chapter concludes that critical factors limiting developments in interdisciplinary entrepreneurship games include a lack of focus on entrepreneurial skills in departments within HEIs other than business schools and a lack of cross-departmental communication and collaboration.

Chapter 17, "Science Fair Project in the Teacher Training Process: Its Emotional Response and Implications," describes a Star Wars scientific gamification experience, presented as a gymkhana with seven different activities to be carried out in the classroom. This proposal was designed to be done with prospective primary teachers during their science training studies. Future teachers have to observe, explore, experiment, and describe the different physical and chemical phenomena involved.

The next chapter, "The Use of an Educational Digital Game in Higher Education: Design and Application to Increase the Motivation in Calculus Learning," presents gamification in higher education to engage and motivate students in Calculus. This course traditionally offers high failure and dropout rates. The main goal is to report an experience developing an RPG-style educational digital game to be used and tested in part of the course during one semester. The project applied concepts of gamifica-

tion, educational digital games, digital game-based learning, and the theory of meaningful learning as a theoretical basis for the formulation of the game.

"The Role of Gameful Elements, Bodily Interactions, and Musical Features in Fostering Engagement and Learning in Musical Serious Games" explores the connections between gameful elements, bodily interactions, and musical features in the context of three case studies of music learning applications, demonstrating the role of these components in accomplishing the application's task. The critical essential element common to the three case studies is engagement due to gameful elements and other design characteristics such as the choice of music materials and the link between their structural elements and full-body/gestural interaction.

Chapter 20, "Commercium and Cognitionis Project: A Gamification Experience in an Undergraduate Course," presents the Commercium and Cognitionis project, which aligns technology and playfulness, implementing DICTs and gamiðcation as pedagogical tools that value didactic content and engagement, combining competition and collaboration in the search for knowledge to solve the proposed challenges. The proposal is aligned with the insertion of urban youth into a highly imagetic and technological contemporary culture.

Digital game-based learning (DGBL) is a novel methodology implemented in many educational virtual settings to improve students' attention, motivation, and engagement while learning. The chapter "Educational Opportunities of Virtual Game-based Initiatives for Students with Disabilities" aims to provide insight into how game-based methods can enhance students' learning process with sensory, intellectual, and learning disabilities. Specifically, this chapter's key is to assess the possibilities offered by introducing DGBL in educational contexts from a theoretical perspective.

The following chapter, "Flow, Motivation, Social Interaction, and Design Issues of Serious Games in Education," discusses the flow, motivation, social interaction, and design issues in serious games in education from a theoretical perspective. Serious games in education aim to improve students' skills or provide them with knowledge while entertaining. The serious game design process and its challenges help create serious games that meet students' needs and expectations.

Chapter 23, "Gamification Framework Understanding the Critical Success Factors for Using Gamification as a Pedagogical Tool," attempts to sort out the requirement for Game-Based Learning as a creative educating approach. Game-based learning is where game features and principles are implanted within learning activities. Game-based learning is also an effective learning technique in which games boost student learning. For educators, it creates original thoughts and ways to deal with the teaching-learning process, allowing instructors to learn new methodologies lined up with research on how students learn.

"Gamification to Engage Students: Integrating the Use of Discord Chat App" describes a case study of the gamification of an educational technology graduate course at the University of Hawaii. The chapter provides some background literature about chat apps, chat apps in education, and gamification. Next, the chapter discusses how gamification design elements, framed by the curricula, were implemented in the Discord chat app server using roles, bots, and participation-based experience points. Finally, the chapter discusses the benefits, challenges, and lessons from incorporating gamification in the Discord server for a graduate online asynchronous course.

The following chapter, "Gamified Learning in Higher Education: An Instructional Design Method to Improve Engagement," highlights that Gamification and Design Thinking can be considered part of Instructional Design (ID) in the Higher Education (HE) context. Each of these fields has much to learn from the others. Furthermore, ID and Gamified Learning share limitations, notably a lack of reflection and empathy/ systems approach in the processes used, that can be remedied by borrowing from Design

Thinking. In the context of HE, it is appropriate to frame that empathy as student engagement to draw on the literature base.

Software project management is a multitask process that involves planning, organizing, monitoring, and controlling. Scrum is an agile project management method based on self-organized teams; that is, the team members, although guided by a product owner and the Scrum master, evaluate the project's tasks and decide who will take care of them and the schedule. The chapter "Scrumming: Gamifying a Dashboard for Undergraduate Students' Motivation" highlights that in academia, the Scrum method might not work as expected in a professional environment because of commitment to the team members. Therefore, the principal results indicate that the teams under a gamified project tend to complete the project.

In the chapter "Understanding the Challenges of Game-Based Training: Recommendations for Moving Research Forward in Games-Based Learning," reviewing and aggregating the literature describes five challenges currently facing the area of game-based learning, the authors offer recommendations as to what future research could do to resolve these challenges moving forward. The primary purpose of this chapter is to provide a stepping stone in the game-based learning literature to help move the field away from conflicting research findings and toward a clearer understanding of game-based learning as an educational solution across disciplines.

Chapter 28, "Solving a Crime in the Geology Lab: A Gamification Lesson Plan to Get Familiar With Common Rocks and Minerals," shows an innovative and manipulative activity to learn about rocks and minerals using gamification and problem-based learning. This was designed to be carried out with Primary School prospective teachers during their training studies but can also be applied in either, Primary or Secondary education levels.

The next chapter, "Entrepreneurial Competences Development Through Game Strategies: A Case Study of a Card Game Focused on Social Transformation With Health Students," discusses a Higher Education experience using an online tailor-made card game to develop entrepreneurial competencies within health students on an online course. The project counted 892 participants from 12 different health majors. The research is qualitative exploratory, based on a case study with a non-probabilistic sampling. The findings indicate the implemented strategies greatly enhanced the student's engagement and co-responsibility in their learning processes, along with the expansion of interaction and experimentation.

"Fostering Motivation to Learn Through Gamification: Understanding the Impact of Different Kinds of Rewards on Learner Motivation" aims to provide teachers with more guidance in the gamification design process, especially concerning the difficult task of planning a motivating reward system. To do so, the authors conducted a qualitative study of the gamified learning app Duolingo. The study focused on understanding how users respond to the different kinds of rewards the app provides and how rewards affect their motivation to learn by fulfilling their need for competence, relatedness, and autonomy, in the framework of Self-Determination Theory.

Chapter 31, "Gamifying the Refugee Classroom: Challenges and Potential," presents the design, implementation, and evaluation of a theory-driven educational scenario for students with a refugee background based on Gamification to support learning Greek as a Second Language. The scenario was implemented in an Educational Priority Zone (ZEP) classroom of a Greek primary school with eight refugee students aged 9 to 11 with a diverse linguistic background. The findings indicate that the game elements significantly impacted engagements were competition and collaboration and some immersion-related features like storytelling, which increased autonomy.

"Increasing Engagement Through Explicit and Implicit Gamification in Higher Education" provides specific definitions of these terms and acknowledges that such attempts to increase engagement often

offer an additional layer of extrinsic motivators. The authors propose that this can lead to unexpected and undesirable effects if extrinsic motivators are not well aligned to the desired behavior. This chapter presents a taxonomy of engagement strategies regarding their implicit and explicit game attributes and their implicit and explicit teaching attributes.

The last chapter, "Merging Tangibles and Gamification to Teach Algorithmic Thinking to KG Children With Gamirithmic," presents the design, implementation, and evaluation of a new technique to improve children's algorithmic thinking skills that enable solving problems following clearly defined steps. Gamirithmic teaches children to codify ideas by coming up with solutions to problems in systematic and structured ways via its step-by-step procedure with the increasing complexity of commands in each step. Gamirithmic teaches technology-related concepts using a technology-independent medium that is less likely to induce behavioral problems associated with screen-based methods.

We hope that this book provides an enjoyable reading experience.

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